Sudan University of Science & Technology

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Integration's Effect of Target Costing and Value Engineering on Manufacturing Firms' Performance: Moderating Role of Competitive Strategy

أثر تكامل التكلفة المستهدفة و هندسة القيمة على أداء المنشآت الصناعية

الدور المعدل للإستراتيجية التنافسية

Thesis Submitted for the Award of the Degree of Doctor of Philosophy in Cost and Management Accounting

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بِسْمِ اللَّهِ الرَّحْمَٰنِ الرَّحِيمِ

قَالَ تَعَالَىٰ:

﴿ ...نَرْفَعُ دَرَجَٰتٍ مَّن نَّشَآءُ ۗ وَفَوْقَ كُلِّ ذِى عِلْمٍ عَلِيمٌ ﴿٧٦﴾ ﴾

صدق الله العظيم

سورة يوسف – اية 76

In the name of Allah, Most Gracious, Most Merciful

"We raise to degrees (of wisdom) whom we please: but over all endued with knowledge is one, the All-Knowing"

The Holy Quran, Surah Yusuf [Joseph], Verse 76.

DEDICATION

I dedicate this research work To my mother for her dedication, unconditional love and support. May God continue bless her……..and to the spirit of my father

Acknowledgment

Special thanks to God for the diverse blessings especially of life, strength, patience and health to do this work. I am thankful to Sudan University of sciences & Technology. I am especially thankful for the mentorship of my ***supervisor Dr Babiker Ibrahim Elsiddig…*** *. I am also extremely thankful for the wonderful guidance and support of the faculty and staff of Business Studies at Sudan University of sciences & Technology I am thankful also to all my friends their help, support and encouragement*

ABSTRACT

To provide a better understanding of modern strategies for cost management and use of contemporary costing techniques in a developing country, the current study aimed to examine effect of integration between the Target Costing and Value Engineering techniques and the role of competitive strategy, to enhance performance of Sudanese manufacturing firms .The researcher constructed the study hypotheses depending on the previous studies, and the contingency theory. The descriptive analytical approach was adopted in this study. The main tool of the study was a questionnaire it was used to collect data from the sample of (165) employees of the senior management of these companies, (73.9%) of the total distributed questionnaires were collected and analyzed using statistics' software package (SPSS) to identify the common factors that explain the variation in study variables and to validate measures of the study variables. And statistical software (Amos) to explore the relationships among the study variables. The results of the study indicated that integration of Target costing and value engineering is found to be significant in relation to operational performance**.** However Sudanese manufacturing firms cannot achieve financial performance from such integration the positive role of applying value engineering to the operational performance of manufacturing firm has been revealed through the moderating role of the comparative strategy.

The study recommends the managers should pay more attention to dimensions related to integration of target costing and value engineering that have achieved excellence for their firms. In addition, manufacturing firms should be more proactive to improve financial performance by thinking of scale, employment, efficiency and leverage.

مستخلص الدراسة

من أجل فهم أفضل للاستراتيجيات الحديثة لإدارة التكاليف واستخدام تقنيات التكلفة المعاصرة في بلد نام، هدفت الدراسة الحالية إلى دراسة تأثير التكامل بين تقنيات التكلفة المستهدفة وهندسة القيمة ودور الإستراتيجية التنافسية، لأجل تعزيز أداء شركات التصنيع السودانية. ولقد تم بناء نموذج الدراسة وفرضياتها اعتماداً على الأدبيات السابقة و كذلك النظرية الشرطية ، ، تم اعتماد المنهج التحليلي الوصفي في هذه الدراسة. واستخدمت الاستبانة كأداة رئيسية لجمع البيانات من عينة الدراسة البالغة (165) مفردة من العاملين في الإدارة العليا في تلك الشركات، ولقد بلغت نسبة الاستبانات المستردة والصالحة للتحليل (73.9٪) من عينة الدراسة وتم تحليلها باستخدام مجموعة البرامج الإحصائية (SPSS) لتحديد العوامل المشتركة التي تفسر التباين في متغيرات الدراسة والتحقق من صحة مقاييس متغيرات الدراسة. و البرنامج الإحصائي (AMOS) لاستكشاف العلاقات بين متغيرات الدراسة. وتشير نتائج هذه الدراسة إلى وجود علاقة ارتباط معنوية موجبة بين تكامل تقنيتي التكلفة المستهدفة وهندسة القيمة والأداء التشغيلي إلا أن شركات التصنيع السودانية لا تستطيع تحقيق الأداء المالي من هذا التكامل .كما تشير أيضا للأثر الايجابي لتطبيق هندسة القيمة على الأداء التشغيلي للمنشات الصناعية من خلال الدور المعدل للإستراتيجية التنافسية. وتوصي الدراسة بأنه يجب أن يولي المديرون مزيدا من الاهتمام للأبعاد المتعلقة بتكامل تقنيتي التكلفة المستهدفة وهندسة القيمة التي تحقق التميز لشركاتهم. بالإضافة إلى ذلك، ينبغي لشركات التصنيع أن تكون أكثر استباقية لتحسين الأداء المالي من خلال تكريس مفاهيم اقتصاديات الحجم و التوظيف و الكفاءة و الرفع المالي.

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List of Abbreviations

GDP	Gross domestic product
TC	Target Costing
VE	Value Engineering
CS	Competitive Strategy
FP	Firm Performance
AMOS	Analysis of a moment structures
EFA	Exploratory factor analysis
CFA	Confirmatory factor analysis

CHAPTER ONE

Introduction

1.1 Research Motivations

The rapid developments in the modern production environment, increased local and International competition, and the speed of technological progress, the diversity of customer needs, and the short product life cycle, Showed inadequate of traditional cost management systems to cope with these developments, and, it was observed through literature that the traditional cost management systems are not suitable in the trends and changes in the current business environment.

To achieve Competitiveness and to ensure high performance, firms need to emphasis particular strategic priorities and contemporary costing techniques Thus, some management accounting authors (Dent, 1990, Simons, 1995) made a claim about the importance of the use and design of cost management systems to support managers in implementing organizational strategies.

To survive in this environment, it is necessary for firms to, restructure their management and cost management systems. It is believed that the firms must pay more attention to the concerns of all other legitimate stakeholders. Additionally, they should link their strategies to quality improvement, and, production costs. Moreover, higher quality, better delivery, increased flexibility and diversity of products are required. So extensive development is needed. Firms have been forced to become involved in team efforts in order to increase responsiveness to customers, adopt new structures, contemporary management techniques and advanced manufacturing technologies in order to respond to changes (Nixon and Burns, 2005; Waldron, 2007).

As a result, a variety of contemporary costing techniques have been developed since the 1990s (Kaplan,1984) reviewed the accounting evolution of management accounting, and(Johnson and Kaplan, 1987) criticized the management accounting practices during the 1980s thus

many contemporary costing techniques such as target costing and value engineering have been developed as a solution to, lead to better firms performance, and to provide better decision-making and cost reductions during different stages of product life cycle that leads to the creation of greater value for the consumer; because adding extra value to the final product is considered as strategic goal which is achieved through integration of the activities during the product life cycle starting from the product design stage and even after-sales service.(Cooper and Slagmulder 1997 Ansari, et al 1997, Ansari, et al, 2007) describe target costing as a feed-forward cost management technique rather than the traditional feed-back techniques used to manage product cost during the design and development stage. Therefore, target costing is mainly initiated as a cost management technique basically to manage product features; cost, quality, and functionality; at the earlier stages of products life cycles based on the customers' expectation and competitive market. And value engineering is Powerful problem-solving tool that can reduce costs while maintaining or improving performance and quality requirements (Smith, et al, 2002).

Researches results of management accounting literature have explored that the adoption of contemporary management accounting techniques and their perceived benefits are lower than researchers' expectations while some traditional ones retain their importance in the majority of firms in many countries (EI-Ebaishi et al., 2003; Phadoongsitthi,2003; Sulaiman et al., 2004). However, the contemporary management accounting techniques considered as key to better performance for firms.

Based on contingency theory of management accounting system is hypothesized that there is no unique appropriate accounting system which applies equally to all organizations in all circumstances. Is dependent on the specific circumstances of the organization, indeed, it is developed

responding to a set of contingency factors (Otley, 1980).the concept of contingency theory assumes that organizational performance can be enhanced through the fit between organizational characteristics and contingencies reflecting from the organizational position (Donaldson, 2001). According to literature, many contingency factors have been examined such as strategy, environment, technology, organizational structure, size, and culture (Chenhall, 2003).This suggests a positive relationship between contemporary management accounting techniques and organizational factors.

1.2 Statement of the Problem

The present research examines in detail the role of target costing and value engineering in manufacturing firms in Sudan, a country that has been struggling with soaring inflation and depreciation of Sudanese pounds since South Sudan's secession Sudan has struggled to maintain economic stability and attempting to generate new sources of revenues, such as from gold mining, while carrying out an austerity program to reduce expenditures. Agricultural production continues contributes to GDP. Despite of all Sudan economy moves towards a market economy by attracting and encouraging foreign investments, this new position may affect managerial needs and required new management accounting techniques .

The British and American accounting education systems and the practices of the private sectors have had the influence on the current accounting education system and accounting practices in Sudan. The management accounting systems of the firms provide adequate information to help managers to take the right decisions. Although, some studies claim that traditional management accounting techniques are still widely used and perceived to be very beneficial(Jaruga and Ho, 2002), nonetheless contemporary management accounting techniques may be

required for firms to be able to meet the challenges and the changes in business environment.

However, contemporary techniques are not much known in Sudanese's firms. Therefore this research seeks to give a more encompassing perspective of target costing and value engineering examining their effects in relation to competitive strategy affecting organizational performance, a better duct for this type of research is (Otley,2008).

There is a lack of knowledge in usage of contemporary management accounting techniques, especially in developing countries (Hopper et al., 2008). Thus, this research attempts to explore the adoption of Target costing and Value Engineering as contemporary techniques and perceived benefit of their Integration as well as their relationships with contingency factors affecting organizational performance in a developing country, particularly Sudan to achieving success in competitors' capabilities, and coping with the growing dynamics of the competitive environments in which Sudanese manufacturing firms operate.

The contingency factor adopted for this research, is competitive strategy that contain cost leadership, differentiation and Porter (1980). During the researcher literature review no previous published research has been undertaken of this strategy variable regarding of target costing and value engineering .There has been limited research explicitly using contingency factors in management accounting (Chenhall and Langfield-Smith (1998).

1.3 Research Rationale and significant

A-The theoretical Significant comes from: Managerial needs comprehensive and integrated techniques and the costs associated with them to be able to run in a way that lead to raising performance. There are many studies on modern strategies for cost management.

Relevant researches (Hussein, 2015; Juhmani, 2010; Rehab, 2011; Amel, 2011; Aljanabi,2011; Aliakbar**,** 2011) revealed the Adoption and benefits of target costing in manufacturing companies.

Researchers have noted a link should exist between a firm's target costing and competitive strategy (Ansari and Bell, 1997). A number of studies have highlighted this relationship. For instance, (Nour Aldeen et al., 2014; Lawrence & Sanusi , 2014; Adeniyi ,*2014*; Naje 2010; R. A. Sabir et al,2011) have revealed a strong relationship between target costing and competitive advantage in the manufacturing industry.**(P.** Pimpanont **&** Chutima**.**2016**;** Chougule &.Kallurkar Panditra, 2014**)** have stressed that Value Engineering (VE)-based methodology for product cost reduction in the manufacturing process. Moreover Value Engineering can help to reduce the cost without affecting the quality of the product Amit et al (,2012). value engineering relates closely to target costing as it is cost avoidance or cost reduction before production **(**Jariri_ and. Zegordi, 2008; K. G. Durga et al,2014; Mjdy, 2014; Azad et al,2014;**) .**

Although many contingent variables have been examined in the management accounting literature, only few of them were found to be relatively popular, e.g technology, and competitive strategy (Chenhall, 2007). Thus, more inclusive effort is needed. With respect to competitive strategy, this study has adopted two dimensions cost-leadership, and differentiation of Porter's (1980) typology of generic competitive strategies (i.e. cost-leadership, differentiation and focus). Which is not significantly different from other competitive strategy typologies such as those developed by Miles and Snow (1978) and Gupta and Govindarajan (1984), it is the most present in recent relevant literature on strategy. But still there is a lack of theoretical frameworks.

Thus the Significant of this study stems of being highlights of target costing as an appropriate technique to the cost-reduction, and Value engineering technique as a scientific method oriented towards functional analysis, which aims to improve the product, thing which supports and enhances performance.

B- The Practical Significant

As management accounting is part of organizational control systems and an important information source**.** Hence, in the light of relevant literature, the present study focuses on one-variable contingency model(see Figure (1/6/1**)**) and seeks to address the integration of the target costing and value engineering as necessary techniques enabling the Sudanese manufacturing firms to face the challenges of competition In light of changes created by the new economic environment.

1.4 Research Aim, Objectives and Questions

1.4.1 Research Aim and Objectives

This study aims to examine effect of integration between the Target Cost and Value Engineering techniques and role of competitive strategy, from a contingency theory perspective, to enhance performance in manufacturing firms in Sudan.

To meet the above aim, the following objectives are set for this research:

1. To Highlight the effect of integration and interdependence between the target costing and value engineering on the performance of manufacturing firms.
2. To Explore the moderation role of competitive strategy on Firms' performance according to target costing and value engineering

1.4.2 Research Questions

To achieve the above objectives, this study attempts to answer the following research questions:

1. Do the Integration of Target Costing and Value Engineering affect the firms' performance?
2. Does the competitive strategy as a moderator variable affect Firms' performance according to target costing and value engineering?

1.5 Research hypotheses

Based on the review of the available relevant literature of TC, VE and Competitive Strategy (see section1.9 and Chapter 2), the research objectives and questions, tow main hypotheses have been formulated for this study as followings:

- **Effect of Target Costing and value engineering on Firm Performance**

Target costing enhance the firm performance in several aspects, there is a significant difference between performance of firms using target costing and those do not use target costing, this difference suggests that higher achievement of target costs is usually associated with higher firm performance(Juhmani , 2010).Application of the target costing system provides accurate information to meet the desires of consumers have a high ability to compare products in terms of quality and price which leads to higher firm performance (Rehab,2011). (Johns,,2017) suggests that higher achievement of Value Engineering is usually associated with higher firm performance. Value Engineering provide the owner with optimum performance at the lowest possible cost (Peter,2016). Ugo and Carlos (2006) suggests VE and TC are complementary processes, because while one allows the identification of where cost reduction could be achieved, the other shows the target to be achieved to guarantee the long-term profitability plan of a company. Ugo and Kaminski(2007) found that Value Engineering and target-costing

improved product cost, functionality and quality accomplishment, in accordance with customer needs and the company strategy

Therefore, the first set of hypotheses is formulated:

H1*.Integration of Target Costing and Value Engineering has significant effect on the firms' performance.*

This Hypothesis breakdown into followings:

H1a*. Integration of Target Costing and Value Engineering has significant effect on the financial performance*

H1b*. Integration of Target Costing and Value Engineering has significant effect on the operational performance*

- **The Moderating affect of Competitive strategy**

According to contingency theory, the effect of organizational practices on firm performance is conditioned by the organization's strategic position. The performance effects of organizational practices, are contingent on the strategy (Ketokivi and Schroeder, 2004). Thus, organizations can achieve competitive strategy through cost reduction by using a cost leadership strategy and differentiation strategy through "quality" but not the cost minimization (Porter, 1980). Appositive relationship between the competition benefits and implementing of target costing was supported by the literature (e.g., Ansari and Bell, 1997; Ellram, 2002; Dekker and Smidt, 2003). Hibbets et al. (2003) draw on Porter's (1980) five-forces model when arguing that intense competition creates a need for target costing, and apositive relationship between the competition benefits and implementing of Value Engineering also was supported by the literature. Value Engineering comes with a host of other related advantages like risk reduction, time management, better schedule, improved quality(Allen ,2015).Therefore, this research assumes that the contingent view is also suited to the performance effects of target costing and Value Engineering. Additionally according to studies, of Nayyar (1993), Ward and Duray

(2000) and Miller(1988) Indices of cost leadership and differentiation are more used for measurement of competitive strategy. Therefore, second set of hypotheses is formulated:

H2 *Competitive strategy moderates the effect of target costing and value engineering on manufacturing firms' performance.*

More formally stated as follows:

H2a *Cost leadership strengths the relationship between target cost and financial performance*

H2b *Cost leadership strengths the relationship between value engineering and financial performance*

H2c *Cost leadership strengths the relationship between target costing and operational performance*

H2e Cost leadership strengths the relationship between value engineering and operational performance

H2f Differentiation strengths the relationship between target *costing and financial performance*

H2d *Differentiation strengths the relationship between value engineering and financial performance*

H2m *Differentiation strengths the relationship between target costing and operational performance*

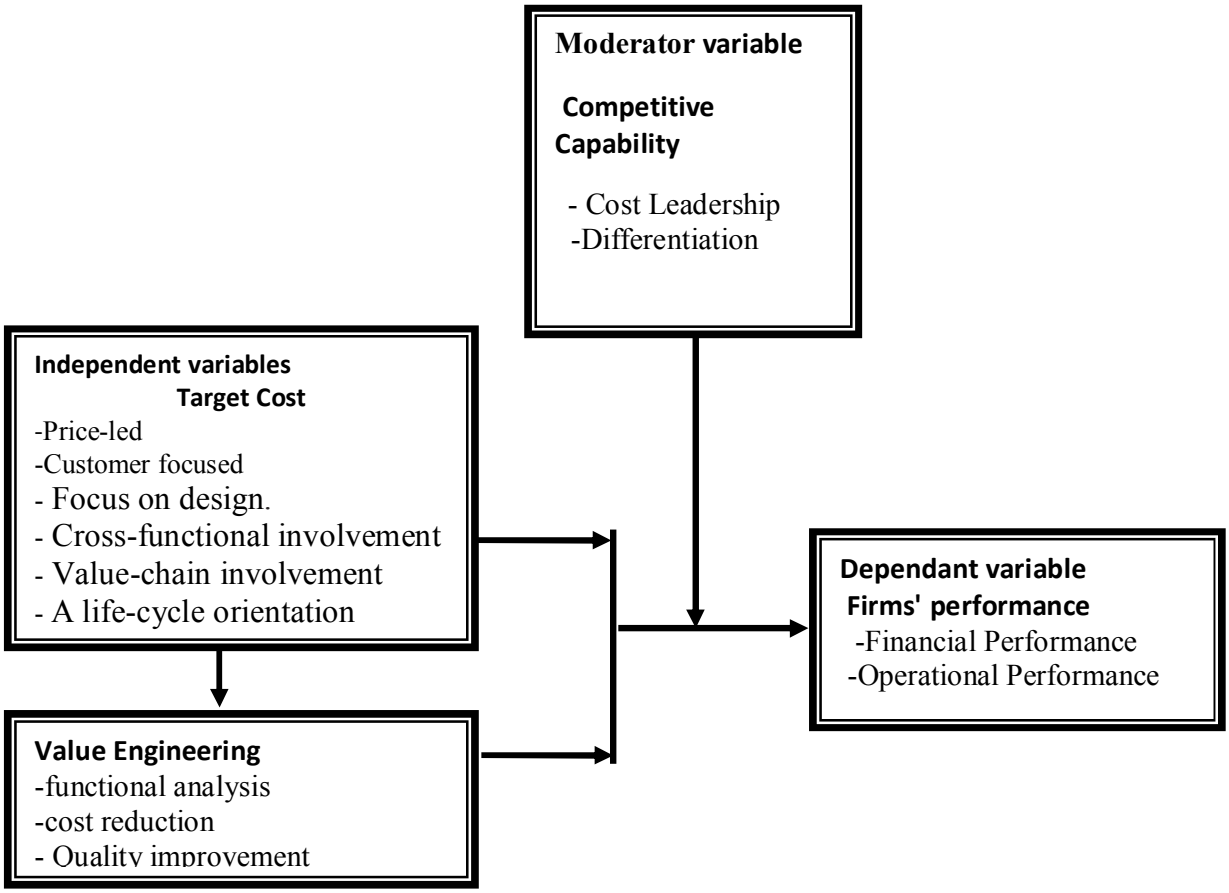
H2n *Differentiation strengths the relationship between value engineering and operational performance*

1.6 Research Model

As can be seen from Figure 1.1below competitive strategy is expected to play a moderating role on the association between firm performance and the target costing and value engineering. This level is concerned with the Interaction fit approach that related to Contingency theory**.**(Lawrence and Lorsch, 1967; Thompson, 1967) argues that no theory or method can be applied in all instances, that means there is no

one best way to design an organization (Scott and Cole, 2000). The environment that an organization operates within shapes its processes and structures this suggests that organizations should match their structures and processes to their environment, in order to maximize performance (Lawrence and Lorsch, 1967; Galbraith, 1973) suggest that an organization performs depends on the alignment between strategy and performance. This alignment between strategy and performance is described as ‘‘fit’’ in the strategic management literature (Venkatraman and Prescott, 1990; Milgrom and Roberts, 1995). Applied to target costing and value engineering**,** structural contingency theory suggests that the individual dimensions of target costing and value engineering should be aligned, in order to achieve the best performance.

Figure (1/6/1) Research Model



Source: the researcher

1.7 Research limits

Study limits include a range of temporal, spatial and technical limits as follows**:**

- Temporal limits: the field study is conducted during 2017 .

- Spatial limits: the field study was conducted on selected private Sudanese manufacturing firms in the state of Khartoum.

- Technical limits: the field study was limited to dependent variable of firms performance of two dimensions**,** namely **(**financial performance, and operational performance,), moderator variable is Competitive strategy of two dimensions, namely (Cost Leadership, and Differentiation) and two independent variables are Target Cost of six

dimensions, namely (Price-led, Focus on customers., Focus on design, Cross-functional involvement., Value chain involvement, A life-cycle orientation) and Value Engineering of three dimensions, namely(functional analysis, cost reduction and Quality improvement)

1.8 Thesis structure

The rest of the thesis is organized as follows.

Chapter Two: provides an overview of the theoretical literature related to the research interests target costing; value engineering and completive strategy and performance as well as their relationships,

Chapter Three: explains the research methodology employed in this research and data collection methods are explored including survey, the questionnaire instrument, population and sample, questionnaire design and , questionnaire administration and response rate,. This is followed by the measurement of all variables including TC, VE, competitive strategy variables, and firm performance. A descriptive analysis is undertaken. The chapter provides preliminary statistical analysis, exploratory factor analysis, significance of factor loadings and Confirmatory Factor analyses to reveal the structure underpinning the questionnaire items of TC, VE, CS and FP.

Chapter Four: contains hypothesis testing using various statistical techniques, based on interaction approach by using structural equation modling to test the related hypotheses. And presenting of the research findings related integration of, TC, and VE. It also presents contingency relationship, which is focused on relationship between organizational variable (competitive strategy) and TC and VE.

Finally, Chapter five: provides summary of the main findings and discussion of these research findings, managerial implications and discussion the contributions of this study to knowledge. The study

limitations and suggestions for future researches are presented at the end of this chapter.

1.9 Previous Studies

AlMaryani,(2015) his paper aims to study the philosophy of target costing and continuous improvement techniques with an indication of the aspects of integration between them and its importance in achieving costs reduction and competitive advantage for the organization. The strategic impact of integration between target costing and continuous improvements techniques in achieving cost reductions and competitive advantage. The study found that that the techniques of target costing and continuous improvement are among the most important techniques of strategic cost management affecting the company's success to the implementation of it competitive strategies, and that the integration between them lead to a significant impact in the successful implementation of competitiveness strategies - least-cost, differentiation, and focus. The strategic impact of integration between target costing and continuous improvements techniques in achieving cost reductions and competitive advantage.

Nour Aldeen et al,(2014): The purpose of this study is to explore impact of target costing on achieving success in the competitive field of Jordan industrial companies, achieving competitive advantages through the company to outdo competitors' capabilities, coping with the growing dynamics of the competitive. The most important findings of the resulting of the research are: (1)There is a good positive and direct correlation between the target costing method and enhancing cost advantage,(2) there is a good positive and direct correlation between the target costing method and enhancing quality advantage and there is a medium positive and direct correlation between the target costing method and enhancing environmental advantage.

Adeniyi,(2014): The main objective of this study is to ascertain the impact of target costing on competitive advantage in Nigeria manufacturing firms. the findings in this study are followings:

The study found the process of reducing cost of the product as one of the main priorities in the company objectives, and discovered that target costing enhances competitive advantage in Nigeria manufacturing firms.

Kabbjee(2014)" This study aims at identifying the availability of the ingredients of implementing target costing entrance in Palestinian shareholding industrial companies, and the extent of awareness of the concepts, principles and the importance of using the target costing in the management costs for the products of the lower cost and with the same quality and to improve profitability. The results revealed that ingredients of implementing target costing entrance in industrial companies, which indicates that the Palestinian industrial companies have the appropriate environment for using the target costing. It turns out that companies have awareness to the concepts, principles and the importance of using the target costing to management costs and enhancing profitability, and that the companies are using value engineering entrance to achieve reduction in costs so as to reach the target cost. The results indicated that there were some difficulties which could hinder the application. The most important difficulty was the high financial costs than returns the application of the entrance to the target costing and value engineering

Sulayman. (2014): This study aims to investigate the use of Target Costing (TC) approach by the Manufacturing Companies in Jordan (MCIJ) Listed in Amman Stock Exchange (ASE). The results of study include the following: (1) Manufacturing Companies in Jordan apply the requirements for implementation of TC, such as: the company uses value engineering to reduce cost, meeting customer's requirements, and remove barriers among departments to facilitate TC implementation.(2) The

benefits of TC include: cost reduction, quality control, efficient pricing decisions, customer satisfaction and application of team work approach.(3) Obstacles facing the companies that do not use TC include the following: the nature of the work of the company makes TC not applicable, high cost of information gathering and analysis, and unstable prices in the market make it difficult to determine the selling price which is the starting point of TC.

Vaisle, E. et al (June, 2013): This study concluded that the target cost method is a management tool for analyzing and reducing the cost of a product throughout its life cycle. The target costing method is market oriented, based on the rule that the market determines the selling prices. The study showed the obstacles that slow the application of target costing are as follows: relatively high cost, low degree of satisfaction of certain customers, diversified product portfolio, and imprecise segmentation by customers and products.

Aliakbar& Nikoueghbal(2011): The purpose of this study is to explore impact of target costing on reducing costs .The findings of the case studies confirm that Organization to achieve goals such as reducing cost, increasing product quality, customer satisfaction, gain a greater share of domestic and foreign markets, continuous improvement in production, diversify products, reduce and eliminate waste in production, and improve the profitability needed to implement modern and effective management techniques such as target costing.

Sabir, et al,(2011): this paper concentrated on lack knowledge of the industrial firms, regarding the significant role of target costing for achieving the competitive prices. The paper depends on the main supposition, using the competitive price to get the target cost in the industrial firms. In order to achieve competitive advantage in business

world the firms should rely on modern methods to manage cost and profit.

Yazdifar and Askarany (2011**):** examined the factors contributing to the adoption of Target Costing systems in manufacturing and service firms in the UK, Australia and New Zealand. They relied on a survey methodology distributed among CIMA-qualified accountants working in manufacturing and service firms in the three countries. They specifically examined the importance of the following TC attributes; relative advantage, compatibility, ease of use, results demonstrability and ability for decision makers to adopt and implement TC. Their results indicate that TC is equally prevalent among manufacturing and service firms while in terms of the levels of implementation there is a significant difference between the two types of firm.

Rehab (2011): the study aimed to demonstrate the impact of target costing applied to reduce the cost of production in Sudanese industrial companies to achieve their goals of making new products at the lowest cost as requirement for the success of the facility in light of the competitive market and attract consumers. The results are: The target cost application leads to reduce the cost in the planning and design stages. Joint cooperation between individuals who work in stages of the product life cycle and suppliers who deal with the company are both contribute to the high quality and low cost products.. Application of the target cost system provides accurate information to help in the face of high competition and meet the desires of consumers have a high ability to compare products in terms of quality and price. A strong incentive for research and development to achieve technological advances can design new products at low cost.

Naji Chaib (2010): The research aims to promote Iraqi industry in the field of manufacturers of electrical and electronic data through the

adoption of technologies Modern commensurate with the requirements of modern global environment characterized by intense competition, and by relying on market mechanisms in Setting prices and not the cost of the product are determined by the price and then access to the designs that will meet the wishes of the customer At the same time check the price per unit of economic competition, which contributes to the prosperity of the electronics industry and increases Market share and lead to growth and expansion. It can be found that the target costing plays an important role in improving the competitive position of its products and by reducing the cost of their products compared to prices of foreign products competition.

Caleb , et al, (2007): the purpose of this research is to examine target costing practices in New Zealand. Findings reveal target costing is being applied to existing products; the manufacturing department is highly involved in target costing; the involvement of suppliers in target costing is relatively low; considerable adjustments are made to the calculated allowable costs, especially in order to assist sales of future products and to ensure the achievement of target costs; and higher achievement of target costs is associated with higher firm performance.

Patricia et al, (2006): The purpose of this study is to explore the characteristics of target costing, and to test whether these characteristics were adopted in three European companies that used target costing. The paper identifies eight characteristics of target costing, based on the early Japanese case descriptions. These characteristics are related to the way a target is set and how progress towards that target is measured. The findings of the case studies confirm these characteristics. However, some differences were found regarding the interpretation of the strict rule that "the target cost cannot be exceeded at product launch".

Dekker and Smidt (2003): surveyed listed Dutch firms on the application and use of costing practices that resemble Japanese Target Costing. They

found that nineteen out of thirty firms claimed to use these practices but names other than Target Costing. Adoption was highest among assembling firms and cost reduction was the main objective of these practices. The product development and design departments were leading in Target Costing processes, which are mainly performed in team structures.

Chougule , et al(2014):This paper outlines the basic frameworks of Value Engineering and presents a case study showing the cost reduction of Value Engineering in a Furniture Manufacturing Industry in Sangli, Maharashtra (India).the study found that VE is recognized as an effective way to improve the performance of a product with reduction in cost. The quality (qualifications and experience) of the team leader and specialists is a key ingredient to the success of the VE program. It is more effective and influential on the performance, quality, and cost of a product when done relatively early in the production schedule.

Jatinder & Brajesh (2014): The paper discusses in detail value analysis/value engineering, as an important tool for reducing the cost. The paper takes an overview of importance of cost reduction and the link between cost reduction and value analysis. The study further takes up the necessity of value engineering in today's scenario and tells when to apply. In the end of the paper also explains the approach and methodology of engineering. As result few examples of corporate have been achieved cost reduction by adopting and implementation technique of VE.

Amit Sharma, et al,(2012): This paper discussed the concept of Value Engineering, its job plan and the effective implementation of it through a case study involving a part used in the medical instruments. It found that the value of the product can be increased by substituting another material in place of the one that is currently in use, the various advantages have

been observed in terms of cost reduction, increase in overall production, reduction in manpower, and reduction in scrap.

Al-Yousefi,(2010):This paper proposes a conceptual synergy between VE and Sustainable Construction that leads to achieving best value over the life span of a project. It demonstrates the linkage VE Job Plan tools and techniques for better planning for Sustainable Construction during early stages of a project. It found that The VE Methodology employs various tools and techniques that help to plan for better Sustainable Construction such as Life Cycle Costing , function modeling, strategic problem solving , Pareto analysis, paired comparison , Quality Base Selection evaluation criteria , quality function deployment, design for Six Sigma, target costing, “Lean” concepts, idea management and action planning.

Ugo and Kaminski(2007)" This research suggests a methodology for the product development process in an automotive company, aiming at the correct systematic approach of Value Engineering (VE) and target-costing in cost management.. This proposed approach was validated in a case study focused on the engine-starter system of a vehicle, aiming at improved product cost, functionality and quality accomplishment, in accordance with customer needs and the company strategy.

Ugo and Carlos (2006): This research suggests a methodology for the product development process in an automotive company, aiming at the correct systematic approach of Value Engineering (VE) and target-costing in cost management. The results that VE and target costing are complementary processes, because while one allows the identification of where cost reduction could be achieved, the other shows the target to be achieved to guarantee the long-term profitability plan of a company.

Rukia(,2015)This study aimed at providing insights on competitive strategies. Specifically, to determine the effect of cost leadership

strategy on performance of manufacturing firms, to assess the effect of differentiation strategy on performance of manufacturing firms, to find out the effect of focus strategy on performance of manufacturing firms and to establish the moderating effect of competitive intensity on the relationship between competitive strategies and performance of manufacturing firms in Kenya. The findings of the study revealed that cost leadership, differentiation and focus strategies have positive significant relationship with manufacturing firm performance in Kenya. However, differentiation strategy had a greatest effect on firm performance.

Seyed & Narges (2012):This study investigates the effect of competitive capability on firm performance under environmental uncertainty conditions. The findings show that competitive capability has direct positive effect on customer satisfaction, financial performance, and market performance. In other words, enhancing these capabilities leads to improving customer satisfaction and increases market and financial performance. Investigation of the effects of different aspects of competitive capabilities on different performance aspects show that the capability of cost leadership positively affects financial performance and market performance but, has no effect on customer satisfaction. Also, the capability of differentiation has direct positive effect on customer satisfaction but affects financial performance and market performance negatively. Additionally, the examination of the moderating effect of perceived environmental uncertainty on the relationship between competitive capability and firm performance shows that in different environmental conditions, the effects of cost leadership capability on customer satisfaction, differentiation capability on financial performance, and differentiation capability on market performance are moderated. On the other word, managerial decisions in these areas are

affected by environmental conditions involved in processes of material supply, production, and market demand.

Rattana (2012) this research aims to investigate business strategies as a moderating role affecting the relationship between best business practices and firm's performance, in Thai manufacturing firms. The finding indicated that the firm's performance could be explained by 5 out of 9 categories of best business practices. Leadership practice, customer and market focus practice, human resource practices, process management practice and process innovation practice were five predictors of firm's performance. Besides, the results of this study indicated that the relationship between best business practices and firm's performance could be influenced by business strategies. findings also found that differentiation strategy play a moderating role in the relationships between product innovation practice and firm's performance.

Christian, et al(2008):The study uses contingency theory arguments that the adoption of target costing positively correlates with the intensity of competition, but negatively correlates with perceived environmental uncertainty. The findings indicate that the adoption of target costing and the intensity of competition positively relate, although the effect reduces with an increase in perceived environmental uncertainty. There is no evidence of a direct relationship between perceived environmental uncertainty and the adoption of target costing.

Mzoughi et al. (2008) studied the effect of competitive advantage on organizational performance in different industries in Tunisia. They measured competitive advantage by the dimensions of price, quality, time to market, innovation, and reliability of delivery. Also financial performance and market performance were measuring elements for organizational performance. The findings show that, from the aspects of

competitive capability, only time to market has positive effect on financial performance.

Swink et al. (2007) surveyed the effect of manufacturing competitive capabilities on plant performance. In order to investigate research objective, they focused on different industries in North America. Competitive capability is measured by cost efficiency, quality, delivery, process flexibility, and new product flexibility; and plant performance by market performance and customer satisfaction. According to the findings, flexibility of new product is a more important competitive capability. On the other hand, cost efficiency and process flexibility are either non-significantly or negatively associated with plant performance. Every capability of quality, delivery, and new product flexibility is associated with enhanced market performance. Also, delivery and quality capabilities are considerably related with more satisfaction of customer. In contrast, cost capability is negatively related with both aspects of business performance.

Li et al. (2006) studied the effect of competitive advantage on organizational performance in different industries in the United States. Competitive advantage is measured by price/cost, quality, delivery dependability, product innovation, and time to market; and organizational performance by market performance and financial performance. The results show that quality and time to market are more powerful indices for competitive advantage relative to other three elements. On the other hand, it can be perceived from the findings that upper levels of competitive capability can lead to better organizational performance. Organizational performance is affected more by competitive advantage than by supply chain management practices.

Vickery et al. (2003) studied the effect of customer service on financial performance in automotive industry of North America through a one-

dimensional approach to competitive capability and performance. In their survey, some firms tended to present objective information from which they gave real values but they used subjective evaluation of perceived performance of managers in other firms. Findings showed that customer service positively and directly affects financial performance

Baines and Langfield-Smith (2003) this study in 141 general managers of large manufacturing companies in Australia, structural equation modelling (SEM) is used to investigate the associations between a range of organizational variables and the changing competitive environment as antecedents to the change in MA (e.g. ABC,target costing, ABM, value chain analysis) as well as their influence on performance. The findings show that an increase in competitive environment drives a higher emphasis on differentiation strategy. This change leads to the changes in the design of organizations, advanced manufacturing technology, and advanced MAPs. This in turn results in a greater reliance on non-financial accounting information, which leads to higher organizational performance.

Comment On The Previous Studies

From the above empirical literature review, several points are identified as follows:

- Most of the studies focused either on one or two TC dimensions when addressing the adoption of it .In this research, all six TC dimensions are investigated and examined collectively
- Most of the studies paid attention to implementing of TC and VE isolation of variables that could, interact with them to, give a better understanding to their relationship. Therefore, a contingent variable(competitive strategy) is included in the current research framework to examine its possible influence on TC & VE and the firms performance

- Competitive strategy and environmental uncertainty were the most frequent organizational factors that have been investigated in the previous studies. although the adoption of contingency theory approach was not explicitly acknowledged in some of these studies(e.g Rattana 2012 , Seyed & Narges (2012) and Baines & Langfield-Smith (2003)
- Most of the previous studies focused on identifying the importance of using the target cost approach, identify the factors that influence the determination of the target cost and the level of success of the application in the conditions of intense competition in the modern economy and the speed of technological development. Examined differences between companies applying the target costing method and that do not apply. This study adds to the benefit of previous studies In that it defines to the Sudanese manufacturing companies the importance of the of target cost and value engineering to by Highlighting their respective dimensions and reflecting the impact of their integration on reducing costs and improving performance
- Most of the studies on TC and VE CS and FP were conducted in developed countries, whereas there were limited studies in developing countries .
- In some studies, a single indicator (e.g. ROS, ROI) was used to measure the dependant variable ((performance), while in other studies the link to this variable was not investigated. in the present study, The performance, which is the (dependent variable) was captured in terms of financial and operational performance measures

CHAPTER TWO

Literature Review

2.1 Chapter overview

This chapter reviews the relevant theoretical literature in relation to the main issues in this study, namely Target costing, Value Engineering and performance. This is followed by a discussion of competitive strategy, as contingent variable that influence performance.

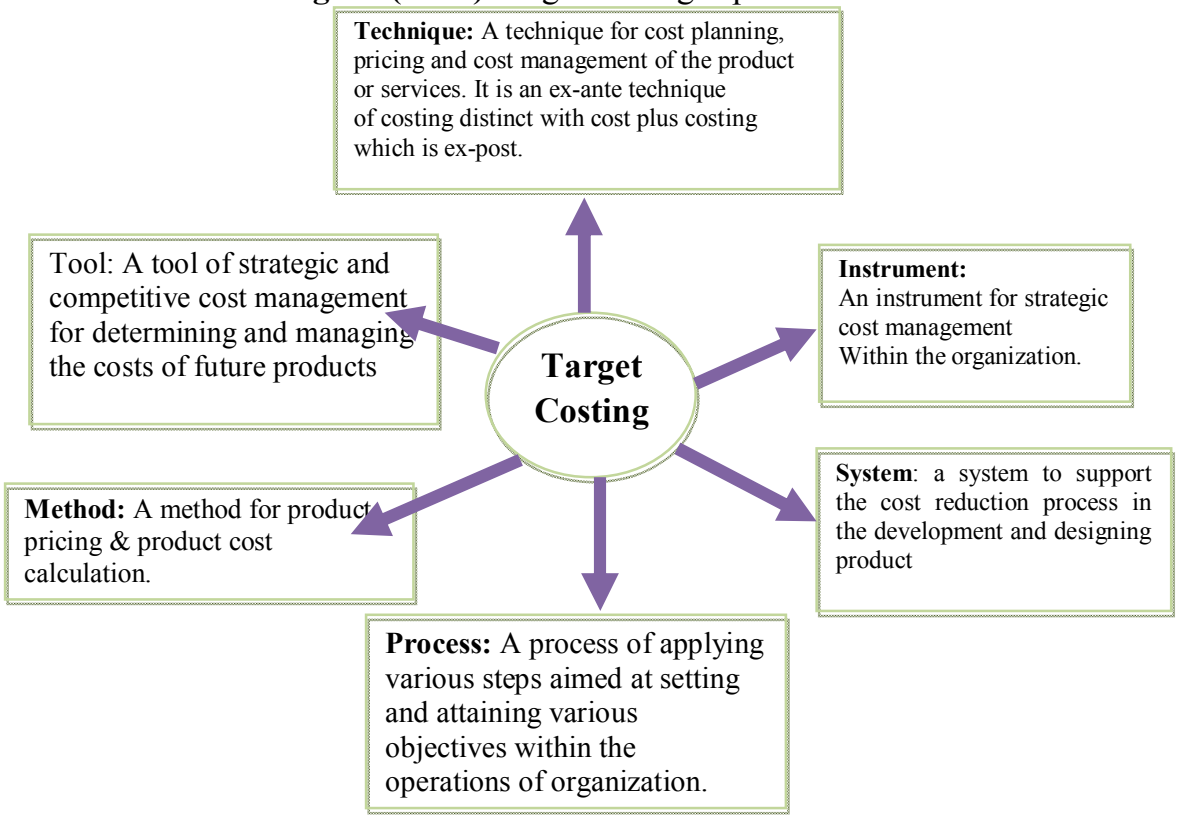
2.2Target Costing

2.2.1Definitions of Target Costing

Target costing is a technique which first introduced in Japan in 1960 as a cost-management technique to help the manufacturers to be globally competitive. In literature different definitions are given to target costing some focus on the purpose of target costing in their definition, i.e. cost reductions in order to realize cost management of future products. For instance It has been perceived as a significant technique for increasing competitiveness since 1990s (Ellram 1999),and Sakurai (1995, 25) defined Target costing as an effective tool for reducing material costs such as materials and parts, but it can also be used for reducing overhead. Monden & Hamada (1991,16) Target costing is the system to support the cost reduction process in the developing and designing phase of an entirely new model, a full model change or a minor model change, Lee, Jacob, Ulinski (1994,183) Target costing is a market-driven system of cost reduction and several others, such as (Ansari & Bell (1997), Brausch (1994), Fisher (1995), Kato (1993), and Sakurai (1989), focus on the purpose of target costing in their definition. Cooper (1995, 135) defined Target costing is a structured approach to determine the cost at which a proposed product with specified functionality and quality must be produced in order to generate the desired level of profitability at the product's anticipated sales price. others defined target costing as achieving tool, For instance Tanaka (1993, 4) Effort at the planning and

development stages to attain a cost target set by management is called target costing, which is carried out mainly by the design divisions, Makido(1989, 6) and Yoshikawa et al. (1993, 35)defined target costing as the process established to set and support the attainment of cost levels expressed as product costs, which will contribute effectively to the achievement of an organization's planned financial performance, and Horvath (1993,) mentioned that "Target costing is a set of management methods and tools used to drive the cost and activity goals in design and planning for new products, to supply a basis for control in the subsequent operations phase, and to ensure that those products reach given life cycle profitability targets.". From the above definitions it is concluded that target costing is a process, system, technique, tool, instrument and method for product planning and development. This fact is depicted in the following figure

Figure (2/2/1) Target costing aspects



Source: Adapted from Cooper & Slagmulder (1997)

2.2.2 The Target Costing Process

Fisher (1995) mentioned two separate phases of target costing process. The first phase involves determination of target cost and the second phase involves attaining the target cost through product design.. There is no single definition and process of target costing in literature. In the process of target costing the variable and fixed costs of product are to be reduced by using different tools (Williamson, 1997). Target costing process consists two major phases (1) determination /establishment phase and (2) implementation/attainment .The previous studies like Sakurai (1989), Kato (1993),Tanaka (1993) and Ansari & Bell (1997) have described different steps of the target costing process, these steps are:

1 Establishing Target Price

This is the starting point for the determination of target cost or first step in this process. Target price is the selling price of a product that the consumers or marketplace accepted to pay for the product, which is based on market analysis. Ansari& Bell (1997) pointed out that Japanese companies use four major factors in the price determination in the process of target costing and these factors are: (1) the consumer needs concerning the product performance and features, (2) the customer's willingness to pay for product features, (3) the estimated competitors' product price and (4) the required market share. This step considers firstly the market present and future needs, next is customers wants and how much they are actually willing to pay for product and lastly current and future products offered by competitors. Target selling price for a new product is set on the basis of market research (Cooper & Slagmulder, 1999; Kato, 1993). Thus, firstly in this process target price is established in the context of market needs and competition. Ansari & Bell (1997) explained first step of target costing involves market analysis, customer surveys and

competitors' analysis to determine the product attributes or demands and customers' needs.

- **Market Analysis for Setting Target Price:**

The target selling price determination is based on market analysis which includes both feed-forward and feedback information. Feed forward information refers to market and customer attitudes while feedback information refers to actual decision and action data such as product failures, purchases, returns and complaints. Ansari & Bell (1997) suggested that feedback information is more important than feed forward information. But both type of information have to be collected at the same time for complete knowledge of the company's situation. There are three aspects of information to be gathering be fort setting target selling price as market analysis and these are:

- **Market surveys/research:** This provides quantitative information regarding market fluctuations, expected changes, target customers and the needs and wants of customers for a particular product.
- **Customer surveys:** Through this surveys the data about customer's Willingness to pay for each function/feature of product can be collected . Through this study the market core information of customers can be identified like their ages, family type, sizes and their incomes level. The ways to attract them to buy a product and upgrade the product can also be identified to satisfy customers.
- **Competitive analysis*:*** This analysis helps to know the position of competitors, their product prices, product functionality and their ways to evaluate the products. This gives the company a hint to launch the product or not. Also company can take information about their future market share which helps them to lead over their competitors. Competitive analysis compares the products offered by the competitors currently to target customers, perception of customers'

about these products and expected reaction of competitors after the introduction of the new products.

2. Establishing the Target Profit Margin

Is being determined after the target price has been decided. Target profit is that amount which a firm wants to yield by selling product at a particular target price. According to Kato(1993) target profit margin for a product should be based on corporate strategic, profit planning and medium-term profit plans. Sakurai (1989) argued that guidance of top management to determine target profits is needed in target costing process. The desired profit is usually based on the return on sales of the. The total target profit is calculated as a ratio or percentage of sales. On the basis of return on sales total target profit for a new product is calculated in follows:

Total Target Profit = Target Sales x Return on Sales Ratio

Target Sales = Expected or Target Selling Price per Unit x Expected Sales Volume

The target profit margin for a future product is estimated during product planning. On the basis of profit determination some authors defined that target costing is a profit management technique. So the target profit margin is based on the firm's long-term strategic and financial objectives and the profit planning

3. Setting the Target Cost

After Determination of the target sales price based on all three analyses the desired profit is subtracted to set the allowable cost. This is sometimes referred to as the engineering cost. In this step calculation is made for the probable cost of current processes for the product. Target cost is the amount by which costs must be reduced. The target cost is set before start of actual production or before design development of the new product development process. . Cooper & Slagmulder (1997) stated that

the allowable cost does not signify the capabilities of the firm and allowable cost is often unfeasible in the short period. Target cost is set between the expected cost and the allowable cost. Different authors give different methods to set the target cost. (Monden, 1995).revealed that the allowable cost is the maximum aspiration of the management and it is difficult to attain it in the short run. According to literature target cost and the allowable or acceptable manufacturing cost can be computed as:

(1) Allowable Cost = Target Selling Price – Desired Profit Margin

Target Cost = Allowable Cost - Expected Cost

OR

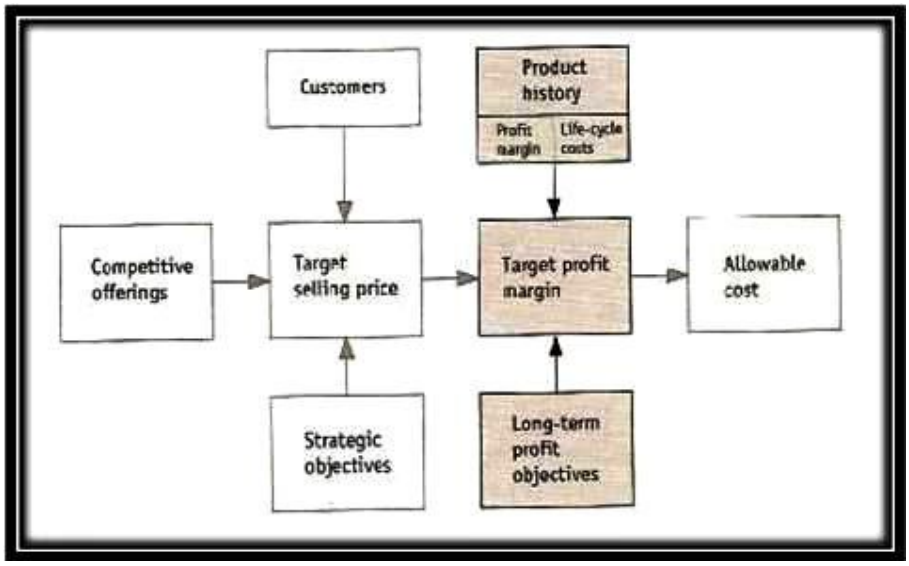
(2) Target Cost = Market Driven Selling Price – Desired Profit Margin

In the first equation allowable cost is the difference between the target selling price and the target profit margin and target cost is the gap between the allowable cost and expected or current cost. In second equation target cost is the difference between target selling price and the target profit. According to previous studies allowable cost and estimated cost are different costs. On the basis of return on sales the allowable cost can be compared with estimated cost. Because estimated cost is based on the current level of materials, labour and overhead cost. The gap between estimated cost and allowable costs is reviewed then attainable target cost is established . Allowable cost is set on basis of external factors and it does not consider design and production capabilities of company therefore it is difficult for the company to achieve the allowable cost in short period. Thus, designers set target cost. Costs of existing products provide cost information for future products. Such cost estimation is called the current cost or ongoing cost. Actually the difference between allowable cost and target cost also is the key focus point of target costing process. If the target cost is too high then employees may lose their motivation and give up. If the target cost is too low then it can be

achieved easily, Kato (1993) argued that a commitment is required to achieve target cost. Agreed target costs are final and the target costs are not changed during the development process so the success is to determine the final target cost of product not the costs of separate components or functions. The following figure shows relationship between the target selling price, target profit margin and allowable cost

Figure (2/2/2)

Setting target price, cost and profit in target costing process



Source: Adapted from Cooper & Slagmulder (1997)

- **Methods for Setting Target Cost:**

According to Everaert et al. (2006) the popular methods for setting target cost of product are:

Deductive methods is commonly explained in previous studies and, in this method the target cost is the allowable cost which is the gap between the target selling price and target profit margin. In this method target cost more or less is imposed on product development team. Also called subtraction or top down method and it is the dominant method**.**

Bottom-up method. The bottom-up method is also called adding-up method. In this method setting of target cost starts from the product

development team or department itself**.** Kato (1993) described that in bottom up method cost is estimated for each component on the basis of actual or current cost then total target cost is set by adding up all individual parts or subassemblies target costs**.** This method is based on the past cost data and existing technologies of the company. The basic idea of the deductive method according to Kato (1993) is:

Target Cost = Expected Selling Price – Target Profit

The basic thought of the adding-up method is:

Target Cost = Sum of Costs of all Components of Product

According to Kato (1993) Bayou & Reinstein (1997) stated that the deductive method is better than the adding-up method Due to these two reasons: (1) it connects the target cost of product and to the target profit (2) it uses the mechanism of value engineering. The adding up method is simple than deductive method. (Kato, 1993). Sakurai (1989) argued that combination of both deductive and bottom-up methods would give best results.

4 Establishing Cross-Functional Team

After the determination of target cost there is a requirement of cross-functional team to achieve that cost. Cross-functional teams as a group activity by involving all employees conducts a functional cost analysis or use value engineering tool. The target costing team has members from different departments like personnel from purchasing, marketing, design, engineering, production, accounting, information systems, operations, research & development and cost planning to reduce the overall product cost. This cross-functional team is leading by the top managers who have knowledge of the company's strategic plans and goals. Kato (1993) argued that target costing has positive impact on new product design and development and it should be used with caution, also for creative products design engineers should be worked under relaxed

conditions not under time pressure. In the target costing process designers of products are the main persons who reduce costs, because they identify the most appropriate actions for product design and cost reduction

5 Determine the Drifting cost

Actual or present cost of manufacturing also known as drifting cost. This cost isestimated by the cross functional team with the assistance of the engineering department. It is determined to get the desired functions of new product which can be provided or adjusted up to the limit of target cost. The current cost of product is reduced to achieve the target cost by applying target costing tools like value engineering.

6 Use of tool Value Engineering

Once the target cost has been determined value engineering is taken into consideration to achieve it. This step considers costs and processes for designing features of the product If the estimated current cost of new product is equal to the target cost then the new product production decision is taken but when new product cannot be realized the target cost or there is a gap between drifting cost and target cost then the product is redesigned or the process of manufacturing is improved to achieve this. At that time value engineering tool is used to adjust the costs of components or functions to take cost efficiency. Through value engineering the components or functions of product that have comparatively high cost then their functionality are redesigned to reduce costs. The target cost is decomposed into various components, functions and cost items of the product Cooper & Chew (1996) argued that for cost reduction target costs should not be decomposed uniformly across all the departments. According to previous studies the function oriented, the component oriented and cost assignment methods are used for target cost decomposition. In the function-oriented method the total target cost is allocated for different functions of the product. In component method the

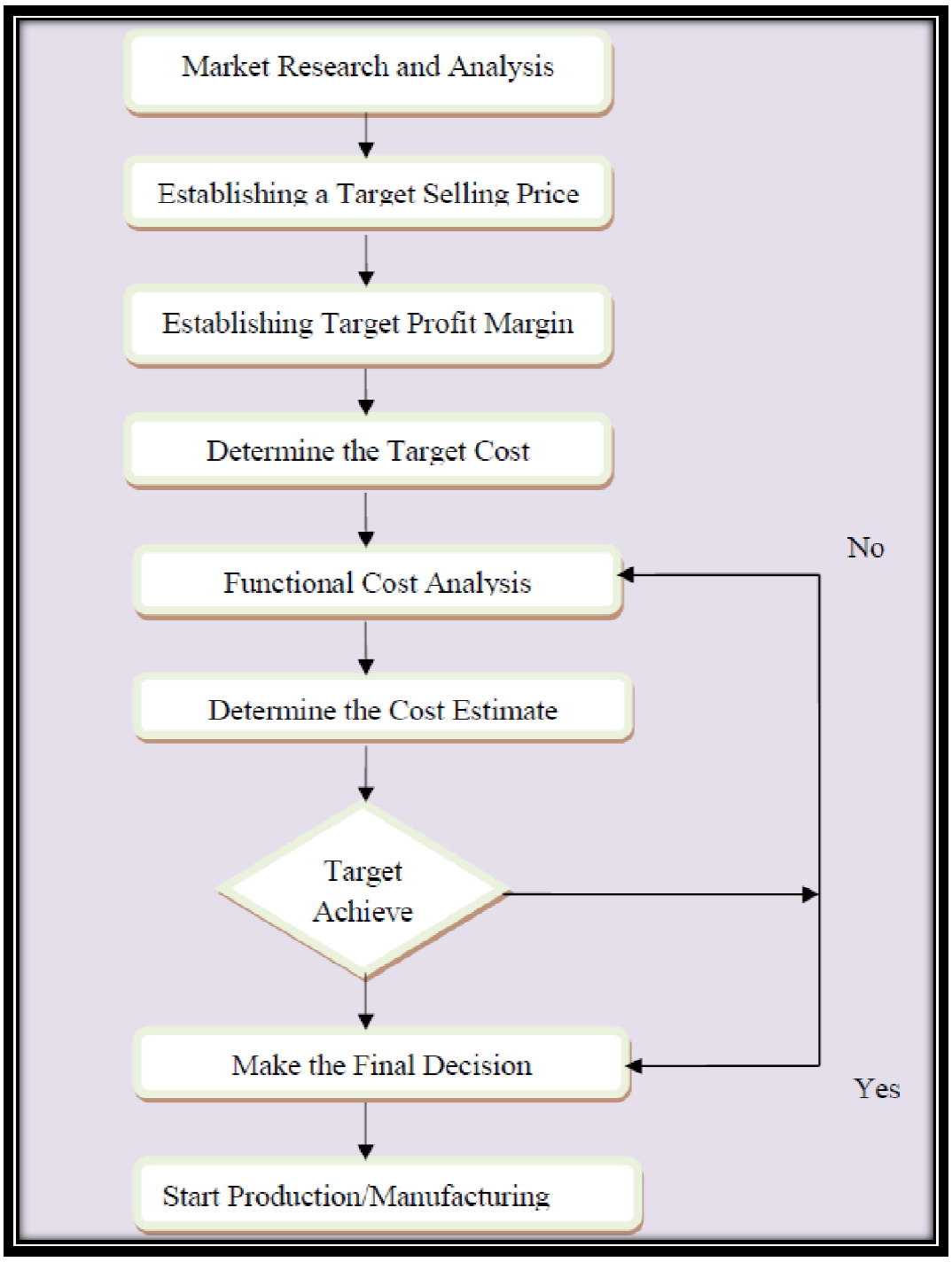
target cost is allocated for different components or parts of the product. Cooper & Slagmulder (1997) pointed out that component method of target costs decomposition should be set only when the components of product can be clearly identified. Component method is suitable when new product has design or features like old product because this method is based on historical cost information. It has been stated in previous studies that the component method is suitable for complex and innovative products because designers can be used their creativity for product design. Monden &Hamada (1991) mentioned that cost assignment method allocates target cost into cost items such as material cost, direct labour cost and purchase cost etc.

7 Achievement of Target Cost

Kato (1993) stressed that cost information that required by designers must be provided at anytime not only during product development and design process. In this step estimated cost of future product is compared with its target cost during product development. Cooper & Slagmulder (1997) argued that top management constantly monitored the work progress of design engineers towards achieving the target cost.

The general target costing process is showed in the following figure.

Figure (2/2/3): **General target costing process**



Source: Adopted from Gagne & Discenza (1995)

8 Final Decision

If the new product is found to be profitable after value engineering activities then product is manufactured in the company and when product does not appear profitable then company can abandoned it. After the determination of drifting or expected cost, target cost is compared with expected product cost at different points during new product development and if target cost is higher than the expected cost then the company has mainly two options. First option is to cut costs by redesigning the product through change in engineering process. This is done by design team members through investigating the need of each component cost. Second drop the idea of production of that particular product. When the target cost is achieved then company can take final decision of manufacturing the product.

2.2.3 Characteristics of Target Costing (Sakurai, etal, 1995)

1. Target costing is used in the planning and design stages.

2. Target costing is a tool for cost reduction. Conceptually, cost management can be divided into two parts: cost reduction (or cost planning) and cost control. Target costing is clearly focused on cost reduction.

3. Target costing is a market-driven technique.

4. Target costing is usually part of strategic profit planning for multiple years. In fact, target costing is often used as a bottom-up tool for attaining the profit goal set by top management when it determines middle-range corporate strategy. Thus, the cost-reduction program is more strategic than operational.

5. Target costing is an engineering-oriented technique. Target costing is a management tool for directing and focusing the decision process for design specifications and production engineering. Financial accounting measurements are not emphasized, and the method has more of a

management engineering characteristic. Hence, it coincides with other Japanese management engineering techniques such as VE, TQC and JIT.

6. Target costing depends on and enforces extremely high levels of cooperation between departments. In target costing, the accounting department acts as the coordinator and information provider while the marketing, engineering (planning and design) and production departments determine success or failure.

2.2.4 Importance of the target costing

The Importance of the target costing stems of the nature of the contemporary industrial environment. Today businesses face a global environment that has four characteristics(Ansari,et al,2000). Are:

1- Competitive, because prices cannot be increased in many key industries. Many new producers, some with a lower cost of doing business, have entered the global marketplace

2- Rapidly changing, because the dissemination of technology and knowledge has accelerated considerably. This faster pace makes it difficult to use any one factor, such as quality, for a long-lasting competitive advantage.

3- Unforgiving of mistakes or delays, since shorter product lives leave little time to respond to changes in the marketplace or to recover from mistakes.

4- Demanding, because sophisticated consumers have knowledge of many products and want better quality products at an affordable price. It is difficult to sell inferior products with reduced features at a lower price.

Target costing is a process that:

1- Anticipates costs before they are incurred.
2- Continually improves product and process designs.
3- Exothermally focuses on customer requirements and competitive threats.

4- Systematically links an organization to its suppliers, dealers, customers, and recyclers in a cohesive and integrated profit and cost planning system.

2.2.5Target Costing-key ideas

The target costing process comes from the Consortium for Advanced Manufacturing International (CAM-I):(Ansari,et al,2000)

(Target costing is a system of profit planning and cost management is price led, customer focused, design centered and cross functional. Target costing initiates cost management at the earliest stages of product development and apply it throughout the product life cycle by actively involving the entire value chain.)

The purpose of target costing is to ensure adequate profits by undertaking simultaneous profit and cost planning. The CAM-I definition contains six key ideas that provide the conceptual foundations for target costing. Each of these six foundations is explained below**:**

1- **Price led costing** means that target costs are established by first determining a competitive market price and then subtracting the required profit margin from it. This is summarized in the equation:

$C = P - \pi$

Where

C: Target cost

P: Competitive market price

π: Target profit

In target costing, market price is the independent variable; costs allowed for designing, manufacturing, marketing, and other functions (the target costs) are dependent on the market price. For example, if the competitive price for a product is $100, and the company requires a 15 percent profit margin, then the target cost for this product is set at $ 85 (100- l5).

2 - Focus on customers. Means that customer requirements about product quality, price, and timeliness guide cost analysis. It is essential to understand what quality features and timeliness customers expect at a given market price and what competition is currently doing or might do to respond to a company's product offerings. The target cost must not only yield the target profit but also allow the manufacturer to match competitive product dimensions. The target cost cannot be attained by sacrificing the features that customers want, lowering the performance or reliability of the product, or delaying its introduction in the marketplace.

3 - Focus on design. of product and processes is the key to cost reduction efforts. Target cost systems design products and their manufacturing and delivery processes simultaneously. This is sometimes called concurrent engineering. Traditional cost reduction methods focus on production efficiencies such as waste reduction or buying in quantity to reduce cost. This is not the prime focus of target costing. Target costing focuses on product design because most costs, nearly 70-80 percent, are Committed at the design stage, while only 10-20 percent of the costs are incurred at this stage. Exhibit 1 shows the typical relationship between committed and incurred product costs. As depicted there, the majority of the costs are committed at the design stage, while the majority of costs are incurred after production starts. The best opportunity to manage costs is while a product is still in design. Concurrent engineering design eliminates costly features and minimizes the need for engineering changes after production begins.

4- Cross-functional involvement. With members representing design and manufacturing engineering, sales and marketing, material procurement, cost accounting, service, and support typically are jointly responsible for attaining target costs. The teams also include outside participants such as suppliers, customers, dealers, and recyclers. The

teams are responsible for a product from initial concept through production. A cross-functional team is not set of specialists who contribute their expertise and leave. They are responsible for the entire product.

5 - Value-chain involvement. Considers all costs of owning a product over its life, such as purchase price, operating costs, maintenance and repairs, and disposition costs. Life cycle casting's goal is to minimize the cost of ownership to a customer.

6 - A life-cycle orientation. Members such as suppliers, dealers, and service and support personnel are part of the target costing process and help to focus cost reduction efforts throughout the value chain. Target costing systems involve an active and collaborative relationship in which cost-reduction techniques are shared by all members of extended enterprise. Target costing system based on long term, mutually beneficial relationships with suppliers and other members of the value chain such as distributors and recyclers

These six features distinguish target costing from traditional cost-plus systems. Traditional cost-plus systems typically start with costs and then add a profit margin to obtain a market price. If the market is unwilling to pay the price, the firm tries to find cost reductions. Target costing starts with a market price and a planned profit margin for a product and establishes an allowable cost for the product. Product and process design are used thereafter to reduce product cost so it is equal to this allowable cost.

Table (2.2.1)

Comparison of the traditional cost-plus with the target costing approach

Target costing	Cost- plus
Competitive market considerations drive cost planning	Market considerations are not part of cost planning
Price determine costs	Costs determine price
Design is key to cost reduction	Waste and inefficiency are focuses of cost reduction efforts
Customer input guides cost reduction	cost reduction is not customer driven
Uses cross- functional teams to manage costs	Cost accountants are responsible for cost reduction
suppliers involved early	suppliers involved after product design
Minimize cost of ownership to customer	Minimize initial price paid by customer
Involves the value chain in cost planning	Little or no involvement of the value chain in cost planning

Sources: (Ansari,et al,2000)

Furthermore, based on field studies, Cooper (1995, 136-137) costing results in Products with *lower* costs than when no target costs are used. As mentioned in chapter one, non-target costing involves one of two approaches, i.e. the conventional western or the cost-plus approach asserts that the main difference between a target costing and a non-target costing environment is that in target costing a manufacturing cost objective is specified, whereas in non-target costing design engineers have no specified cost objective to achieve. These non-target cost

approaches should outperform target costing, because they set out to minimize a product's cost rather than to reduce it to a specific level. However, in practice, Cooper found that target costing appears to lead to products with lower costs than the non-target costing approaches.

Figure(2/2/4)

Target Costing versus Non-Target Costing

Target Costing: Target Cost = Target Sales Price - Target Profit Margin
Non-Target Costing: 1. Conventional western Approach: Profit Margin = Target Sales Price - Expected Cost 2. Cost-plus Approach: Sales Price = Target Profit Margin + Expected Cost

2.2.6 Benefits of Target Costing

Target costing is a common financial technique, and it can benefit producers and resellers trying to compete in the marketplace. As follows http://smallbusiness.chron.com/benefits-target-costing-66494.html

- **Cost Optimization**

A primary advantage of target costing is that it allows company to analyze the best way to make or acquire products at the lowest costs. Minimizing costs is a common financial goal of any business, regardless of whether they offer high, medium or low prices. Minimizing costs gives a company financial flexibility to focus on achieving high profit margins or to enter the market at low price points to attract a large customer base.

- **Systematic**

Target costing is a much more formal and systematic way to focus on cost optimization than other less-formal approaches often used by businesses. It requires more time to go through a systematic approach like

this, but the results are typically finer tuned. Target costing involves consideration of all equipment, processes, labor and materials needed to make goods, or the costs to acquire goods and get them ready to sell to customers.

- **Reduced Development Cycle**

A point of emphasis in reducing costs with target costing is minimizing product cycle time. This is the amount of time it takes from conception to market-ready product. A reduced cycle time means to eliminate unnecessary steps or waste that take time and don't add value to the end solution for the customer. A shorter cycle time is a competitive.

- **Profitability**

If it's effective, target costing ultimately gives business greater profitability. It takes into account both factors in profit: the costs and the price. Many companies start by developing products and base pricing on costs. By starting with market pricing first, it help in ensuring end up with a product that has benefits and a price point customers will value. In essence, company achieve the optimal price-to-cost relationship possible for the products

2.3Value Engineering

2.3.1 Definition of Value Engineering

Value engineering, introduced by Larry Miles publicly in 1947 is considered to be the first formalized design process technique for problem solving that requires specific steps .Value engineering is a tool which is being used by Japanese producers to enhance the value of products and to attain the target costing **B**rown (2002). Value engineering is defined by the Chartered Institute of Management Accountants as the functional analysis and redesign of products and services to provide value to the customer, Sakurai (1989) defined value engineering as a tool of designing a product from various aspects but always with the aim of

reducing costs and providing the customers what they needs. Value engineering is essentially a process which uses function analysis, team-work and creativity to improve value(Miles, 1972) .(Ansari & Bell, 1998) defined Value engineering to reduce costs through improved design (along with maintaining quality) and redundant functions of identifying the product the customer is willing to pay to help management. Sperling, (2001:46) adds Value = Function / Cost and contends' improving value means enhancing function, reducing cost, or both. Kelly and Male (1993) described value engineering as a philosophy supported by technique rather than an absolute method or set of rules. (Watson, 2005). defined value engineering as an organized approach to identifying and eliminating unnecessary costs which urges a complete analysis of the use of a service or product rather than simply its engineering attributes . Value engineering is not cost reduction, reduction of quantities, cheaper materials or lower standards; nor is it quality control or a design review. It is the analysis of functionality focusing on the elimination or modification of elements that add cost without contributing to the functionality required (Jergeas and Revay,1999).An understanding of function is the essential thing to the uncovering of alternatives (Sperling, 2001). Dell'Isola (1982) maintains that traditional cost reduction methods have generally given little thought to functional consideration. Function analysis plays a very important part of value engineering by encouraging thought about why an item is necessary rather than just thinking about the item.VE is used by organizations to increase product functionality and quality while at the same time reducing costs. The scope of VE includes design costs reduction, process improvements, and working with suppliers. The output of VE is a series of improvement plans that raise the value of the target product, emphasizing functionality and meeting customer requirements within the

allowable cost parameters, VE goes beyond the particular styles or configurations of current products to consider the functions that lie at the heart of the product in order to come up with innovative ways to achieve desired functionality with less cost or effort. Value Engineering is not just "good engineering." It is not a suggestion program and it is not routine project or plan review. It is not typical cost reduction in that it doesn't "cheapen" the product or service, nor does it "cut corners. Value Engineering simply answers the question "what else will accomplish the purpose of the product, service, or process we are studying?"(Value Engineering Manual, 2004).VE technique is applicable to all type of sectors. Initially, VE technique was introduced in manufacturing industries. This technique is then expanded to all type of business or economic sector, which includes construction, service, government, agriculture, education and healthcare (McDowell, 1996).VE can be defined as: An organized team effort aimed at analyzing Functions and Quality of projects in order to generate practical cost effective alternatives that meet customer requirements (Al-Youself 2004)

2.3.2Value Engineering Process:

Job plan of Value Engineering Consists of the following sequential steps Habibollah et al, (2010)

A - Information

The team is made familiar with the present state of the project. All team members participated in a functional analysis of the project as a whole, and then of its component parts, to determine the true needs of the project. Areas of high cost or low worth are identified

B - Functional analysis

Function' can be defined, as the use demanded of a part of a product and the esteem value that it provides. These functions therefore make the product work effectively or contribute to the 'salability' of the product.

C - Creative

This step requires a certain amount of creative thinking by the team. A technique that is useful for this type of analysis is brainstorming. This stage is concerned with developing alternative, more cost effective ways of achieving the basic function. All rules of brainstorming are allowed, and criticism needs to be avoided as it could cease the flow of ideas Simply list down all ideas.

D - Evaluation

In this phase the VE team judges the ideas developed during the creative phase. The VE team ranks the ideas. Ideas found to be irrelevant or not worthy of additional study are disregarded; those ideas that represent the greatest potential for cost savings and improvements are selected for development. A weighted evaluation is applied in some cases to account for project impacts other than costs (both capital and life cycle). Ideally, the VE team would like to evaluate all attractive ideas but time constraints often limit the number of ideas that can be developed during the workshop. As a result, the team focuses on the higher ranked ideas. This step is designed so that the most significant ideas are isolated and prioritized.

E - Development

In the development step, final recommendations are developed from the alternatives selected during the analysis phase. Detailed technical and economic testing is conducted and the probability of successful implementation is assessed**.**

F –Presentation

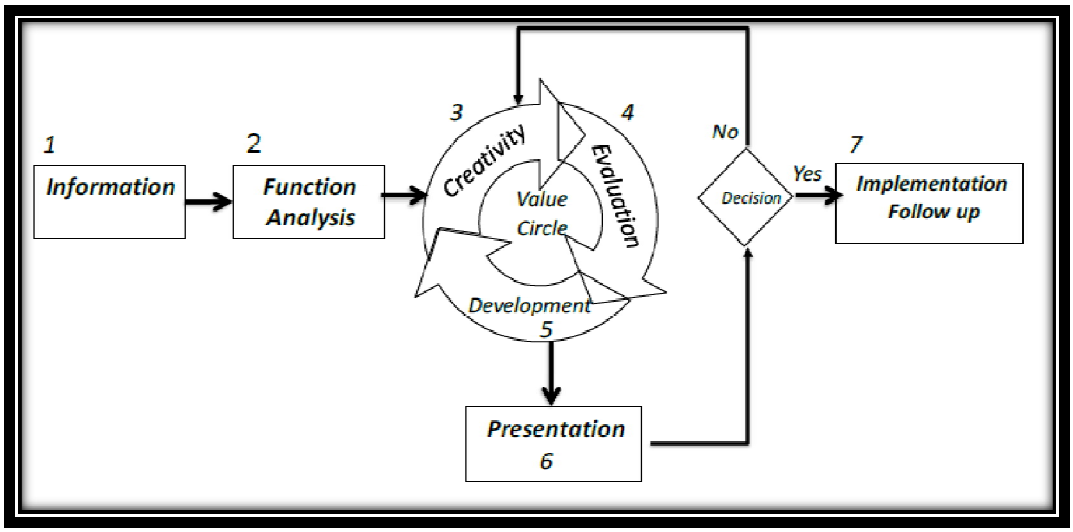
The presentation phase is actually presenting the best alternative (or alternatives) to those who have the authority to implement the proposed solutions that are acceptable. It includes preparing value engineering

proposal (VEP) that contains the information needed to reach a decision and implement the proposal.

H. Implementation and Follow Up

During the implementation and follow-up step, management must assure that approved recommendations are converted into actions. Until this is done, savings to offset the cost of the study will not be realized

Figure (2/3/1) The Seven steps of the VE Job Plan



Source: Al-Yousefi(2010).

2.3.3 Principal Characteristics of value engineering

Value Engineering is functionally oriented to include:

- Identifying the function
- Placing a price tag on that function.
- Developing alternative means to accomplish the function without any sacrifice of quality.
- Base judgments on a total life cycle cost with strong emphasis on maintainability. Lack of VE during location, design, and construction results in higher than necessary maintenance costs.
- The two main differences that distinguish VE from other cost reduction programs are:

- Functional approach analysis
- Systematic approach job plan.

2.3.4 Importance of Value Engineering

Value engineering has to be treated as future investment for gaining technology leadership in the industry" Value engineering is a fantastic process that triggers a complete overhaul of the system alternate design, alternate material, design verification for strength, durability and safety, manufacturing process and testing (Najafi et al, 2010).The success of each Value engineering program depends mainly on the quality of the team ie., their qualification experience and relationship with the management. It is effective and influential if it is performed early in the development of the project schedule. Following points are to be applied when an activity or function decides to do the value engineering:

- Value Engineering determines the basic function of an item.
- Value Engineering evaluating high cost areas and systematically reducing those costs.
- Value Engineering analyzes a problem area and developing alternative ways of resolving the problem
- Value Engineering selects the best possible alternative to perform the basic function at the lowest cost.
- Value Engineering presents and promotes a proposal.
- Value Engineering also simplifies, resulting in increased reliability and ease of maintenance.
- Value Engineering extends financial, manpower, and material resources (Value Engineering, 2013)

2.3.5 Value Engineering -Key Ideas

Value engineering can be applied to new designs, extensive redesigns or in an evaluation of a competitor's product. Ideally, the application of

value engineering should begin at the conceptual design stage and continue through the design process as part of the design to cost effort. Value engineering concentrates on the effectiveness through stating functions, goals, objectives, needs, requirement and desires. Then define the quality features that make the product more acceptable. Finally, generate VE Proposals that meet the requirements at the least possible Life Cycle Cost.VE is a balance between Function, Quality and Cost (Al-Yousefi,2010) this Concept contains three key ideas that provide the conceptual foundations for Value Engineering. Each of these three foundations is explained below

1- Functional analysis

A - **Create a list of components**

The first step in a functional cost analysis is to list the component parts of the product. If a tangible product exists (e.g., existing product, competitor s product, prototype), it may be beneficial to dismantle the product to support this exercise. If a tangible product does not exist, exploded diagrams can be used. Parts lists and engineering drawings can also be used but may be of lesser value because they do not offer the same ease of visualization. For each component, indicate the purpose of function. In some cases, it may be difficult to attribute a function to a single component therefore grouping a number of components as a sub-assembly may aid the process. When assigning functions, consider whether they are:

- Secondary functions that support the basic function- for example, the kettle housing contains water or the handle facilitates pouring water

or

- Other functions which are neither primary nor secondary functions. These other functions may be determined to be unnecessary, or they may be functions that have been added to solve problems with the

product or introduce redundancy in order to increase reliability (http://people.ucalgary.ca/)

B - Determine the cost of each component

The determination of product costs is often oversimplified and therefore inaccurate, even for relatively simple products. This explains why many companies employ specialists in cost estimating. It is not sufficient to merely determine the cost of the individual components and estimate the labour involved. A number of other factors must be considered and included. Some of these factors are:

- Cost of parts including the purchase price as well as any associated shipping Cost of consumables that are used in the fabrication of the product (e.g., glue, cleaners, finishes)
- Labour costs for assembly as well as for any modification or finishing to parts
- Equipment or tooling costs
- Handling and inventory control
- Packaging and shipping costs

Make sure to consider even what appears to be an insignificant item. A few screws may not seem like much, but consider a product that uses a half dozen screws of which a thousand units are manufactured every day; over the course of a year, over 1.5 million screws will be used. Equipment or tooling costs are items that may require some calculation since there is not a one-to-one ratio between the unit of equipment and unit of product. Therefore, it may be necessary to calculate equipment costs based on projected volumes. Depreciation of equipment may also need to be taken into consideration. If the equipment is used for more than one product line or component, the equipment costs are further subdivided. Very detailed cost calculations may also include indirect or overhead costs. These involve facility costs (e.g., heat, hydro, taxes), non-

direct labour (e.g., finance, human resources, marketing), or any other cost that cannot be directly tied to a product. There are a number of different methods by which companies apply overhead costs to products. One method is to add an overhead percentage to direct labour costs while another is to divide the overhead costs amongst all products. In a functional cost analysis, it is easiest to assume that all components equally share the overhead costs and therefore leave these figures out of the calculations. Once the costs have been determined for each component or sub-assembly in relation to the function(s) they support, the total cost of the component or sub-assembly is determined. The total product cost is calculated by summing the totals for all components. This total is then used to calculate the percentage of the total cost that each part represents. For example, if a component costs $0.27 and the total cost of the product is $4.90, the component represents 5.5% of the total cost. The cost of each function can be calculated by adding all of the costs attributed to a specific function. As with the component costs, the percentage of the total cost that each function represents is calculated. If desirable, the cost sequence can be determined where the functions are numbered, with representing the most costly function this sequence may be useful when comparing cost of functions to their value.

C - Determine the value of each component

This step is one of the most difficult in the functional value analysis because much of it is subjective and it requires an estimate of the value as perceived by the customer. When determining the value of the components and subassemblies, it is important to consider the value of aspects other than those that contribute to function or performance. For example, the brass plating of sink taps does not contribute to performance but do provide prestige or aesthetic benefit that can be labeled esteem value . Automobiles provide an example of exchange or market value.

Two vehicles may provide the same performance and functionality, but a customer may attribute more value to one over the other if there are perceived differences in market value other values that can be considered are those associated with materials, serviceability and place of manufacture. One method to determine value in terms of currency is to compare the costs and characteristics of similar products. For example, if two televisions are identical in every aspect except one has picture-in-picture, the difference in cost of the two televisions may represent the value of the picture-in-picture functionality to the customer. Although it is preferable to quantify the values of components, it is often difficult for developmental products or when legacy products do not exist. In these situations, a relative comparison can be made where components are assigned a high, medium or low value. Prioritization matrices can help make these comparisons.

D - Consider the value of functions

Before looking at ways of reducing the cost of the product or increasing its value, the value of the current functions should be examined. If a certain function is not perceived to be valuable to the customer and the function is determined not to be necessary for reasons such as performance or reliability, then perhaps that function should be simplified or eliminated. Having added functionality in a product that is not perceived valuable by the customer can actually hurt the sale of the product. For example, if a television with an antenna is priced the same as one without, a customer may believe that the first television is inferior as the antenna is provided at the expense of the quality of the other components.

E - Generate alternatives that lead to reduced costs and/or increased Value

Once the existing product has been assessed, the next step is to find design or component alternatives that serve to reduce costs without risking value or increase value without adding cost. The most ideal situation is to find alternatives that reduce costs while adding value. Brainstorming is methods that can be employed to generate alternatives.

F - Evaluate alternatives

Not all alternatives suggested to improve costs or increase value will be feasible or compatible therefore a careful evaluation should be made before any implementations are made. Evaluation matrices or quality function deployment may be helpful in considering the alternatives. If the functional cost analysis results in changes to the product design, be sure to manage these changes carefully and update all necessary documentation including specifications.

2 - Cost reduction

A - Gather the Data

The first step in systematically evaluating cost should be to gather up all the relevant data. Relevant data at a minimum includes the cost of every part in the product. In addition, the data should include all bills of material (BOM), standard costs, tooling agreements and where used on quantity lists and quotes. This data enables answer questions about BOM/part, quantity errors or about vendor quote quantities/price. Without the baseline data, it is often impossible to get the root of why parts costs are the way they are and when they can be reduced. This data should be gathered and placed into a well-organized database and should be archived as the ‘base case, Costs tend to be dynamic, component costs, BOMs and product attributes change. If possible, the best time to capture data that is considered to be a ‘base case’ is after a program review or

when the major standards for a product have been set. This helps to minimize problems with stale prices or obsolete components creeping in to the analysis. It also minimizes the problem of data synchronization errors creeping into the analysis. Care should be taken to avoid this. If fact, prior to implementing the cost savings ideas, good practice suggests to run a second dataset in order to be certain the cost savings you propose are still valid and cost effective. Finally, after implementing your cost savings ideas, a third dataset should be created to document the savings

B - Check for Errors

Tracking all the parts, quantities, costs and auxiliary information can lead to numerous small errors that magnify with product volume. With today's leaner organizations, and automated systems, fewer eyes look at the cost data. Fortunately Electronic Document Interchange automated material systems like help reduce total error rates by assuring correct translation of data between the various enterprise entities. Unfortunately if bad data makes it through the input filters; it has a tendency to acquire a life of its own. Most of the data errors were due to obsolete or stale cost data and system errors. For instance, common errors include:

- The latest BOM is not on file.
- The vendor quotes were based off the wrong revision.
- Cost data had not been updated on the system.
- A change to a lower level part or its cost has not rippled through the analysis.
- Incorrect part costs were the result of an automated cost system that replaced a zero by a rote algorithm because the system cannot function with a zero.
- ERP software that could only handle whole numbers Careful checking for data errors is a crucial step in establishing baseline data. Careful

proofing can eliminate many of these errors. It is prefer to group together like parts and their costs and then identify those that appear out of line.. On the other hand, in the new product phase, with its higher reliance on estimated and initial quotes, error elimination exercises yield better results.

C - Identify the Product Cost Drivers

The best place to find cost savings is where the most cost is being consumed. This statement appears to be obvious and yet many organizations do not know where most of the cost of a product occurs. The most expensive part is not necessarily the cost driver of a product. The most cost correlates with the highest extended cost. Extended cost considers not only a part unit's cost but the part quantity being employed.

Extended Cost = Part Unit Cost x Quantity Used

In addition to extended cost, it is important to understand the cost environment of the part. A structured, indented BOM should be constructed and expanded down to the lowest practical level. Performing this analysis identifies what costs roll up under each subassembly. Magnify this by the number of times that a subassembly is used and leads to effective cost savings.

D - Understand the wider cost environment

As a corollary to the product cost analysis, one should also fully understand the cost environment for the product. The final product cost to a business unit is the sum of the direct product cost and a large number of indirect costs and allocations, i.e. overhead. Except for the highest volume producers and product, direct product cost is a small fraction of the sales price or even the internal business unit product cost.

The problem with indirect costs, such as sales & marketing expenses and R&D expenses or general allocations, is that most of them are fixed and/or period expenses that are charged back to the product on a per unit

basis. In a perfect world, cost accretion and expensing to an appropriate product cost would be tightly coupled. The reality is there are many grey areas, subject to interpretation. Expenses common to more than one product or business unit have to be apportioned. That apportionment is usually done according to rules that meet the reporting/information needs of the organization. (**http://web.mit.edu/meeker/Public)**

3 - Quality improvement

Can be through:

- Increasing the system complexity through introduction of additional subsystems and elements that improve quality
- Using more expensive materials
- Increasing the labor consumption, especially for finishing and testing operations **(http://www.ideationtriz.com)**

2.3.6 Benefits of Value Engineering

Benefits of Value Engineering can be defined as follows:

- Lowering costs.
- Improving quality management
- Improving resource efficiency.
- Simplifying procedures.
- Minimizing paperwork.
- Lowering staff costs.
- Increasing procedural efficiency.
- Optimizing expenditures.
- Developing value attitudes in staff.
- Competing more successfully in marketplace.
- Customer Satisfaction.
- Performance Improvement.
- Time Saving.
- Functions Achieved (**http://www.ideationtriz.com)**

2.3.7 The Relationship between Value Engineering & Target Costing

Value engineering helps businesses achieve cost efficiencies and meet their cost and profitability targets. Target costing establishes a relationship between cost, price and profit. When a company introduces a new product into the market place it can either choose to focus on costs i.e. work towards the lowest possible cost and hopefully be able to set a selling price that secures a large percentage of the market, and achieve a high level of profit, or focus on differentiating its product to make it more attractive to customers. Target costing is an activity aimed at reducing the life-cycle costs of new products, while ensuring quality, reliability, and other consumer requirements by examining all possible ideas for cost reduction at the product planning, research and development and prototyping phases of production. But it is not just a cost reduction technique; it is part of a comprehensive strategic profit management system, value engineering is used to change production methods and/or reduce expected costs so the target is met". Target costing establishes the relationships between cost, price and profit. The traditional approach to pricing centered on developing a product, then determining the expected cost based on the expected volumes, and then setting a selling price that would recover all indirect costs and generate sufficient profit to satisfy company objectives. However, when a target costing approach is followed, the company develops a product and then determines the price customers are willing to pay. The desired profit margin is deducted from the price leaving a figure that represents the maximum total cost. The company then has to ensure the product can be produced for this amount. If this cannot be achieved, the product will not be produced. other factors would need to be considered, including:

- The usual reductions/efficiencies would naturally result from an increase in volumes.

❖ The potential learning curve effects.

❖ Usual cost reduction techniques should have a positive effect and reduce costs.

It is for these reasons that a company may go ahead with production, even though the target cost is below the current estimated, attainable cost. It would be confident that reductions would accrue as above plus the company might introduce better methods of recruitment and training, use different grades of labour, and buy as opposed to making some of the components and so on. Such costs won't take place without a systematic approach to cost reduction. Value engineering is "Redesign of an activity, product or service so that value to the customer is enhanced while costs are reduced (or at least increased by less than the resulting price increase)".Value engineering relates closely to target costing as it is cost avoidance or cost reduction before Production.

Value engineering is a systematic evaluation of all aspects of the value-chain business functions, with the objective of reducing costs while satisfying customer needs. Value engineering via improvement in product and process designs is a principal technique that companies use to achieve target cost per unit. Value engineering in short, breaks down every component to its core and keeps only the parts that are integral to functionality, safety, or what a customer will pay for. A company can have a basic, step-up, and premium addition, but everything must be appropriated. Value engineering aims to reduce no value-added costs and also seeks to reduce value-added costs by achieving greater efficiency in value-added activities.

2.4 Firms' performance

2.4.1 Firm Performance Definitions

Concept of firm performance is very common in the academic literature, its definition is difficult because of it have many meanings. For this reason, there isn't a universally accepted definition of this concept. (Neely, Gregory & Platts, 1995).defined Performance as the process of measuring the action's efficiency and effectiveness In the current business management, performance measurement is considered to be in a more critical role compared to quantification and accounting (Koufopoulos, Zoumbos & Argyropoulou, 2008). Bititci, &McDevitt (1997) described performance as a process wherein the organization manages its performance to match its corporate , functional strategies and objectives. The company's performance can be viewed from the financial statement reported by the company. Consequently, a good performing company will reinforce management for quality. In the '50s firm performance was defined as the extent to which firm, viewed as a social system fulfilled their objectives (Georgopoulos & Tannenbaum, 1957: Performance evaluation during this time was focused on work, people and firm structure. Later in the 60s and 70s, firm have begun to explore new ways to evaluate their performance so performance was defined as an firm's ability to exploit its environment for accessing and using the limited resources (Yuchtman &Seashore, 1967:. 379).The years 80s and 90s when the identification of firm objectives is more complex than initially considered. Managers began to understand that a firm's successful depends on accomplishing of its goals (effectiveness) using a minimum of resources (efficiency). Thus, firm's theories that followed supported the idea of a firm that achieves its performance objectives based on the constraints imposed by the limited resources (Lusthaus & Adrien, 1998). In this context, profit became one of the many indicators

of performance. The authors Lebans & Euske (2006: 71) provided a set of definitions to illustrate the concept of firm performance:

- Performance is a set of financial and nonfinancial indicators which offer information on the degree of achievement of objectives and results (Lebans & Euske 2006).
- Performance is dynamic, requiring judgment and interpretation.
- Performance may be illustrated by using a causal model that describes how current actions may affect future results Performance may be understood differently depending on the person involved in the assessment of the firm's performance (e.g. performance can be understood differently from a person within the firm compared to one from outside)To define the concept of performance is necessary to know its elements characteristic to each area of responsibility.
- To report a firm's performance level, it is necessary to be able to quantify the results.

From the above Performance is an analysis of a company's performance as compared to goals and objectives. Within corporate firm, there are three primary outcomes analyzed: financial performance, market performance and shareholder value performance (in some cases, production capacity performance may be analyzed).

2.4.2Firm Performance Measurement

Performance measurement is the process of quantifying the efficiency and effectiveness of past action. More concrete performance measurement is the process of measuring how well organizations are managed against their targets and the value they generate for their stakeholders .According to K. Hon(2005), Performance measurement is indispensable for managing the state of the system and taking the appropriate actions for maintaining company's competitiveness. And many companies conduct performance measurement for measuring,

evaluating, and monitoring their operations of the entire activities Traditionally, business performance has been measured in three ways:

- **First, financial measures** provide objective firm's performance. Accounting data such as return on assets (ROA), return on investment (ROI), and return on sales (ROS) have been applied to numerous studies (Bromiley, 1986; Daily et al., 2002). The new financial measure, economic value-added (EVA), also has been applied to some studies (Bacidore et al., 1997; Chen and Dodd, 1997). However, the use of EVA is not popular because it is complex for managers to understand and use (Ittner and Larcker, 1998). Using of financial measures make easy comparing of the performance level of various business (Sieger, 1992). However, financial measures often do not result in the valid valuation of intangible assets (Huselid, 1995). Nonetheless, financial measures remain the most popular approach in strategy-performance studies (Geringer et al., 1989).
- **Second, market-based measures** of performance have considerable attention in the literature (Amit and Livnat, 1988). Market value added (MVA) has been most accurate means of evaluating how well a firm creates shareholder wealth (Tully, 994).
- **Third, qualitative measures** include subjective side of performance such as stakeholder satisfaction with performance, customer satisfaction, and ethical behavior, management satisfaction with performance (Parnell et al., 2000). They may also include quality, machine flexibility, delivery performance inventory levels, and process improvement, measures of material and parts delivery time, throughput time, due-date performance, , and employee satisfaction (Hendricksetal., 1996). Moreover, the Internet businesses rely heavily on measures of web traffic to gauge performance. Viewing performance through a non-financial lens which cannot be seen via

financial measures. In fact, non-financial measures are indicators of intangible assets and basic drivers of firm value and may be better predictors of future financial performance than historical accounting measures (Ittner and Larcker, 1998b; Kaplan and Norton, 1996; Wallman, 1995).

Although financial performance has been widely used as a key measure of firm performance (Bender, 1986; Boyer, 1999; Boyer *et al.*, 1997), but some studies have pinpointed numerous limitations in relying solely on financial performance measures. Therefore, this research, adopt both operational and financial performance to measure the benefits of integration of target costing and value engineering

2.4.3Importance of Firm measurement Performance

Performance measurement is Important for effective management of any firm (Demirbag, Tatoglu,Tekinus and Zaim, 2006). The improvement is not possible without measuring the outcomes. Hence, organizational performance improvement requires measurements to identify the level to which the use of organizational resources impact business performance (Madu, Aheto, Kuei and Winokur, 1996). The firm's success is basically depend on its performance over a certain period of time. Researchers have extended efforts to determine measures for the concept of performance as a crucial matter. Finding a measurement for the performance of the firm enables the comparison of performances over different time periods. Nevertheless, no specific measurement with the ability to measure every performance aspect has been proposed to date (Snow & Hrebiniak, 1980).

On the opinion of the researcher the importance of performance measurement system it not only improves the performance, but also the productivity of a business entity by reducing costs. It is a way to alignment the activities with the plans being established. It provides

necessary feedback that the activities may be guided by allowing managers to implement best practices. It may thus be said that performance measurement process is a great way to manage, understand and improve the overall functioning state of a business organization. If done efficiently and effectively it drives success into business.

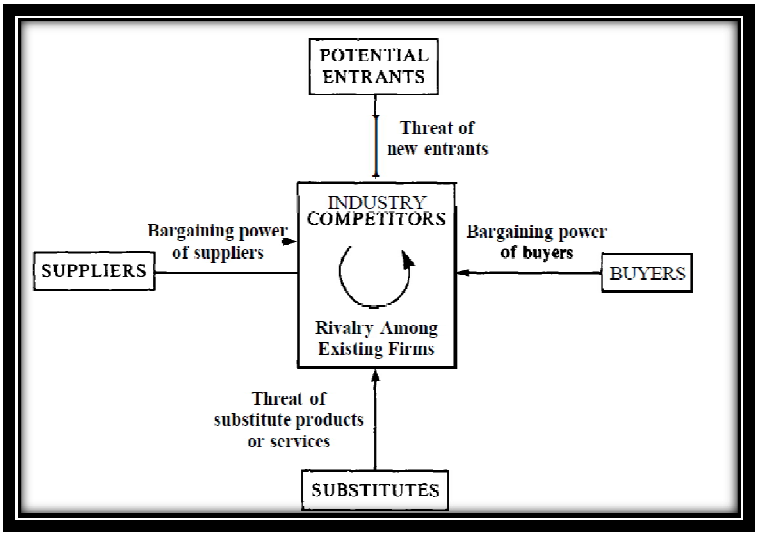
2.5Competitive Strategy

2.5.1 Definition of Competitive Strategy

Competitive strategy may be defined as Long-term action plan that is devised to help a company gain a competitive advantage over its rival. This type of strategy is often used in advertising campaigns by somehow discrediting the competition's product or service. Competitive strategies are essential to companies competing in markets that are heavily saturated with alternatives for consumers. Competitive strategies are the method by which a firm can achieve a competitive advantage in the market.(http://www.businessdictionary.com)

Porter(1980),described Competitive strategy as taking offensive or defensive actions to create a defendable position in an industry, to cope successfully with the five competitive forces and thereby yield a superior return on investment for the firm which are shown in the following Figure **(2.5.1/)**

Figure (2.5.1/) five basic competitive forces



2.5.2 Types of Competitive Strategies

- **The Strategic Types of Porter (1980, 1985),**

According to Porter (1980, 1985), a company can leverage its strengths to position itself within the competition. When classifying the strengths of a company, they can either be placed under the heading of cost advantage or differentiation. Within those two strength categories, the scope of the company is either broad or narrow. As a result, there are three strategies that can be applied to any business or industry at the business level

1. Cost Leadership

A business that wants to achieve an edge through cost leadership will become an expert in lowering costs while maintaining prices. The goal should always be to reduce the costs associated with doing business, while continuing to charge the same price as its competitors. This gives the company a greater profit, without having any extra expenses. Another method of maximizing the Cost Leadership position is by lowering the selling point. Because the costs associated with the products are already low, the company is still making a healthy profit. This allows the company to under bid the competitors while still preserving profits so Cost Leadership trategy:

- Increasing profits by reducing costs, while charging industry-average prices.
- Increasing market share through charging lower prices, while still making a reasonable profit on each sale because you've reduced costs.

2. Differentiation

The differentiation strategy seeks to set a company apart by creating products that are different than a competitor's. The specific ways that a company differentiates itself from the competition will depend on the industry of the company, but may include features, support and

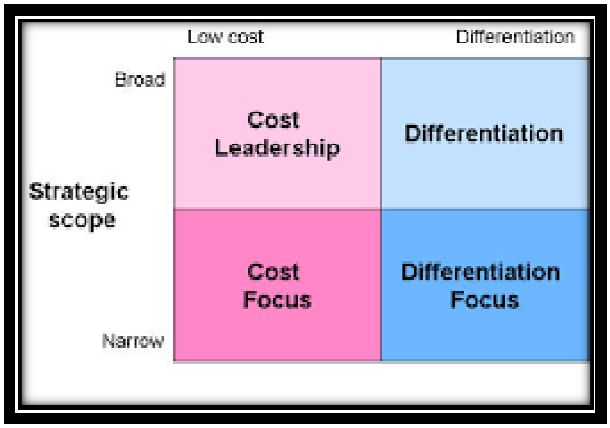
functionality. The uniqueness of the company – the differentiation – must only be a feature that a customer is willing to pay a premium price for. A company that focuses on differentiation may be disappointed to realize that their market share is continually changing and comes with a set of risks To make a success of a Differentiation strategy, organizations need:

1. Good research, development and innovation.
2. The ability to deliver high-quality products or services.
3. Effective sales and marketing, so that the market understands the benefits offered by the differentiated offerings.

3. Focus

The company that uses the Focus strategy is selecting a niche market, and then determining the scope of the focus. Within the Focus strategy is the option to use either cost leadership or differentiation. It may be confusing to keep in mind that the Focus strategy is dealing with a specific, niche market. Focus does not mean a smaller market simply because the company is small – it means that the company has chosen to add value to their products and offer them to a select number of customers. Because the company who chooses a Focus strategy deals exclusively with their client base, they develop a loyal relationship which can generate sales and profits for the future. The difference among the three generic strategies are illustrated in figure(2/5/2)

Figure (2/5/2) Three Generic Strategies



***Source**: Porter (1985)*

For Choosing the Right Generic Strategy, a company must decide which strategy to employ. Taking into account the strengths of the company may give an indication of the best strategy to choose. To determine the best strategy for the company, follow a few simple steps:

1. **Creating a Strengths, Weakness, Opportunities, Threats (SWOT)** chart for each of the three strategies. Once that is completed, it may be clear that a strategy would not be appropriate. If that is the case, eliminate that strategy, and continue to the next step.
2. **Conducting an analysis of the industry the business is in**. Finding out specifics about the business industry can lead to an increased understanding of the market and how to best position the company.
3. **Comparing the SWOT analysis to the business industry results**. To Select the most viable options from the SWOT analysis and compare to the business industry analysis

- **The Strategic Types of Michael Treacy and Fred Wiersma**

Michael Treacy and Fred Wiersma(1997) describe three value disciplines or generic competitive strategies namely operational excellence, product leadership and customer intimacy**.**

1. Operational Excellence

The objective of this strategy is to achieve cost leadership. The strategy focuses on automating work procedures and manufacturing processes so as to streamline operations and bring down costs. The approach, lends itself to standardized, transaction-oriented and high-volume production that hardly requires much differentiation.

Operational excellence is an ideal strategy for markets where customers prefer cost to a choice. This is frequently the situation with respect to commoditized, mature markets where cost leadership offers a medium for continued growth. Businesses that excel in this strategy have a rule-based, standardized operation and strong organizational discipline. They are also

effectively centralized. Disciplines such as SCM, TQM, and Six Sigma are fostered in a volume-oriented business mode.The Discipline of Operational Excellence are:

✓ **People**:

• The team is what counts, not the individual

• Everybody knows the battle plan and the rule book

✓ **Efficient transactions:**

• Automated routines, tasks and coordinated activity through better communications.

• Low overhead, efficient, reengineered business processes.

• Virtual integration of the whole extended value chain.

• Streamlining the connections among team members eliminates duplications, delays,and even payment complications .

✓ **Information technology:**

• Integrated information systems, not only in the core operating processes, also in measuring & monitoring to ensure rigorous quality control and cost control to make fast management decisions

• Aggressively mobile technologies to extend their control and to improve customer service.

✓ **Customer service:**

Redesign of the customer-service cycle

- Aggressively streamlining the selection, ordering, receiving, paying for, and maintenance of their products

Getting the client to adopt the operationally excellent company's way of doing business

✓ **Exploiting the value:**

Growth

❖ To assure a constant , steady volume of business

❖ To find new ways to use their existing assets

❖ To replicate their formula in other markets

2. Product Leadership

The intention behind this strategy is to develop a culture that continuously introduces superior goods to the market. Product leaders are aware that brilliance in creativity, teamwork, and problem-solving is crucial to their success. These leaders are able to accomplish first-class market prices owing to the experience they develop for their customers. Included among the corporate disciplines they cultivate are research portfolio management, product management, talent management, teamwork, and marketing. Product leaders work towards leveraging their expertise across organizational and geographical boundaries by achieving expertise in disciplines such as knowledge management and collaboration. The Discipline of Product Leadership is:

- Product leaders have to prepare markets and educate potential customers to accept products that never before existed
- Cultivation of markets must go hand in glove with breakthrough product development
- The challenge is to push the rate of diffusion beyond what is natural and common, to get demand to climb faster, earlier
- Larger-than-life launches, early adopter programs, and massive marketing are all in the repertoire
- Find ways to quickly narrow the portfolio
- Concentrate resources on the handful opportunities with the greatest potential to hit big

Product leaders don't just follow their gut feeling; they squeeze as much uncertainty as possible. It comes down to vision, insight, and judgment of a few people at the top.

3. Customer Intimacy

As the term suggests, customer intimacy is about intimacy or closeness to the customer. It is about precision in segmenting and targeting markets and customizing offerings to perfectly match the demands of those markets. Companies practicing successful customer intimacy blend comprehensive customer knowledge with operational flexibility to quickly respond to practically any need, from product personalization to meeting special requests. So essentially, product development, executive functions, administrative focus and manufacturing should all be aligned around the requirements of the individual customer.

The solutions that materialize from a customer intimacy strategy are rarely the cheapest or the most original for the customer but are rather considered "good enough."The Discipline of Customer Intimacy is:

✓ **People:**

• Tremendous skills at effecting change within client organizations.

• Get things implemented, to make things happen.

• Proof of their value is found only in results.

✓ **Delivery systems:**

• Offer a staggering range of products and services.

• They *"rent"* rather than own many of these capabilities.

• Strength lies in what they know and how they coordinate expertise to deliver solutions.

• Using the network is key.

1. Ability to broaden the range of its total solution by extending its network into areas in which it lacks capabilities

2. It can avail itself and its customers of components that have other value propositions of lowest cost or best products.

✓ **Relationships:**

• They go for the long view as long as the long-term relationship promises to be profitable

• A steady client is a lasting asset; one-time client is a poor investment

• If they pursue "transaction customers" they will find itself competing with operational excellent and product-leadership companies

1. Attitude: customer must be open to a relationship in which some independency is lost

2. Ideal operational fit exists when compelling expertise meets client's incompetence

3. Ideal financial fit occurs when the customer understands he has a problem, has the money and wants the solution delivered by another party.

✓ **Exploiting value:**

- Creation of an unmatched value proposition of best total solution
- Growth within the client and growth of accounts

Figure (2/5/3) disciplines strategies

Source : Michael Treacy and Fred Wiersma(1997)

- **The Strategic Types of Miles and Snow (1978)**

Miles and Snow (1978) studied the relationship between structure and strategy. They published 'Organizational Strategy, Structure, and Process,' which identified four types of organizations – defenders, prospectors, analyzers, and reactors. Collectively, these types show how companies compete.

1. Defenders

For the defender, a stable form of organization is appropriate. Companies create this stable domain by producing only a limited set of products for a small segment of the total potential market. In this small segment, defenders strive aggressively by competitive pricing or high quality products to keep competitors out of its domain. Though, defenders tend to ignore trends from outside their domain. In the long term, defenders are able to maintain a small niche in the industry which is hard for competitors to penetrate when looking at the theories of Porter and Treacy and Wiersema, the defender shows the most similarity with a company that is a focuser". Defenders don't choose one strategy explicitly, but try to keep their competitors outside their domain by either differentiation or Competitive pricing. Furthermore, they focus on a target segment rather than on the complete market.

2. Prospectors

The goal of the prospector is to find and exploit new product and market opportunities. They want to maintain a reputation as innovator. They develop and maintain the capacity to consider a wide range of environmental conditions, events and trends. Therefore, the company invests a lot in people who scan the environment for potential opportunities. To keep competitors out of their domain, prospectors use change as a major tool. Prospectors are most similar to the "differentiators" of Porter and "product innovators" of Treacy and

Wiersema. They all want to stand out in terms of product design and are continually looking for new ways to improve their products

3. Analyzers

Analyzers attempt to minimize risk while maximizing the opportunity for profit. This shows that these firms are a combination of the prospector and the defender. When moving towards new markets, the analyzer only adopts the most successful product innovations developed by prospectors. Though, the most revenue is generated by a stable set of products and customer or client groups. In short, for an analyzer to be successful, it must be able to respond quickly and at the same time maintain operating efficiency in its stable product and market areas. Treacy and Wiersema's "operational excellence" shows the most equality with this group. They both want to deliver products or services to customers at competitive prices and minimal inconvenience.

4. Reactors

The fourth and final type is the reactor. Reactors show a pattern of adjustment to its environment that is unstable and inconsistent at the same time. This type of organization thus lacks a set of response mechanisms which it can consistently put into effect when facing a changing environment. Reactors respond inappropriately to a changing environment and perform poorly as a result. This strategy arises when one of the other three strategies is improperly occupied. Companies can't behave as reactors indefinitely, unless it exists in a protected environment. They have to move towards one of the other three strategies Reactors show the most similarity with companies that are "stuck in the middle". Both groups don't operate that well in an industry and must thus move towards another strategy sooner or later.

Figure (2 .5.4) Miles and Snow strategic types

Source: adapted from Miles and Snow (1978)

- **The Strategic Types of Gupta and Govindarajan**

According to Gupta and Govindarajan (1984a; 1984b)There are four different strategic typologies: build, hold, harvest and divest.

Build*:* A firm that pursues a build strategy tends to focus on building market share growth and competitive position rather than short-term earnings and cash flow. A build strategy relates to product quality improvement, aggressive marketing and decrease in prices in order to generate market demand. Consequently, it requires investments in R&D,engineering support and capital investment. Appropriate managerial characteristics of build strategy are high risk-taker, greater tolerance for ambiguity and having R&D, marketing or production backgrounds. Build strategy can be achieved by the superior organizations in an industry (Guilding, 1999).

Hold*:* Under hold strategy, a firm aims to protect market share and competitive position while earning reasonable short-term profits (Gupta, 1987).

Harvest*:* Maximizing short-term profit and cash flow is the main theme of a firm pursuing a harvest strategy; increasing market share is ignored

and becomes less important. No investments such as R&D, marketing expenditures and capital investment are required for this strategy. A harvest strategy implies a highly risk-averse person, less tolerance for ambiguity and a manager with a finance control background (Guilding, 1999).

Divest*:* An organization follows divest strategy plans to cease and come out of the business (Gupta and Govindarajan, 1984a; 1984b).

Porter claims that competitive strategy is the search for a favorable competitive position in the industry. The literature outlines three reasons why Porter's competitive strategy is useful.

First: it builds on previous findings and bears some relationship to other strategic categorizations, typologies and taxonomies in the literature (Miller and Friesen, 1986; Hambrick, 1983). Hall (1980) revealed in an in-depth study, that success comes from either the lowest cost position, or the highest product/service/quality position in hostile environments, which is related to Porter's (1980) cost leadership and differentiation strategy. Also Henderson (1979) discussed the importance of cost leadership. Cost leaders pay great attention to employee productivity, asset use, and discretionary expenses, which often results in the lowest prices in the market.

Second: Porter did not limit his classification to special circumstances, applies to a wide range of business situations (Chrisman and Hofer, 1988)

Third: past empirical research findings have shown that there is a general consistency between commitment to one of Porter's strategies and higher performance (Dess and Davis, 1984; Hambrick, 1983).

So due to the reasons above, Porter's framework of generic strategies provides a valuable research tool, in order to examine the relationship between performance and strategic choice. Porter's ultimate goal of Competitive Strategy is to distinguish between successful and

unsuccessful companies on behalf of their strategic choice: cost leadership, differentiation, and focus. A firm must make a choice between one of the three strategies or else it will be "stuck in the middle" and suffer from below-average performance (Porter, 1980,40).

2.5.3Target Costing and Strategy

In simple way strategy can be defined as a plan or set of rules required to adjust uncertain future circumstances and includes actions according to the situations. Top level managers or groups of managers play important role in strategy creation. Cooper (1996) stated that effective systems of cost management are developed to face changing competitive conditions. Companies can no longer maintain their condition or sustain competitive advantage by pursuing cost leadership or differentiation strategies. In low cost strategy or cost leadership strategy companies try to be the lowest cost producer without focusing quality of product while in differentiation strategy companies strive to manufacture high quality and functionality products for high income group persons without focusing cost of product. Under low competitive environment non-confrontational strategies, cost leadership and product differentiation can be successful. Hence, companies have moved to use new strategy in competitive environment which is 'confrontation strategy'(Cooper,1996). The companies who apply a confrontation strategy do not avoid competition. The basic idea of confrontation strategy is that firms have to compete under 'survival triplet' concept.

The competitive strategy of firm is closely linked to its adoption of target costing (Ansari& Bell, 1997). Target costing is a strategic management accounting tool (Ewert & Ernst,1999). Cooper & Slagmulder (1997) described that target costing is directly related with the organization's competitive strategy. The confrontational strategy is about three key competitive areas quality, functionality and price. Confrontation

management thinking emerged during late 20th century as a result of increasing modern day competition. It is a strategy through which firms can operate internationally against competition. Companies that adopt this strategy can develop product at low cost, high quality and functionality. This is a competitive strategy because the firm that fails to reduce cost with rapidly changing environment and competitors will notice that its profit margin are being squeezed and its existence is in danger. The three product feature or survival triplet play a critical role for the survival of firms under confrontation strategy. The confrontational competition strategy demands the integration of cost, quality and functionality and these should be applied consistently to meet the perfect quality and functionality at the perfect price. The confrontational strategy requires the integration of price, quality and functionality and this integration can enable a firm to respond rapidly the market competition (Cooper & Slagmulder, 1997). Some previous studies interpret confrontation as a strategy of producing a cheaper product with quickest introduction and supply. This is difficult to work according this strategy therefore a company should have a strong learning culture. Low cost leadership strategy and product differentiation strategy are used with target costing because these are the parts of confrontation strategy to take sustainable competitive advantage during uncertainty. Companies cannot ignore product quality to produce product at the lowest possible cost. Confrontation strategy is based on the assumption that competition in market is not avoidable and this strategy is best suitable in the environment of high competition. The strategy selected by the organization is influenced by the pressure of competition and this pressure is not similar for every firm. on confrontational strategies such as differentiation and cost leadership are suitable in the environment of less intensity of competition

From all it concludes that target costing improves product quality by making it an explicit objective of the product development and costing processes. Cost targets cannot be achieved by compromising the features that a customer desires or by reducing the performance or reliability of a product. Reducing costs is the heart of target costing it makes cost planning a part of profit planning and uses customer-focused design process to manage costs before they are incurred. Target costing reduces the time from concept to marketing of products no time is lost in trying to determine how to manufacture a product after it is designed or in correcting design error. And conceptual perceive of target costing focusing on customer satisfaction, determining a target cost through company strategic policy and aligning it with achievable costs and attaining target costing by using VE and other cost-reduction techniques.

CHAPTER THREE

Research Methodology and Data Analysis

3.1Chapter overview

This chapter presents the research philosophy, methodology adopted and shows the process through which the data was collected from firms represents various industries in Khartoum -Sudan and analyzed to presents the findings. The chapter was organized into thirteen sections

3.2 Research Philosophy

It is the way that guiding the conducting of scientific research (Collis and Hussey, 2009). According to, Easterby-Smith et al. (2008) Saunders et al.(2009), and Collis and Hussey (2009), social science research design based on two main philosophies are positivism and interpretivism.

Within positivism philosophy, the assumption is that social phenomena is independent of the researcher and objectively measured. In contrast, interpretivism (or social constructionism), which developed as a result of the criticisms of the positivism, is supported by the idea that social phenomena is part of the researcher and subjectively measured.

In addition, positivism philosophy implies the quantitative, objective, scientific, and traditionalist approach; whereas the interpretivism philosophy implies the qualitative, subjective, humanist, and phenomenological approach (Collis and Hussey, 2009).

For this research Positivistic philosophy was adopted for the following reasons:

- Positivism is still the dominant philosophy in many areas of management and business research.
- The research topic of this study seeks to identify the Target costing and value engineering used in manufacturing firms in Sudan and to examine the relationship between them and Competitive strategy as well as other research variables using an existing theory, the

Therefore, the positivistic philosophy was considered as appropriate for this research study.

This research is also based on the deductive approach because the hypotheses are developed based on the existing theory. Then the hypotheses are tested relying on quantitative data and statistical packages. However, the deductive approach is also consistent with the positivism that adopted in this research.

3.3 Research Approaches

Creswell (2009) identifies three approaches of methodology each of them can be linked to philosophies, methods of data collection and analysis. These are: quantitative, qualitative, and mixed methods approach.

- Quantitative approach: The researcher adopts a positivistic philosophy and uses surveys experiments and, employs predetermined instruments for collecting data, and uses statistical techniques in analyzing the data.
- Qualitative approach: The researcher adopts interpretivism philosophy and uses, grounded theory studies, case studies, and phenomenological.
- Mixed methods approach: The researcher uses both quantitative information (e.g. instruments) as well as qualitative information (e.g. interviews).

According to the above, and taking into account the adopted research philosophy, objectives, and questions, this research study adopted the quantitative approach. So a survey method was adopted as the research strategy of inquiry. Bryman and Bell (2007, p. 56) indicated that survey research "comprises a cross-sectional design in relation to which data are collected predominantly by questionnaire or by structured interview on

more than one case and at a single point in time in order to collect a body of quantitative or qualitative data in connection with two or more variables, which are then examined to detect patterns of association".

The reasons behind choosing the questionnaire survey in this research **are:**

- Questionnaire survey is a popular method for collecting primary data among management and business research (Sekaran and Bougie, 2010 Saunders et al., 2009,).
- This method has been utilised in previous research in similar areas of, management accounting (Teerooven and Bhagtaraj, 2008).
- To be consistent with the adopted research philosophy (i.e. positivistic philosophy) and to achieve the research objectives, recognizing relationships between research variables, and conducting the appropriate analysis techniques.

According to (Williams and May, 1996) there are two research approaches deductive approach (testing theory) and inductive approach (building theory). The deductive research concerns with developing of hypotheses from theory, collecting data, testing hypotheses, and confirming or modifying the theory if (Creswell, 2003).the important characteristic of the deductive approach is the search for causal relationships between variables (Saunders et al., 2003). The inductive research concerns with forming the theory and less concern with generalization**.**

This research is based on the deductive approach because the hypotheses are developed then tested relying on quantitative data and statistical packages**,** deductive approach is also consistent with the positivism philosophy.

3.4 Research Type

There are many different research types; and no simple classifications of research types consider comprehensively all variations (Cooper and Schindler, 2008).due to the research purpose Collis and Hussey (2009) are described research types as being exploratory, descriptive, analytical /explanatory or predictive research. Exploratory research is conducted when there are few or no earlier research studies that the researcher could refer to. The main aim is to seek for patterns or hypotheses, rather than testing hypotheses. Descriptive research is conducted to describe a particular problem by identifying and obtaining information on its characteristics. So, quantitative data are appropriate for descriptive studies (Sekaran and Bougie, 2010). Analytical or explanatory research is developed stage of the descriptive research. The researchers beside the description of characteristics, they analyze and explain why or how the phenomenon is happening. It aims to discover and measure causal associations among phenomena in order to understand them. Finally, predictive research is predicting certain phenomena on the basis of hypothesized general relationships. (Collis and Hussey,2009).

According to the research's aim and objectives, the present study can be classified as descriptive and analytical. Specifically, Objective two, that seeks to examine the relationship between contingent variable and the usefulness of target costing and value engineering in relation to Firms' performance.

Due to time horizons (Sekaran and Bougie, 2010,Saunders etal., 2009) recognize two different types of research including cross-sectional and longitudinal studies. With the cross-sectional, studies data can be collected once at a point in time. On the other hand, longitudinal studies are carried out across a period of time and the data are collected at two different points in time.

Consequently, this research study is classified as cross-sectional as the required data are gathered at a point in time.

According to investigation, Sekaran and Bougie (2010) stated that studies can be classified into causal or correlational studies. Causal study is conducted when there are one or more variables causing the problem. (i.e. cause-and-effect relationships). Correlational study is concerned with identifying the important variables associated with the problem.

Base on the research objectives, this research study can be classified as causal and correlational investigation.

3.5 Data Collection Methods

Research data can be obtained from primary or secondary sources. The primary data are collected from experiments, questionnaire survey, interviews or focus groups, whereas the secondary data are gathered from publications, databases and internal records. Moreover, several methods can be adopted for collecting survey data in a positivistic research, including questionnaires and interviews (Collis and Hussey, 2009).

To the nature of the research population, namely manufacturing firms operating in Khartoum - Sudan, the self administered questionnaire was considered appropriate to achieve the research objectives.

The main advantage of a self-administered questionnaire is that the response can be collected within a short period, ensure a high response rate, and minimize researcher bias save time and cost, (Sekaran and Bougie, 2010, Collis and Hussey, 2009, Bryman and Bell, 2007)

3.6 Research Population and Sample

The population of this research study is defined as manufacturing firms operating in Khartoum - Sudan. The justification for this selection is that the manufacturing firms tend to design their management

accounting system differently from those firms operating in the service sector (Drury, 2008 Fisher, 1995).

So, it is difficult to design two questionnaires, one for manufacturing and the other for non-manufacturing companies. In addition, similarities in features among manufacturing companies, compared to non-manufacturing ones, make it easier to design one questionnaire.

The sampling frame is a list of all firms in the study population from which the researchers will draw their sample. In the case of this study, the researcher has visited the Industrial Register Office, which is based in Khartoum, to obtain a list of the names and addresses of manufacturing companies in Khartoum state .The final sampling frame consists of a total 269 out of 896 due to the Steven Thompson formula (Thompson, 2012)

The senior managers, such as the Planning and Quality Manager, Production Manager Financial Manager, Head of Costs Division, Head of accounting Department were the target respondents for this research. The reason for choosing these respondents is that they are in a managerial position and should be knowledgeable enough to complete the questionnaire and provide accurate information as well as they are in relation with formulation strategies

3.7 Questionnaire Design

The questionnaire was designed to acquire information including target costing Value engineering techniques, competitive strategy, and firms' performance from the Manufacturing firms in Khartoum- Sudan

The questionnaire consists of five sections. The first section reveals general data relating to the person who fills out the questionnaire and general characteristics of the companies, Section two is mainly concerned with target costing, technique both the adoption, and the benefit. The third section is related to Value engineering technique benefit. Section

four is about competitive strategy. Whereas the last section relates to firms' performance two types of question are commonly used for constructing the questionnaire, the open-ended and closed types. ,(Collis and Hussey, 2009). In the case of exploratory research, the researcher utilizes open questions for gathering much information. On the other hand, with explanatory or analytical research, the researcher usually uses closed questions. van der Velde et al (2004).the type of questions used in a research is influenced by the research philosophy, therefore with the positivistic philosophy, the closed questions are commonly used, whereas in the interpretivism, the open-ended questions are concerned. Collis and Hussey (2009). Types of closed question were used in the questionnaire, including category questions, list questions, quantity questions, and rating questions. According to Saunders et al. (2009). There are many variants of the Likert-scale with the four-, five-, six- or seven-point rating scales as the most commonly used (Saunders et al., 2009),and the reliability rating is not effected by an increase in the rating scale from five to seven or even to nine points (Sekaran and Bougie, 2010, p.151)

For this research questionnaire, in accordance with the research philosophy, the closed-ended type was used as the main type in constructing the questionnaire. In addition, a few open questions in the form of "*other (please specify)*" were used .The main type of closed questions used in this questionnaire to measure the main research variables in Questions of section two, three and four was rating questions in the form of five-point scale as quicker and easier to use. The questionnaire was initially prepared in the English language, and then translated into Arabic language as the official language used in the Sudan companies the translated questionnaire was tested for accuracy of content by Two Sudanese academics, who have long experience teaching management accounting in the Sudan University of seines & technology

The questionnaire was validated using reverse translation. That is the researcher first translated the questionnaire from English to Arabic language then, another Sudanese academic, who had PhD degree in English system, translated the questionnaire back from Arabic to English language. Both of English copies have been compared, and it was concluded that the English and Arabic questionnaires have the same contents, and meanings. The translation was also applied to the cover letter and the glossary which were included in the questionnaire. Pre-testing the questionnaire is always recommended to ensure that the respondents will not have difficulties in answering questions and there are no problems with the wording as well as measurement (Sekaran and Bougie, 2010). Also Pre-testing the questionnaire enables the researcher to obtain initial assessment of the validity and reliability of the collected data (Saunders et al., 2009). Pre-testing the questionnaire could involve friends, colleagues, an expert or group of experts, and people who resemble, as possible, to the research sample to identify different views, insights, and ideas (Oppenheim, 1992, de Vaus, 2002, Saunders et al.,2009).

To refine the questionnaire, Pre-testing were conducted for both English and Arabic versions by seven academics shown in appendix(1) from different universities titled ‘lecturer, Assistant Professor, and associate Professor’ who have a master and doctoral degree in Accounting, business studies, and statistics' sciences. Helpful comments in terms of design, wording, and contents were obtained and used to adjust the questionnaire in order to improve its clarity and relevancy.

3.8 Questionnaire Administration and Response Rate

The researcher employed convenient sample where self-administrated survey was used to distribute 165 questionnaires to the manufacturing firms operating in Khartoum. The survey started on the 1rst of March

2017 and by the end of April 2017 .Those who didn't responded to fill the questionnaire some were mentioned that they were not authorized to fill the questionnaires while others were not transparent in their justifications. Each questionnaire contained a cover letter, a glossary, and research objectives. Bellow is Table (3.1) to shows the summary of questionnaire response rate

Table (3.7.1): Summary of Survey Responses

sample size (manufacturing companies)	**269**
Less: companies not operating	**- 104**
Total distributed questionnaires	**165**
Less: Returned blank questionnaire regarding company policy	**-34**
Less: Returned incomplete questionnaires	**-9**
Returned and usable responses	**122**

Source: researcher from data (2017)

$$\text{Response rate (\%)} = \frac{number\ of\ usable\ questionnaires}{number\ of\ population\ size\ -number\ of\ ineligible,company\ not\ operating}$$

Response rate= 122/165 = 73.9%

A response rate of approximately 35 per cent is considered acceptable in most of the academic studies. The percentage could vary according to cultural aspects (Baruch, 1999,) so, the response rate obtained from this research is very reasonable.

3.9 Measurement of Variables

The variables in this research can be divided into four groups; target costing technique, value engineering technique, competitive strategy, and firm's performance. Their measurements are shown as follows.

3.9.1Measurement of target costing

Six dimensions of target costing through (Price-led, Focus on customers**,** Focus on design, and Cross-functional involvement**,** Value-chain involvement, and A life-cycle orientation) of Ansari et al. (2006)

were adopted, the measurement of 18 items for target costing were self constructed. Respondents were asked to rate each dimension on a five-point Likert-scale ranging from (Strongly agree) to (Strongly Disagree).to indicate the extent, to which target costing had been implemented

3.9.2Measurement of value engineering

Three dimensions of value engineering (functional analysis, cost reduction and Quality improvement) of (Al-Yousefi,2010) were adopted. There are 12 items in this section were self constructed. Respondents were asked to rate each dimension on a five-point Likert-scale ranging from (Strongly agree) to (Strongly Disagree), to indicate the extent, to which value engineering had been implemented

3.9.3 Measurement of competitive strategy

For the purpose of this research, two dimensions of competitive strategy of (Porter, 1980) were adopted in this study: cost leadership and differentiation. 16 items were used to measure competitive strategy have been adapted from Nayyar (1993), Ward and Duray (2000) and Miller(1988). the respondents were asked to rate each dimension on a five-point Liker type scale ranged from (most important) to (most unimportant), to indicate the importance of the listed competitive ways compared with their overall strategy. The third dimension of competitive strategy(focus)is left out because customer focus is one of the target costing dimensions

3.9.4 Measurement of firm's performance

Performance was measured relying on two dimensions of Lebans & Euske (2006: 71) that are operational performance and financial performance. The measures for operational performance were adopted from those of Boyer (1998),Boyer and Lewis (2002),Flynn *et al.* (2010), Kathuria (2000) and Ward *et al.* (1998). was measured by10 items. The items for financial performance were based on the works of Gunasegaram

et al. (2001),Flynn *et al.* (2010) and Vickery *et al.* (2003). was measured by 6 items .The respondents were asked to rate each dimension on a five-point Likert-scale ranging from (much better) to (much worse) to indicate how their performance on those items compared with that of their competitors

3.10 The Credibility of the Research

For decreasing the risk of wrong answers related to the research questions, there are two main issues of the research design, validity and reliability (Saunders et al., 2003).

3.10.1Validity

Validity is concerned with the Accuracy of the research findings, (Collis and Hussey,2009, Saunders et al., 2009, Sekaran and Bougie, 2010). There are three common types of validity usually used to test the goodness of measures, including *content*, *criterion*, and *construct* validity. Content validity could be achieved through, a well defined topic, scaled items, and the use of a suitable judges to assess the goodness of an instrument in meeting the standards (Cooper and Schindler, 2008, Sekaran and Bougie, 2010).

Construct validity is ensured by the use of factor analysis It is believed that the measures using and factor analysis are more vigorous and that the measurement error is diminished. The measurement of variables and the use of factor analysis to form the constructs are presented in sections (3.13.1and 3.13.3)

3.10.2 Reliability

Is primarily concerned with stability of the measures and the research findings (Ghauri and Gronhaug,2005). Reliability is regarded as an important aspect for positivistic studies, and normally survey research maintains high reliability (Collis and Hussey, 2003). Reliability is establishing by Crohnbach's alpha. Regarding this research the questions

in the questionnaire, which are used to measure the variables, most of them are drawn from previous research. This demonstrates the consistency in measuring concepts. As a result, reliability of this research concerning both measurement and research findings is expected to be high as presented in section (3.13.2)

3.11. Descriptive Analysis

Prior to any analysis, it is recommended to screen the data (Tabachnick and Fidell, 2007).using SPSS programme as well as graphic examination of the variables. The descriptive results are shown as follows.

3.11. 1 General Information about the Respondents

Given the nature of the information required by this research, respondents who are experienced or know much about management accounting techniques in their firms were targeted to participate in answering the questionnaire.

Table 3.11.1 General Information about the Respondents

Job Title	Frequency	Percent
Director general	14	11.5
Planning and Quality Director	15	12.3
Production Manager	16	13.1
marketing manager	19	15.6
Financial Manager	10	8.2
Head of Costs Division	6	4.9
Head of accounting Department	10	8.2
other	31	25.4
Total	121	99.2
missing	1	.8
Total	**122**	**100.0**

Experience in the Specialization	**Frequency**	**Percent**
Less than 5 years	50	41.0
5 to less than 10	37	30.3
10 to less than 15	5	4.1
15 years and more	30	24.6
Total	**122**	**100.0**
Educational Level	**Frequency**	**Percent**
Bachelor	58	47.6
Post-graduate (e.g. MSc, MBA, Ph.D.)	43	35.2
Others	21	17.2
Total	**122**	**100.0**
University Specialization	**Frequency**	**Percent**
Business Administration	29	24
Cost and management accounting	15	12
Accounting	50	41
engineering	7	6
Others	21	17
Total	**122**	**100.0**

***Source**: researcher from data (2017)*

As Table(3.11.1) shows, the vast majority of the respondents (60.7 %) are in charge of top management responsibilities in their companies and most (60.5%) have experience for more than 5 years. The most academic degrees achieved by the respondents are 47.6% holding a bachelor's degree and 35.2% have a post-graduate qualification. It implies that the respondents are generally knowledgeable and also relatively highly experienced. Hence, the respondents are considered appropriate to

provide relevant information regarding their firm's strategy, performance and management accounting techniques

3.11. 2 General Information about the Responding Companies

The businesses Information was also obtained and summarized in Table (3.11.2) below:

Table (3.11.2) profile of responded Companies

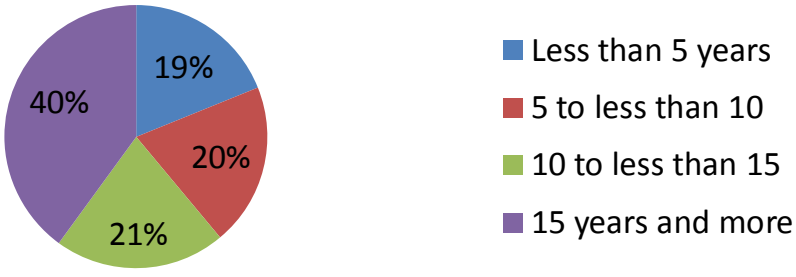
Category	frequency	%
Food Industry	34	27.9
Leather industry	4	3.3
oils and soap industry	5	4.1
construction materials and refractories	3	2.5
Textile industry	20	16.3
Chemical industry and medicine	36	29.5
Engineering industries.	8	6.6
Packaging and printing materials industry	12	9.8
Total	122	100.0

Source: prepared by researcher from data (2017)

Although the participating companies represent a wide range of manufacturing sector, nearly 74% are from food Industry, the Chemical industry and medicine and Textile industry.

The age distribution of companies is presented in Figure (3/11/1) below, showing that 81% of companies have been operating for over 5 year.

Figure (3/11/1)Age Distribution of Companies



Source: researcher from data (2017)

3.12 Examining the Data

Before further analysis is undertaken, the data are examined in more detail. The issues to address include missing data, dealing with outliers, and the tests for the statistical assumptions underlying most multivariate analyses. It is maintained that this step is crucial and ensures more accurate results during the main analysis (Tabachnick and Fidell, 2007). . Thus in this study data examining is used to manipulates missing data, unengaged responses, and outliers.

3.12.1 Missing Data

Missing data is common and always expected in the process of collecting and entering data due to lack of concentration and/or the misunderstanding among respondents, and missing information or other invalid data during the entry of data. Missing data can cause several problems. The most apparent problem is that there simply won't be enough data points to run the analysis and particularly in structural equation model (SEM).

Both exploratory and confirmatory factor analysis and path models require a certain number of data points in order to compute estimates. Additionally, missing data might represent bias issues. Some people may not have answered particular questions in survey because of some common issue. If missing data is more than 10% of the responses on a particular variable, or from a particular respondent, that variable or respondent may be problematic. In this study the proportion of missing data is lower than 10% therefore there no need to remove any of responses.

3.12.2 Unengaged responses

Unengaged responses means some responses giving same answer for all the questionnaire it seems to be random answers, in this case standard deviation to is used to find out any unengaged response this means that any standard deviation of responses less than 0.5 when Likert's five point

scale is used just deleted. Therefore, the researcher didn't remove any items in dataset because all the items in dataset are different from other.

Table (3.12.1) Unengaged responses

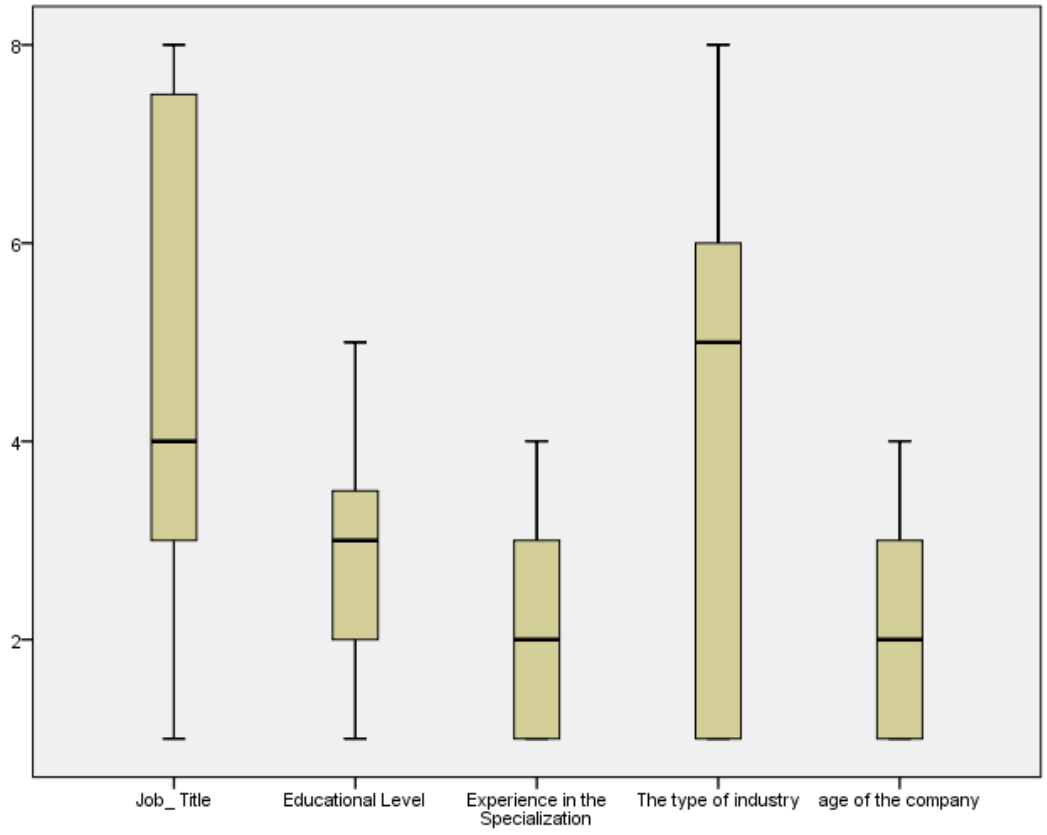
Total Questionnaires	**122**
Unengaged responses	0
Unengaged responses Rate	%

Source: researcher from data (2017)

3.12.3 Outliers

It's very important to check outliers in the dataset. Outliers can influence the results of analysis. If there is a really high sample size, the need for removing the outliers is wanted. If the analysis running with a smaller dataset, you may want to be less liberal about deleting records However, outliers will influence smaller datasets more than largest ones., in this dataset outliers were checked as showed in figure(3/12/1)There was no any outliers on dataset everything in dataset is logic .

Figure(3/12/1) Outliers



Source: researcher from data (2017)

3.12.4 Missing data in columns

some missing value is observed in the following variable the biggest value in fun_analysis3 and fun_analysis5 is missing (9) and cost_leadership3 is missing(9) and Differentiation5 is missing (17) and operational_performance8 is missing (12) items . And median value is used for that respondent to impute the missing value.

3.13 Preliminary Statistical Analysis

This section, reports the results of validity and reliability tests as a means to assess the goodness of measures in this study (Sekaran, 2003). The study used exploratory factor analysis (EFA) and (CFA) confirmatory factor analysis. The following are the detailed information of each

3.13.1Exploratory factor analysis

Exploratory Factor Analysis (EFA) is a statistical approach for determining the correlation among the variables in a data set. This type of analysis provides a factor structure (a grouping of variables based on strong correlations). In general, an (EFA) prepares the variables to be used for cleaner structural equation modeling (SEM). This means the (EFA) will be able to spot problematic variables much more easily than the (CFA). Therefore, this study used exploratory factor analysis for testing the validity and uni-dimensionality of measures to all variables under study, followed the assumptions recommended by (Lowry & Gaskin, 2014) as follow:

- There must be a clean pattern matrix.
- Adequacy.
- Convergent validity.
- Discriminant validity.
- Reliability.

Maximum Likelihood is used the summary of results was showed in Table (3.14) and the SPSS is used. As shown in all Tables below all the remaining items has more than recommended value of at least 0. 5 in measure of sample adequacy (MSA) with (KMO) (above the recommended minimum level of(0.60), and Bartlett's test of sphericity is significant (p<.01). Thus, the items are appropriate for factor analysis.

- **Discriminant validity**

Discriminant validity refers to the extent to which factors are distinct and uncorrelated. The rule is that variables should relate more strongly to their own factor than to another factor. Two primary methods exist for determining discriminant validity during an (EFA). The first method is to examine the rotated component matrix instate of pattern matrix when principle component used. Variables should load significantly only on one factor. If cross loading do exist (variable loads on multiple factors) then the cross loading should differ by more than 0.2. The second method is to examine the factor correlation matrix. The correlation between factors should not exceed o.7.

- **Convergent validity**

Convergent validity means that the variables within a single factor are highly correlated. This is evident by the factor loadings. Sufficient/significant loadings depend on the sample size of dataset. The table below (3.13.1) outlines the thresholds for sufficient/significant factor loadings. Generally, the smaller the sample size, the higher the required loading.

Table (3.13.1) thresholds for sufficient/significant factor loadings

Sample size	Significant factor loadings
50	0.75
60	0.70
70	0.65
85	0.60
100	0.55
120	0.50
150	0.45
200	0.40
250	0.35
350	0.30

Source :Hair *et al*. (2006)

Since the sample size used in analysis for this study was 122, therefore the sufficient factor loading was 0.50 as shown above in Table (3.5) of the factor structure for (EFA) indicating sufficient convergent validity of the measurement instrument

1 - Exploratory factor analysis (EFA) for independent variables:

Target Costing and value engineering

The exploratory factor analysis for the construct Target Costing turned out to be 2 dimensions instead of the original 6 identified. The remained dimensions are Cross-functional involvement and a life-cycle orientation which explains 54% of this construct as shown in Table (3.6) below

Two items of the "Focus on design" dimension namely "engineering design eliminates costly features" and "design minimizes the need for engineering changes after production begins" showed considerable cross loadings with "functional" dimension (i.e. showed higher loading to "functional" dimension). Hence it was decided to include these Items along with "functional" dimension for further analysis.

Due to the weak contributions of these dimensions (Price-led, Focus on customers and Value-chain involvement) to the factor loadings, they were deleted .All the remaining items have more than recommended value of at least 0. 5 Thus the items are appropriate for further analysis.

Table (3.13.2): Exploratory factor analysis for independent variable (target costing)

		Re classified items	
coding	**Item**	functional	life cycle
Focus_design2	engineering design eliminates costly features	.548	
Focus_design3	design minimizes the need for engineering changes after production begins	.827	
functional1	The Company form teams from different functions	.787	
functional2	A cross-functional team responsible for the entire product from initial concept through final production according to allowable cost	.701	
functional3	A cross-functional team include outside participants	.622	
life_cycle1	Life cycle costing considers all costs of owning a product over its life,		.770
life_cycle2	The company's strategy is to minimize costs for the customer		.844
life_cycle3	The company is in the follow-up to minimize production costs		.692
	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.788
	Bartlett's Test of Sphericity		364.522
	Total Variance Explained		54.343

Source: SPSS output

As shown in Table (3.13.3): below the exploratory factor analysis for the construct value engineering reveals that all loadings are greater than 0.5

Thus the items are appropriate for factor analysis and explains 55.6% of this construct.

One item attached to "functional analysis" dimension namely "for existing product The company finds component alternatives for reducing costs without risking value" was showing higher loading to "cost reduction" dimension and hence decided to include this item along with "cost reduction" dimension for further analysis.

Also one item namely "The Company understands the cost environment for the product" was showing higher loading to "quality improvement" dimension rather than "cost reduction" dimension and hence decided to include it with "quality improvement" dimension for further analysis

Table (3.13.3): Exploratory factor analysis for independent variable (value engineering)

coding	Item	Re classified items		
		quality improvement	cost reduction	fun analysis
fun_analysis3	The company determine the value of each component by comparing the characteristics of similar products			.523
fun_analysis4	The company eliminates un necessary function to the customer			1.025
fun_analysis5	for existing product The company finds component alternatives for reducing costs without risking value		.820	

cost_reduction1	The company systematically evaluating cost by gathering up all the relevant data of every part in the product		.566	
cost_reduction2	The company tracking small errors that magnify with product volume		.747	
cost_reduction4	The company understands the cost environment for the product	.697		
quality_improvement1	The company is increasing the system complexity that improve quality	.698		
quality_improvement2	The company is using more expensive materials	.682		
quality_improvement3	The company is increasing the labor consumption especially for finishing	.702		
	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.			.739
	Bartlett's Test of Sphericity			338.323
	Total Variance Explained			55.629

Source: SPSS output.

2-Exploratory factor analysis (EFA) for moderator variable (competitive strategy)

The construct Competitive strategy contains two factors Cost leadership and differentiation. The Cost leadership turned out to be five sub-dimensions instead of the original 8 identified and Differentiation turned

out to be 6 sub-dimensions instead of the original 7 identified as shown in Table (3. 13.4)below each item was mainly related to only one factor and explains 50% of this construct. All the remaining items have more than recommended value of at least 0. 5 Thus the items are appropriate for further analysis

Table (3. 13.4): Exploratory factor analysis for moderator variable (competitive strategy

coding	Item	Re classified items	
		Differentiation	cost leadership
cost_leadership2	Purchases of raw material related with production volume		.709
cost_leadership3	Pricing products below competitors		.627
cost_leadership4	Pursuing economy of scale		.751
cost_leadership5	The use of high-efficiency distribution channels		.806
cost_leadership6	Reducing the costs of interrelated activities with each		.794
Differentiation2	Targeting high-priced product segments	.740	
Differentiation3	Advertising of products	.685	
Differentiation4	Control of distribution channels	.753	
Differentiation5	Hiring specialists-employees	.565	
Differentiation6	Focus on advanced marketing research	.670	

coding	Item	Re classified items	
		Differentiation	cost leadership
Differentiation7	Provide technical assistance to the customer	.659	
	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.784
	Bartlett's Test of Sphericity		543.771
	Total Variance Explained		50.528

Source: SPSS output

3 - Exploratory factor analysis(EFA) for dependent variable: Firm performance

The construct Firm performance contains two factors Operational performance turned out to be 5 sub-dimensions instead of the original 10 identified and financial performance turned out to be 2 sub-dimensions instead of the original 6 identified. As shown in Table (3.13.5): below each item was mainly related to only one factor and explains 57% of this construct. All the remaining items have more than recommended value of at least 0. 5 Thus the items are appropriate for further analysis

Table (3.13.5): Exploratory factor analysis for dependent variable Firm performance

Coding	Item	Re classified items	
		operational performance	Financial performance
Customer service level	Customer service level	.934	
Pre-sale customer service	Pre-sale customer service	.729	
operational_performance4	Product supports	.773	
operational_performance5	Responsiveness to customers	.701	

operational_performance7	Delivery dependability	.551	
Financial_performance4	Growth in(ROI)		.831
Financial_performance6	Growth in market share		.739
	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.735
	Bartlett's Test of Sphericity		282.460
	Total Variance Explained		57.450

Source: Source: SPSS output

- **Discriminant validity**

The following Tables show the discriminant validity.

Table (3.13. 6) Factor Correlation Matrix for target costing

Factor	functional	life cycle
Functional	1.000	.350
life cycle	.350	1.000

Source: SPSS output

Table (3.13.7) Factor Correlation Matrix for value engineering

Factor	fun analysis	cost reduction	quality improvement
fun analysis	1.000	.234	.300
cost reduction	.234	1.000	.498
quality improvement	.300	.498	1.000

Table (3.13.8) Factor Correlation Matrix for competitive strategy

Factor	Differentiation	cost leadership
Differentiation	1.000	.087
cost leadership	.087	1.000

Source: SPSS output

Table (3.13.9) Factor Correlation Matrix for Firm performance

Factor	operational performance	Financial performance
operational performance	1.000	.227
Financial performance	.227	1.000

Source: Source: SPSS output

As shown in the above Tables (3.13.6) (3.13.7) (3.13.8) (3.13.9) for all the measures of target costing, 'value engineering competitive strategy and firm performance **to** examine the factor correlation matrix. The correlation between factors is less than 0.7 that mean no any problem in Discriminant validity.

3.13.2 Reliability Analysis

This study used Cronbach's alpha as diagnostic tool to assess the degree of internal consistency between multiple measurements of variables. (Hair et al, 2010) stated that the lower limit for Cronbach's alpha is 0.70, although it may decrease to 0.60 in exploratory research. While Nunnally (1978) considered Cronbach's alpha values greater than 0.60 are taken as reliable.

Table (3.14) presents the summary of the results for reliability analysis. Confirmed that all the scales display the satisfactory level of reliability (Cronbach's alpha exceed the minimum value of 0.60). Therefore, it can be concluded that the measures have acceptable level of reliability. Except for Financial performance lower than 0.6, in some literature it is acceptable (Bowling A,2002) , nonetheless, the results must be treated with caution

Table (3.13.10) Reliability for study variables after EFA

variables	Factors	No of items	Cronbach's alpha
Target Costing	Cross-functional involvement	**5**	**.725**
	life cycle1 orientation	**3**	**.809**
Value Engineering	Functional analysis	**2**	**.719**
	Cost reduction	**3**	**.751**
	Quality improvement	**4**	**.785**
competitive strategy	Cost leadership	**5**	**.855**
	Differentiation	**6**	**.836**
Firm Performance	Operational performance	**5**	**.805**
	Financial performance	**2**	**.543**

Source: SPSS output

3.13.3 Confirmatory factor analysis

Confirmatory Factor Analysis (CFA) is the next step after exploratory factor analysis to determine the factor structure of data set. The (EFA) explored the factor structure (how the variables relate and group based on inter-variable correlations), the (CFA) confirm the factor structure that extracted in the (EFA). All the items in Table (3.14) were used to conduct confirmatory factor analysis with maximum likelihood and promax.

❖ **Model fit**

Model fit refers to how well the proposed model accounts for the correlations between variables in the dataset. If the accounting for all the major correlations inherent in the dataset (with regards to the variables in the model), then the model will have a good fit. If not, then there is a significant "discrepancy" between the correlations proposed and the correlations observed, and thus have poor model fit. There are specific measures that can be calculated to determine goodness of fit. The

thresholds and cut off Criteria listed in the tables (3.15) and (3.16) below are simply a guideline.

Table (3.13.11) measures to determine goodness of model fit

Measure	Threshold
Chi-square/degree of freedom(cmin/df)	< 3 good; < 5 sometimes permissible
P-value for model	>.o5
CFI	>.95 great; >.90 traditional; >.80 sometimes permissible
GFI	>.95
AGFI	>.80
SRMR	<.09
RMSEA	<.5 good; .05-.10 moderate;> 10 bad
P Close	>.05

***Source**: Adopted from* Fornell, and Larcker,. (1981),

Table (3.13.12) Cutoff Criteria

Measure	Terrible	Acceptable	Excellent
CMIN/DF	> 5	> 3	> 1
CFI	<0.90	<0.95	>0.95
SRMR	>0.10	>0.08	<0.08
RMSEA	>0.08	>0.06	<0.06
PClose	<0.01	<0.05	>0.05

***Source**: Adopted from* Fornell, and Larcker,. (1981)

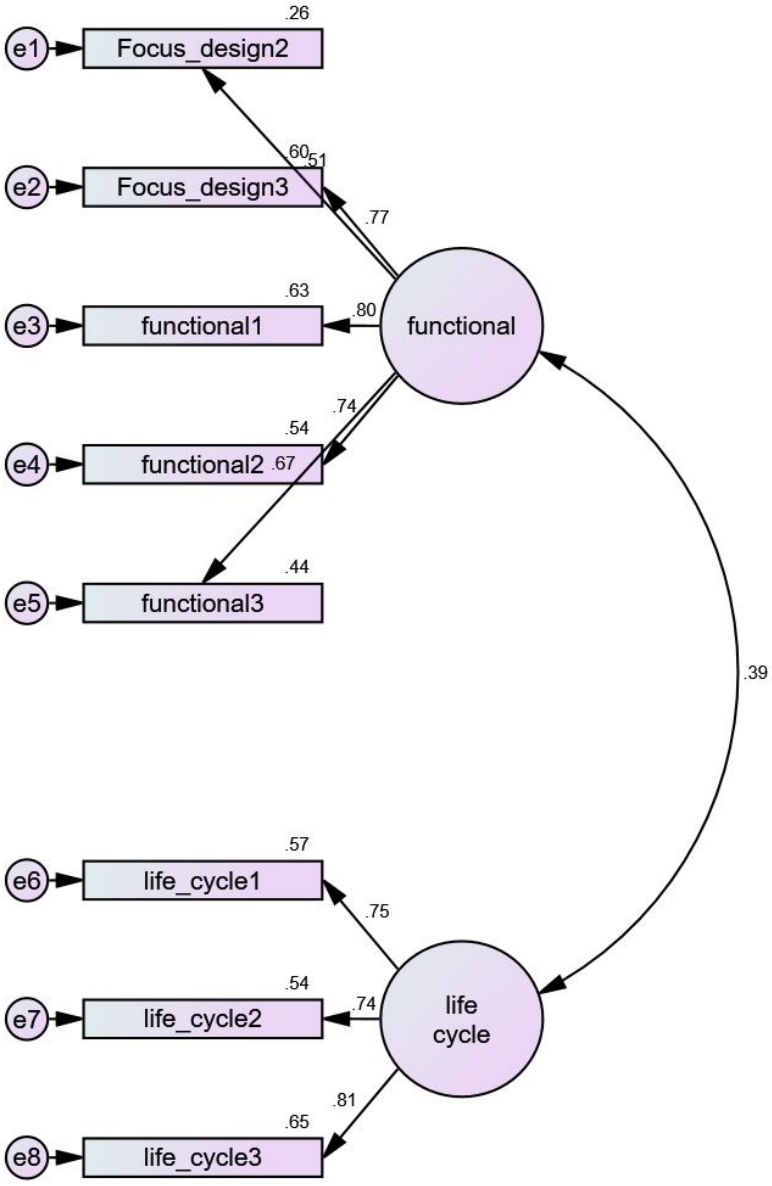
1- Confirmatory factor analysis for independent variables

a- Target Costing

Based on the thresholds listed in Table (3.13.11) above and Table (3.13.12) the confirmatory factor analysis (CFA) was run to check the validation of the measurements, including unidimensionality and convergent validity The five items of "Cross-functional involvement" dimension and the three items of "life cycle1 orientation" dimension were suggesting good fitting model as illustrated in Figure (3/131/) All the paths shown in the model are significant.

Table (3/13/2) presents the measures of target costing and the model fit

Figure (3/13/1) Path diagram for independent variable: **Target Costing**



Source: Amos 24output

Table (3.13.13) Model Fit Measures: Target Costing

Measure	Estimate	Threshold	Interpretation
CMIN	36.866	--	--
DF	19	--	--
CMIN/DF	1.940	Between 1 and 3	Excellent
CFI	0.949	>0.95	Acceptable
SRMR	0.075	<0.08	Excellent
RMSEA	0.088	<0.06	Terrible
PClose	0.073	>0.05	Excellent

Source: Amos 24output

Reliability and Validity

To evaluate the reliability and validity of the measurement instrument, several statistical analyses were conducted. To verify scale reliability, Composite Reliability (CR) and Cronbach's alpha were engaged. Table (3.13.13) shows that all CR and Cronbach's alpha values have exceeded the minimum requirement of 0.70 Therefore, the measurement instrument has a high level of reliability (Lee, Foo,, & Ooi, 2016). In terms of convergent validity, the Average Variance Extracted (AVE) for all scales is greater than the suggested threshold 0.5 as recommended by (Fornell & Larcker, 1981) indicating sufficient convergent validity of the measurement instrument. To evaluate discriminante validity the calculation of (AVE) showed that the correlation of the construct with its measurement items is greater than its correlation with the other constructs (Lowry & Gaskin, 2014). No validity concerns here.

Table (3.13.14) validity and reliability test of target costing

	CR	AVE	MaxR(H)	functional	life cycle
Functional	0.827	0.494	0.847		NaN
life cycle	NaN	NaN			

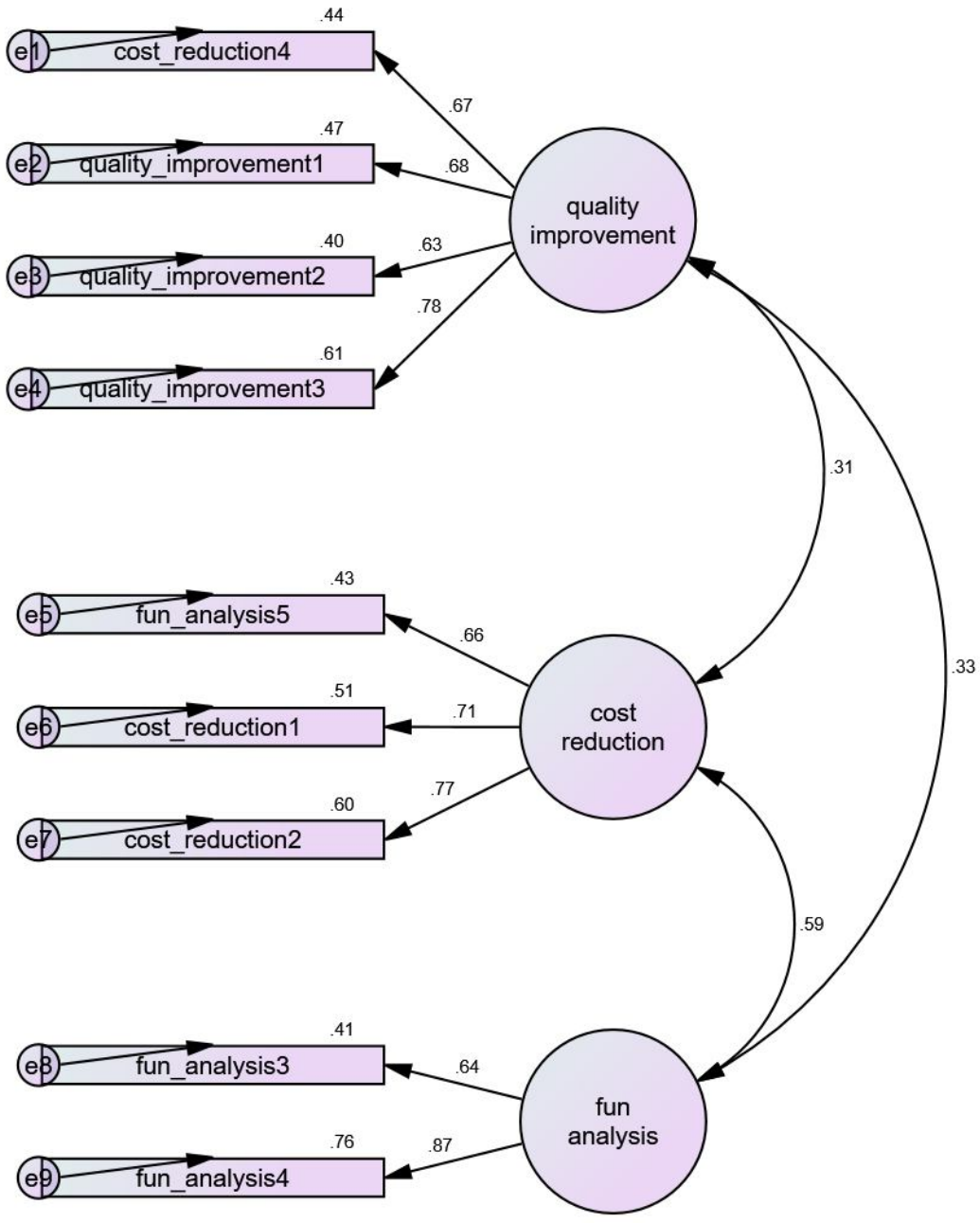
Source: Amos 24output

B -Value Engineering

The two items of "functional analysis" dimension , the three items of "cost reduction" dimension and the four items of " Quality improvement "were suggesting good fitting model as illustrated in Figure(3/4)All the paths shown in the model are significant.

Based on the thresholds listed in Table (3.15) above and Table (3.16) the confirmatory factor analysis (CFA) was run to check the validation of the measurements, including unidimensionality and convergent validity**.** Table (3.13.15) below presents the measures and the model fit of value engineering.

Figure(3/13/2) Path diagram for independent variable: **value engineering**



Source: Amos 24output

Table (3.13.15) Model Fit Measures of value engineering

Measure	Estimate	Threshold	Interpretation
CMIN	44.460	--	--
DF	24	--	--
CMIN/DF	1.852	Between 1 and 3	Excellent
CFI	0.935	>0.95	Acceptable
SRMR	0.080	<0.08	Acceptable
RMSEA	0.084	<0.06	Terrible
PClose	0.077	>0.05	Excellent

Source: Amos 24output

❖ **Reliability and Validity of value engineering**

Table (3.13.16) shows that all CR value has exceeded the minimum requirement of 0.70, the Average Variance Extracted (AVE) for all is greater than the suggested threshold 0.5**.** So no validity concerns here.

Table (3.13.16) Model Validity Measures of value engineering

	CR	AVE	MSV	MaxR(H)	quality improvement	cost reduction	fun analysis
quality improvement	NaN	NaN			**NaN**		
cost reduction	NaN	NaN				**NaN**	
fun analysis	NaN	NaN					**NaN**

2 -Confirmatory factor analysis for moderator variable competitive strategy

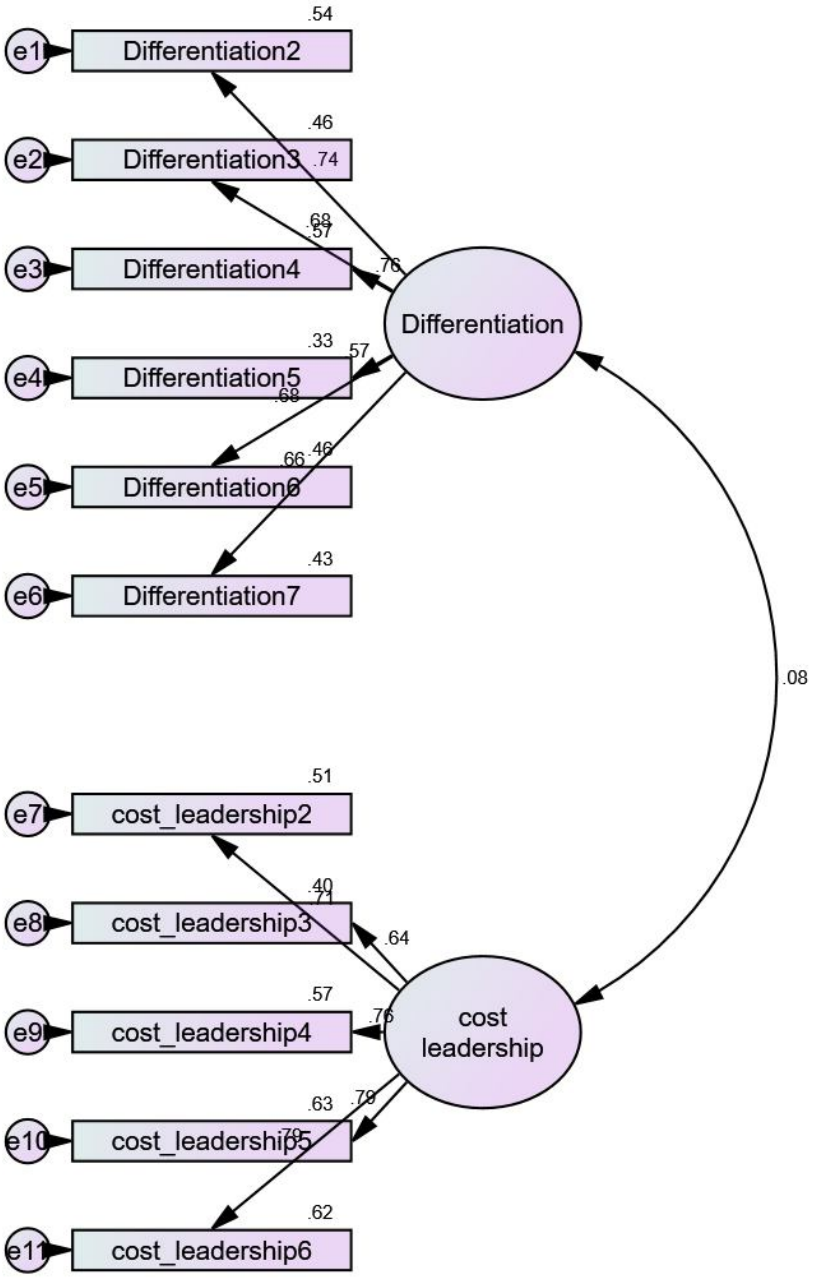
The six items of "Differentiation" dimension and the five items of "cost leadership" dimension were suggesting good fitting model as illustrated in Figure 3.5 All the paths shown in the model are significant.Based on the thresholds listed in Table (3.13.15) above and Table (3.13.16) the confirmatory factor analysis (CFA) was run to check the validation of the measurements, including unidimensionality and convergent validity**.** Table (3.13.17) below presents the measures and the model fit of value engineering

Table (3.13.17) Model Fit Measure of competitive strategy

Measure	Estimate	Threshold	Interpretation
CMIN	80.795	--	--
DF	43	--	--
CMIN/DF	1.879	Between 1 and 3	Excellent
CFI	0.926	>0.95	Acceptable
SRMR	0.063	<0.08	Excellent
RMSEA	0.085	<0.06	Terrible
PClose	0.027	>0.05	Acceptable

Source: Amos 24output

***Figure (3/13/3) Path diagram for* moderator *variable:* competitive strategy**



Source: Amos 24output

❖ **Reliability and Validity of competitive strategy**

As shown in table (3.13.18) that all CR value has exceeded the minimum requirement of 0.70, the Average Variance Extracted (AVE) is greater than the suggested threshold 0.5. And acceptable for Differentiation So no validity concerns here.

Table (3.13.18) Model Validity Measures of competitive strategy

	CR	AVE	MaxR(H)	Differentiation	cost leadership
Differentiation	0.838	0.465	0.845		NaN
cost leadership	NaN	NaN			

Source: Amos 24output

2-Confirmatory factor analysis for dependent variable: Firm Performance

Table (3.13.5)reveals the five items of "operational performance" dimension and the two items of "financial performance" dimension were suggesting poor fitting model in the first estimate as the RMSEA (0.116) was outside the recommended indices. To modify the model the item "operational_performance4" was removed due to the standardized residual co variances. The resulting model was found to be good fitting model, as illustrated in Figure (3.13.4)All the paths shown in the model are significant.

Table *(3/13/19)*) Model fit of Firm Performance

Measure	Estimate	Threshold	Interpretation
CMIN	34.055	--	--
DF	13	--	--
CMIN/DF	2.620	Between 1 and 3	Excellent

CFI	0.909	>0.95	Acceptable
SRMR	0.087	<0.08	Acceptable
RMSEA	0.116	<0.06	Terrible
PClose	0.014	>0.05	Acceptable

Source: Amos 24output

❖ Reliability and Validity Firm Performance

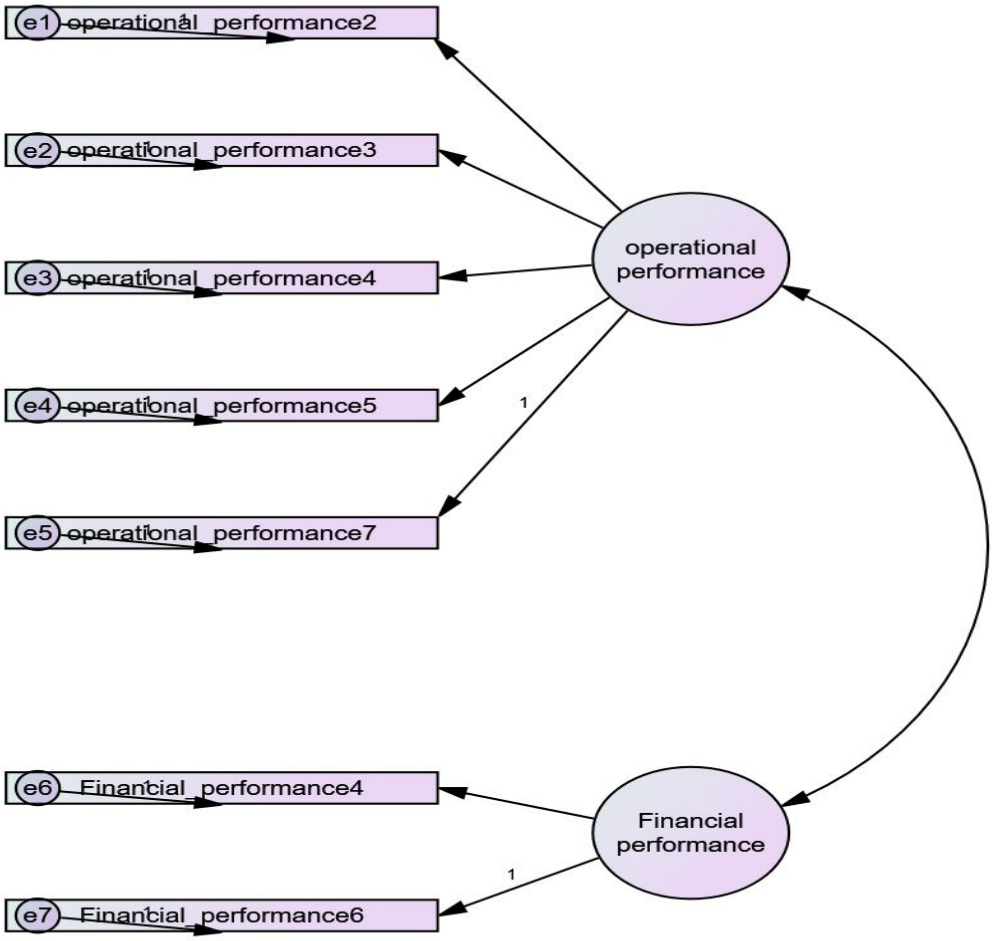
As shown in table (3/13/20) that all CR value has exceeded the minimum requirement of 0.70, the Average Variance Extracted (AVE) is greater than the suggested threshold 0.5. So no validity concerns here.

Table *(3/13/20)* Model Validity Measures of Firm Performance

	CR	**AVE**	**MaxR(H)**	**operational performance**	**Financial performance**
operational performance	NaN	NaN			NaN
Financial performance	NaN	NaN			

Source: Amos 24output

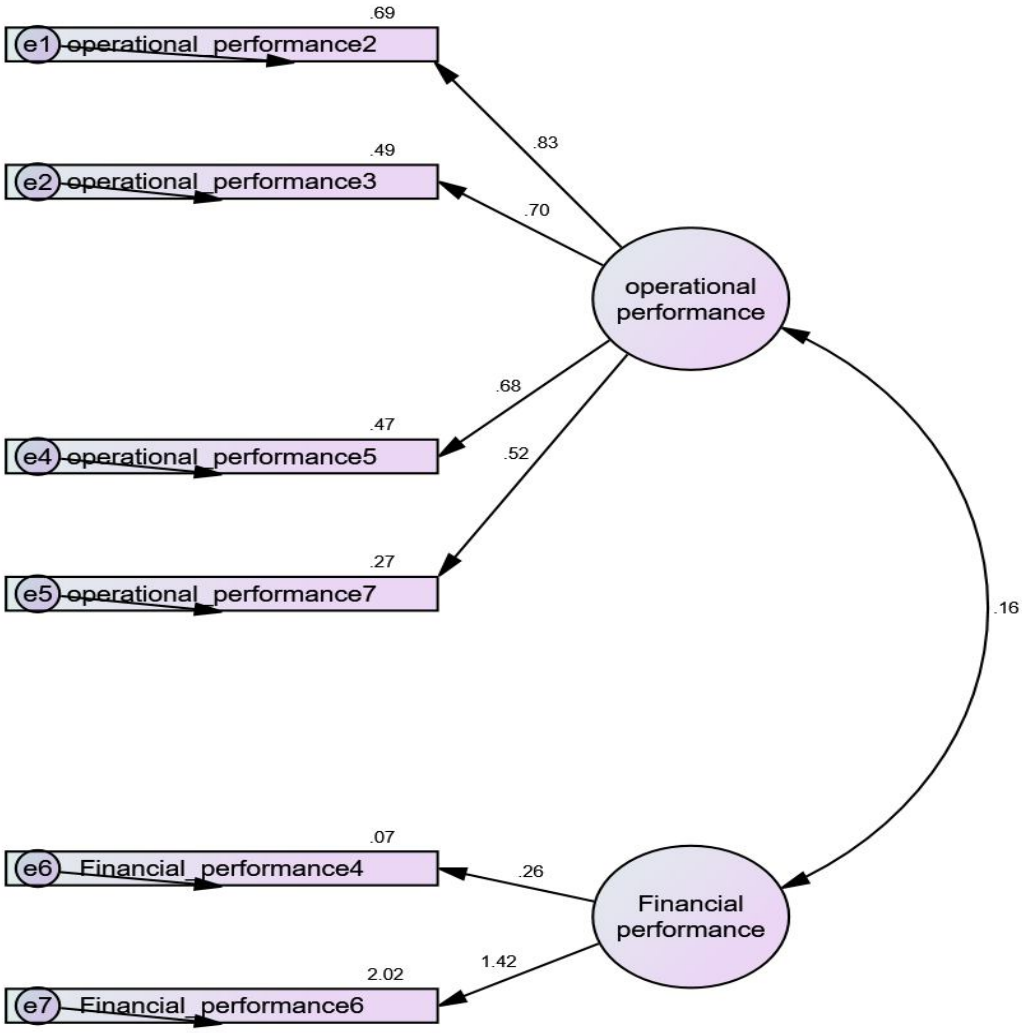
Figure (3/13/4) Path diagram for dependent variable: **Firm Performance**



Source: Amos 24output

- **Confirmatory factor analysis for dependent variable(Firm Performance) after Modification the CFA**

Figure (3/13/5) Path diagram for modified dependent variable: **Firm Performance**



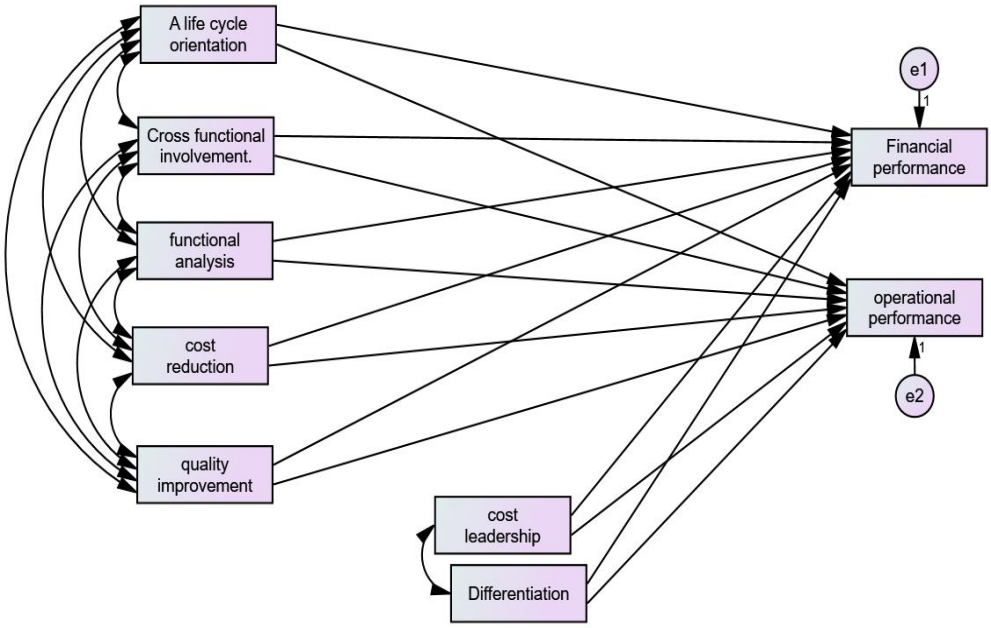
Source: Amos 24output

3.13.4 Modification of Research Model

As a result of factor analysis the initial Framework of this study had been changed, Figure ***(3/13/6)*** shows that the factors of construct Target Costing remained are life cycle orientation and cross functional involvement. The factors of construct value engineering are cost reduction, functional

analysis and quality improvement. Factors of construct competitive strategy are cost leadership and differentiation. And the Factors of construct firm performance are operational performance and financial performance Hence the Hypotheses items are adjusted due to this new model

Figure (3/13/6) The Modified Research Model



Source: AMOS2 4output

- **Descriptive Analysis of model**

Table (3. 13.21) shows the means and standard deviations that the scale used a 5-point scale. It can be noted that the means of Operational performance, financial performance, and Differentiation dimensions are fairly high that present a higher importance of those dimensions and the most of respondents seek to improve their operational performance through differentiation strategy

Table (3.13.21) Descriptive Analysis of the model

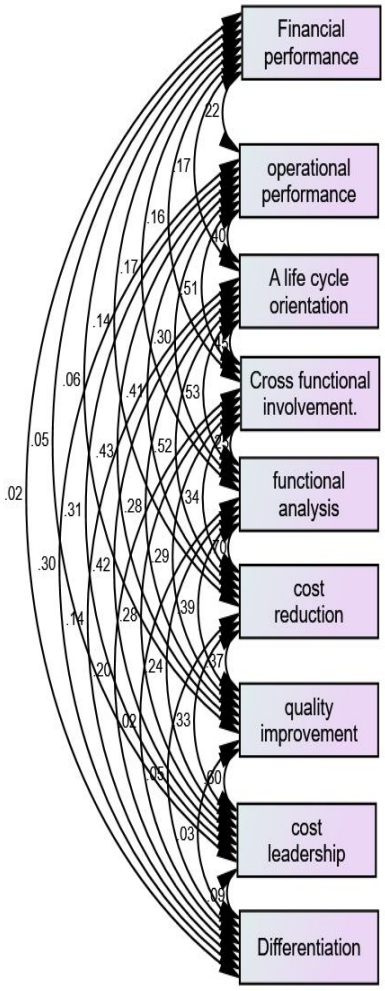
Factor	Variable names	Mean	Std. Deviation	Importance
Life cycle orientation	IV	3.4210	.48910	68%
Cross-functional involvement	IV	2.3763	.33132	48%
functional analysis	IV	3.2050	.46771	64%
Cost reduction	IV	3.6086	.41817	72%
Quality improvement	IV	3.6241	.47070	72%
Cost leadership	MODV	3.3418	.43528	67%
Differentiation	MODV	4.1596	.50699	83%
Financial performance	DV	4.1516	.69201	83%
Operational performance	DV	4.3934	.49577	88%

Note: *All variables used a 5-point likert scale (1= strongly disagree, 5= strongly agree)*

- **Correlation Analysis**

The zero-order correlation was conducted for all dimensions of the constructs operationalized in this study using bivariate correlations. These bivariate correlations allow for preliminary inspection of hypothesized relationships. Table (3/13/7) presents that all the hypothesized relationships are in positive correlations in the full AMOS output. Based on the bivariate correlations there was some expectation that these coefficients would be significant.

Figuer *(3/13/7)* Person's correlation coefficient for all variables.



AMOS output

Table(3.13.22) Correlations: (Group number 1 - Default model)

			Estimate
fun_analysis	<-->	quality_improvement	.391
quality_improvement	<-->	functional	.290
quality_improvement	<-->	life_cycle	.283
fun_analysis	<-->	cost_reduction	.697
Functional	<-->	cost_reduction	.345
life_cycle	<-->	cost_reduction	.517

			Estimate
fun_analysis	<-->	life_cycle	.528
functional	<-->	life_cycle	.450
quality_improvement	<-->	cost_reduction	.373
fun_analysis	<-->	functional	.248
Financial_performance	<-->	cost_leadership	.048
Financial_performance	<-->	Differentiation	.024
quality_improvement	<-->	Financial_performance	.057
cost_reduction	<-->	Financial_performance	.141
fun_analysis	<-->	Financial_performance	.168
functional	<-->	Financial_performance	.159
life_cycle	<-->	Financial_performance	.170
cost_leadership	<-->	operational_performance	.309
Differentiation	<-->	operational_performance	.296
quality_improvement	<-->	operational_performance	.426
cost_reduction	<-->	operational_performance	.406
fun_analysis	<-->	operational_performance	.302
functional	<-->	operational_performance	.509
life_cycle	<-->	operational_performance	.403
cost_leadership	<-->	Differentiation	.094
cost_reduction	<-->	cost_leadership	.335
fun_analysis	<-->	cost_leadership	.244
functional	<-->	cost_leadership	.282

			Estimate
life_cycle	<-->	cost_leadership	.421
quality_improvement	<-->	Differentiation	.030
cost_reduction	<-->	Differentiation	.048
fun_analysis	<-->	Differentiation	.016
functional	<-->	Differentiation	.203
life_cycle	<-->	Differentiation	.136
Financial_performance	<-->	operational performance	.219
quality_improvement	<-->	cost_leadership	.601

As shown in table (3.13.22) above the correlation analysis provides strong indicators of associations, thus for more examination of the proposed relationships path analysis through structural equation model (SEM) was conducted to gives the best predictive model of the relationship present among the variables.

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CHAPTER FOUR

Hypotheses Testing

4.1Chapter overview

This chapter focuses on testing the hypotheses of the study. The hypotheses were tested with the path analysis that discloses the effect of independent variables on dependent variable and the effect of moderator in relationships between variables through the structural equation modeling (SEM).

4.2 Structural equation modeling (SEM).

Structural equation modeling is similar to multiple regression, but in more powerful way which takes in account the modeling of interactions between variables, nonlinearities, correlated independents, measurement error, correlated error terms, multiple latent independents each measured by multiple indicators, and one or more latent dependents also each with multiple indicators (Hair et al, 2011). SEM may be used as a more powerful alternative to multiple regression, path analysis, factor analysis, time series analysis, and analysis of covariance. That is, these procedures may be seen as special cases of SEM, or, to put it another way, SEM is an extension of the general linear model (GLM) of which multiple regression is a part.

In order to perform path analysis, it is generally agreed that there are at least the assumptions of model fit should be met. It's given that the model fit was done in (CFA), however the need to do it again in structural model is important in order to demonstrate sufficient exploration of alternative models (Hair et al, 2011).Every time the model changes and a hypothesis are tested, model fit must be assessed. Thus the Absolute fit indices and Incremental fit indices assumptions are provided below.

4.2.1 Absolute fit indices

Absolute fit provide the most fundamental indication of how well the proposed theory fits the data, it includes indices like the Chi-Squared test,

RMSEA, GFI, AGFI, the RMR and the SRMR the information about each are in the following sub sections.

1. The relative/normed chi-square/df (χ2/df)

Due to the restrictiveness of the Model Chi-Square (Hooper, Coughlan, & Mullen, 2008) indicates that researchers have sought alternative indices the relative/normed chi-square (χ2/df) which means (the model calculated value of chi-square divided by the degree of freedom), as one example of statistic that minimizes the impact of sample size on the Model Chi-Square. The recommendations regarding an acceptable ratio for this statistic range from as high as 5.0 to as low as 2.0 (Hooper et al, 2008).

2. Root Mean Square Error of Approximation (RMSEA)

The RMSEA is the second fit statistic reported in SEM to tell us how well the model, with unknown but optimally chosen parameter estimates would fit the populations' covariance matrix (Hooper et al, 2008). In recent years it has become regarded as one of the most informative fit indices due to its sensitivity to the number of estimated parameters in the model. In other words, the RMSEA favors' parsimony in that it will choose the model with the lesser number of parameters.

Recommendations for RMSEA cut-off points have been reduced considerably in the last fifteen years. Up until the early nineties, an RMSEA in the range of 0.05 to 0.10 was considered an indication of fair fit and values above 0.10 indicated poor fit, and then it was thought that an RMSEA of between 0.08 to 0.10 provides average fit and below 0.08 shows a good fit (MacCallum et al,2001, 1996, in Hooper et al, 2008). However, more recently, a cut-off value close to .06 (Hu and Bentler, 1999) or a stringent upper limit of 0.07 (Steiger, 2007) seems to be the general consensus amongst authorities in this area (Hooper et al, 2008). Finally it is generally reported in conjunction with the RMSEA and in a

well-fitting model the lower limit is close to 0 while the upper limit should be less than 0.08.

3. Goodness-of-fit statistic (GFI) and the adjusted goodness-of-fit statistic (AGFI)

According to Hooper et al, (2008) the (GFI) was created as an alternative to the Chi-Square test and calculates the proportion of variance that is accounted for by the estimated population covariance, this statistic ranges from 0 to 1 and with larger samples increasing its value and the cut-off point of 0.90 has been recommended for the GFI however, simulation studies have shown that when factor loadings and sample sizes are low a higher cut-off of 0.95 is more appropriate. On the other hand the value of AGFI which adjusts the GFI based upon degrees of freedom also ranges between 0 and 1 and it is generally accepted that values of 0.90 or greater indicate well fitting models.

4. Root mean square residual (RMR) and standardized root mean square residual (SRMR)

The RMR and the SRMR are the square root of the difference between the residuals of the sample covariance matrix and the hypothesized covariance model. Values for the SRMR range from zero to 1.0 with well fitting models obtaining values less than .05, however values as high as 0.08 are deemed acceptable (Hooper et al, 2008). An SRMR of 0 indicates perfect fit but it must be noted that SRMR will be lower when there is a high number of parameters in the model and in models based on large sample sizes (Hooper et al, 2008).

4.2.2 Incremental fit indices

Incremental fit indices are a group of indices that do not use the chi-square in its raw form but compare the chi-square value to a baseline model this means it use to measure how well the model fits in comparison to no model at all. This category includes Normed-fit index (NFI), Non-

Normed Fit Index (NNFI) and Comparative fit index (CFI) (Hooper et al, 2008). The following sub sections will discuss these indices.

1. Normed-fit index (NFI)

This statistic assesses the model by comparing the $\chi 2$ value of the model to the $\chi 2$ of the null model. Values for this statistic range between 0 and 1 with Bentler and Bonnet (1980) recommending values greater than 0.90 indicating a good fit. More recent suggestions state that the cut-off criteria should be NFI $\geq$ .95 (Hu and Bentler, 1999).

2. Non-Normed Fit Index (NNFI)

Non-Normed Fit Index (NNFI), also known as the Tucker-Lewis index (TLI), is an index that prefers simpler models. Recommendations as low as 0.80 as a cutoff have been preferred however Bentler and Hu (1999) have suggested NNFI $\geq$ 0.95 as the threshold.

3. Comparative fit index (CFI)

This statistic assumes that all latent variables are uncorrelated (null/independence model) and compares the sample covariance matrix with this null model. The values for this statistic range between 0.0 and 1.0 with values closer to 1.0 indicating good fit. A cut-off criterion of CFI $\geq$ 0.90 was initially advanced however, recent studies have shown that a value greater than 0.90 is needed in order to ensure that miss-specified models are not accepted (Hu & Bentler, 1999). From this, a value of CFI $\geq$ 0.95 is presently recognized as indicative of good fit (Hu & Bentler, 1999). Today this index is included in all SEM programs and is one of the most popularly reported fit indices due to being one of the measures least affected by sample size (Fan, Thompson, & Wang, 1999).

4.3 Hypotheses Testing

Given that the variables appeared in confirmatory factor analysis encompasses 2 hypotheses in this study. The main effects as well as the moderating effect were tested using path analysis, the statistical procedures of which had been explained in chapter 3.

4.3.1 H1.Integration of Target Costing and Value Engineering has significant effect on the manufacturing firms' performance

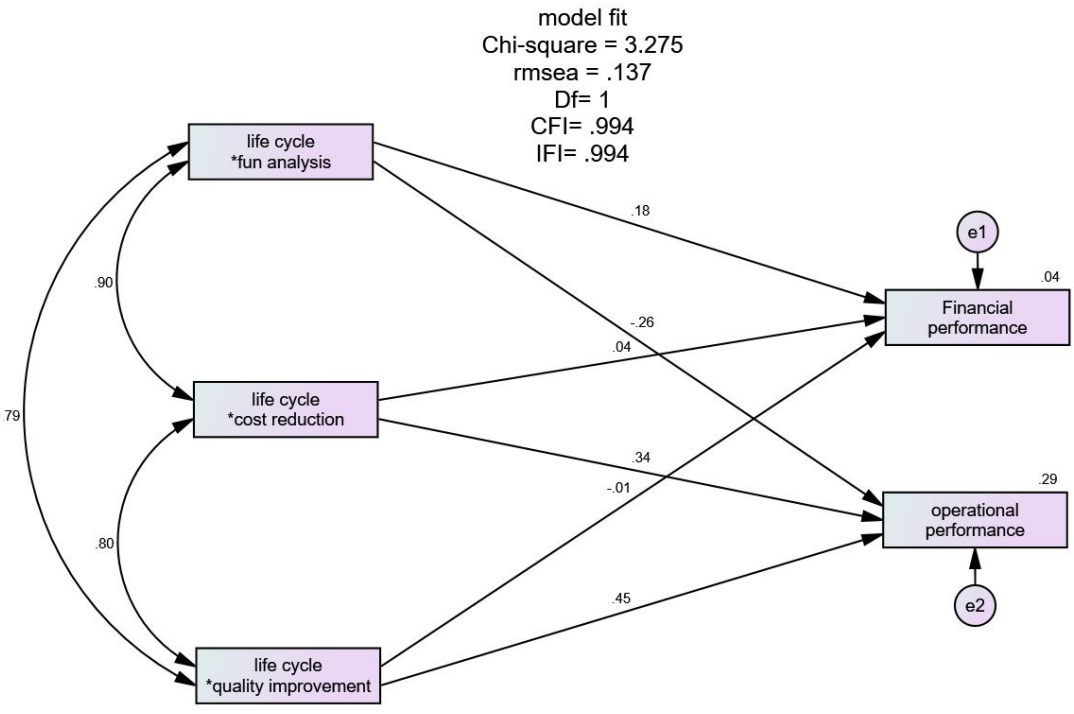
In This section 2 sub hypotheses were developed to investigate the effect of Target Cost and Value Engineering dimensions on the firm performance dimensions as shown below.

H1a Integration of Target Costing and Value Engineering has significant effect on the financial performance

H1b Integration of Target Costing and Value Engineering has significant effect on the operational performance

From figure (1.4). The results of path analyses showing Model fit parameters consistent with recommendation for CMIN/DF<2, 0<RMSEA<1, 0<GFI<1, 0<AGFI<1, 0<RMR<1, 0<NFI<1, 0<CFI< 1, and PCLOSE>0.05. The full AMOS output (Regression Weights) is displayed in table (1.4).

Figure ***(4.3.1): The*** **Integration** ***between Target Cost and Value Engineering on firm performance.***



source: AMOS2 4output

Table (4.3.1) Regression Weights: integration's effect of life cycle orientation and Value Engineering on firm performance.

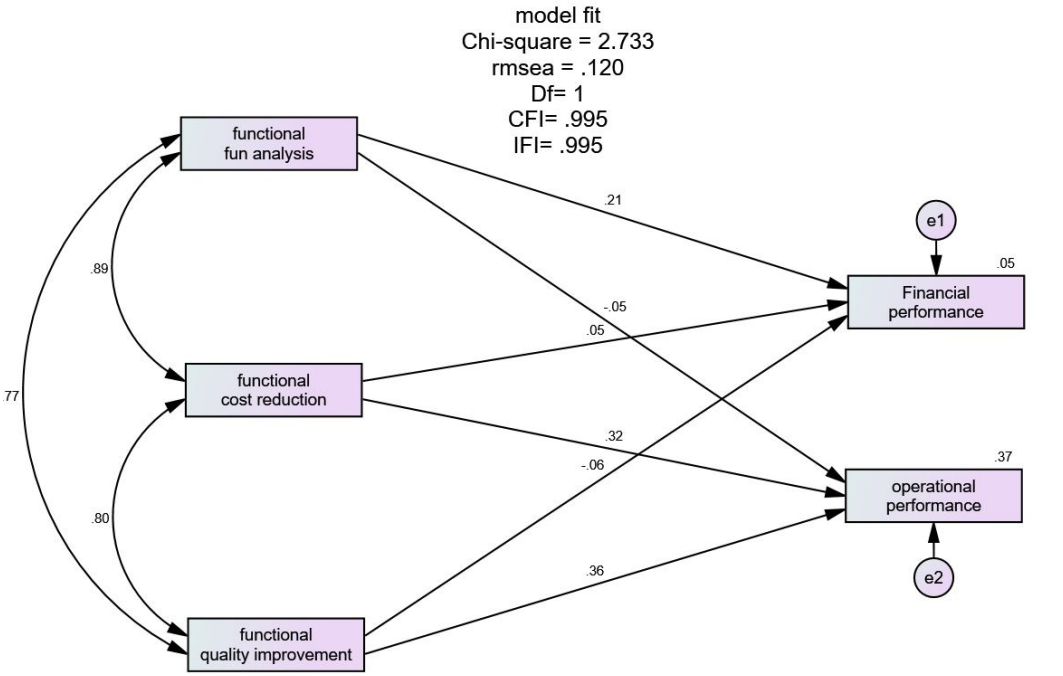
			Estimate	S.E.	C.R.	P	Label
Financial_performance	<---	life_cycle_x_fun_analysis	.045	.056	.815	.415	par_1
Financial_performance	<---	life_cycle_x_cost_reduction	.010	.056	.176	.860	par_2
Financial_performance	<---	life_cycle_x_quality_improvement	-.003	.039	-.084	.933	par_3
operational_performance	<---	life_cycle_x_fun_analysis	-.047	.034	-1.378	.168	par_4
operational_performance	<---	life_cycle_x_cost_reduction	.062	.034	1.816	.069	par_5
operational_performance	<---	life_cycle_x_quality_improvement	.082	.024	3.394	***	par_6

Figure (4.3.1) and Table (4.3.1) show Integration's effect of (life cycle orientation and functional analysis, life cycle orientation and cost reduction, life cycle orientation and quality improvement) on financial performance is not proved, effect Values estimation were (0.0456, 0.10, -0.003) with a probability values of (0.415, 0.860, 0.933) ($p > 0.05$). Test results are not able to prove empirically. Therefore, these hypotheses were rejected or not supported.

Figure (4.3.1) and Table (4.3.1) also show Integration's effect of (life cycle orientation and functional analysis, life cycle orientation and cost reduction) on operational performance is not proved. Effect Values estimation were (-.047, .062) with a probability value of (0.168, o.96) ($p > 0.05$). Test results also are not able to prove empirically. Therefore, these hypotheses rejected or not supported. But the Integration's effect of life cycle and quality improvement on the operational performance is proved. Value estimation effect life cycle and quality on operational performance was 0.82 with a probability value of 0.000 ($p<0.05$). The test results prove the Integration between life cycle and quality lead to higher operational performance. Therefore, this hypothesis can be accepted or fully supported by empirical evidence.

From figure (4.3.2) also the results of path analyses showing Model fit parameters consistent with those recommended. The full AMOS output (Regression Weights) is displayed in table (4.3.2)

Figure ***(4.3.2): The* Integration *between Cross-functional involvement and Value Engineering on firm performance.***



Source: AMOS2 4 output

Table (4.3.2) Regression Weights: integration's effect of Cross-functional involvement and Value Engineering on firm performance.

			Estimate	S.E	C.R.	P	Label
Financial_performance	<---	functional_X_fun_analysis	.085	.081	1.052	.293	par_1
Financial_performance	<---	functional_X_cost_reduction	.021	.082	.251	.802	par_2
Financial_performance	<---	functional_X_quality_improvement	-.023	.056	-.414	.679	par_3
operational_performance	<---	functional_X_fun_analysis	-.014	.047	-.302	.763	par_4
operational_performance	<---	functional_X_cost_reduction	.089	.048	1.857	.063	par_5
operational_performance	<---	functional_X_quality_improvement	**.097**	**.032**	**2.983**	**.003**	**par_6**

Resource: AMOS2 4 output

Figure (4.3.2) and Table (4.3.2) show Integration's effect of (Cross-functional involvement and functional analysis, Cross-functional involvement and cost reduction, Cross-functional involvement and quality improvement) on financial performance is not proved, effect Values estimation were (0.085,0 .021, -0.023) with a probability values of (0.293, 0.802, 0.679) ($p > 0.05$). Test results are not able to prove empirically. Therefore, these hypotheses were rejected or not supported.

Figure (4.2) and Table (4.2) also show Integration's effect of (Cross-functional involvement and functional analysis, Cross-functional involvement and cost reduction) on operational performance is not proved. Effect Values estimation were (-0.014, 0.089) with a probability value of (0.763,0 .063) ($p > 0.05$). Test results also are not able to prove empirically. Therefore, these hypotheses rejected or not supported. But the Integration's effect of Cross-functional involvement and quality improvement on the operational performance is proved. Value estimation effect life cycle and quality on operational performance was 0.097with a probability value of **.**003 ($p<0.05$). The test results prove the Integration between Cross-functional involvement and quality lead to operational better performance. Therefore, this hypothesis can be accepted or supported by empirical evidence

4.3.2 H2 Competitive strategy moderates the effect of target costing and value engineering on manufacturing firms' performance.

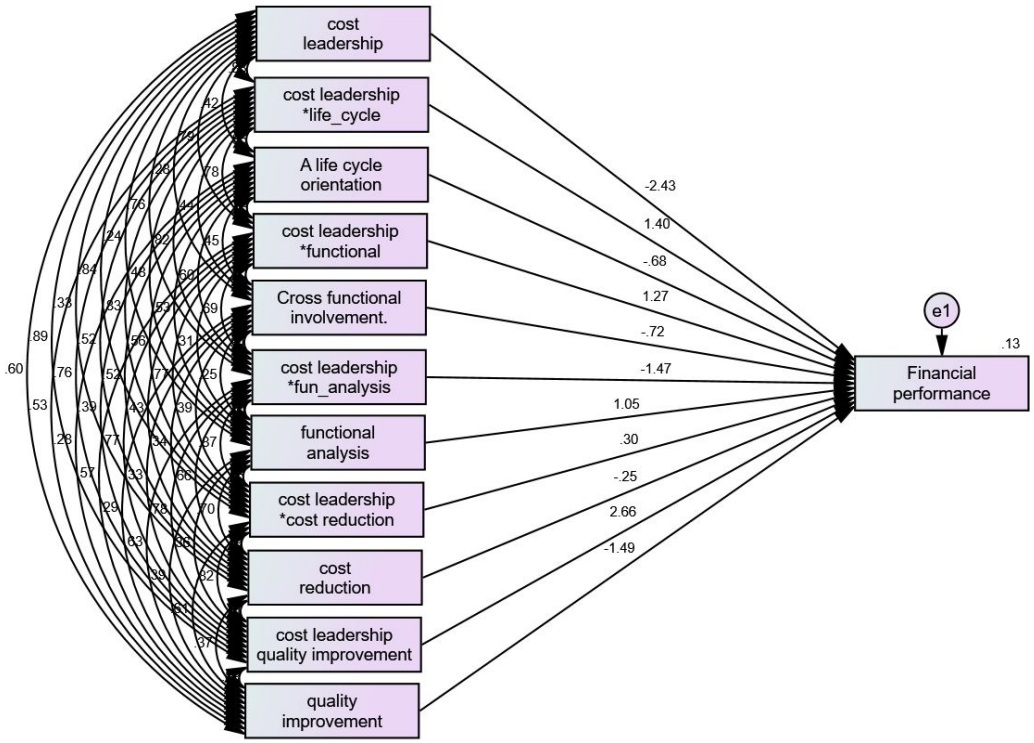
This section aims to investigate the second hypothesis in this study as shown below.

H2a Cost leadership strengths the relationship between target costing and financial performance

Figure (3.4) shows. The results of path analyses showing Model fit parameters consistent with those recommended for CMIN/DF<2, 0<RMSEA<1, 0<GFI<1, 0<AGFI<1, 0<RMR<1, 0<NFI<1, 0<CFI< 1,

and PCLOSE>0.05. In order to test this hypothesis many criteria must be met. These criteria can be classified as global or local tests. According to (Gaskin, 2016) in arranging for a hypothesis to be supported global tests of model fit are the first assumption must be met, to let a local test (p-value) to have meaning. Next is the global test of variance explained or R-squared. Lastly, if a regression weight is significant, but is in the wrong direction, the hypothesis is not supported. Instead, there is counter-evidence. The full AMOS output (Regression Weights) is displayed in the followed tables.

*Figure (4.3.3)**: The Relationship between cost leadership interaction and financial performance.***



source: AMOS2 4 output

Table (4.3.3).Regression Weights: Cost leadership moderate the relationship between life cycle orientation and financial performance

			Estimate	S.E.	C.R.	P	Label
Financial_performance	<---	life_cycle	-.969	1.139	-.851	.395	par_1
Financial_performance	<---	cost_leadership	-3.865	1.476	-2.619	.009	par_6
Financial_performance	<---	cost_leadership_life_cycle	.382	.357	1.068	.285	par_62

Source: AMOS2 4output

Table (4.3.4).Regression Weights: Cost leadership moderate the relationship between Cross-functional involvement and financial performance

			Estimate	S.E.	C.R.	P	Label
Financial_performance	<---	Functional	-1.500	1.308	-1.146	.252	par_2
Financial_performance	<---	cost_leadership	-3.865	1.476	-2.619	.009	par_6
Financial_performance	<---	cost_leadership_x_functional	.515	.402	1.280	.200	par_63

Source: AMOS2 4output

Based on table (4.3.3) the relationship between financial performance and life cycle orientation is not moderated by cost leadership. From the analysis, it is clear that the path between financial performance and life cycle orientation is not significant. With p-value of (0. .285) ($p > 0.05$) in the multi group analysis. Due to table (4.3.4) the relationship between financial performance and cross- Functional involvement also is not moderated by cost leadership from the analysis, it is clear that the path between financial performance and cross- Functional involvement is not significant. With p-value of (0.200) ($p > 0.05$) in the multi group analysis.

Hence, hypothesis **H2a** is not supported. So cost leadership just dampens the negative relationship between life cycle and financial performance, also dampens the negative relationship between cross-Functional involvement and financial performance

H2b Cost leadership strengths the relationship between value engineering and financial performance

Figure (4.3) shows. The results of path analyses showing Model fit parameters consistent with those recommended. The full AMOS output (Regression Weights) is displayed in the followed tables

Table (4.3.5).Regression Weights Regression Weights: Cost leadership moderate the relationship between functional analysis and financial performance

			Estimate	S.E.	C.R.	P	Label
Financial_performance	<---	fun_analysis	1.547	1.783	.868	.385	par_3
Financial_performance	<---	cost_leadership	-3.865	1.476	-2.619	.009	par_6
Financial_performance	<---	cost_leadership_x_fun_analysis	-.437	.527	-.829	.407	par_64

Source: AMOS2 4 output

Table (4.3.6).Regression Weights Regression Weights: Cost leadership moderate the relationship between cost reduction and financial performance

			Estimate	S.E.	C.R.	P	Label
Financial_performance	<---	cost_reduction	-.413	2.058	-.201	.841	par_4
Financial_performance	<---	cost_leadership	-3.865	1.476	-2.619	.009	par_6
Financial_performance	<---	cost_leadership_x_cost_reduction	.086	.599	.144	.886	par_65

source: AMOS2 4output

table (4.3.7).Regression Weights Regression Weights: Cost leadership moderate the relationship between quality improvement and financial performance

			Estimate	S.E.	C.R.	P	Label
Financial_performance	<--	quality_improvement	-2.187	1.111	-1.970	.049	par_5
Financial_performance	<--	cost_leadership	-3.865	1.476	-2.619	.009	par_6
Financial_performance	<--	cost_leadership_x_quality_improvement	.659	.343	1.922	.055	par_66

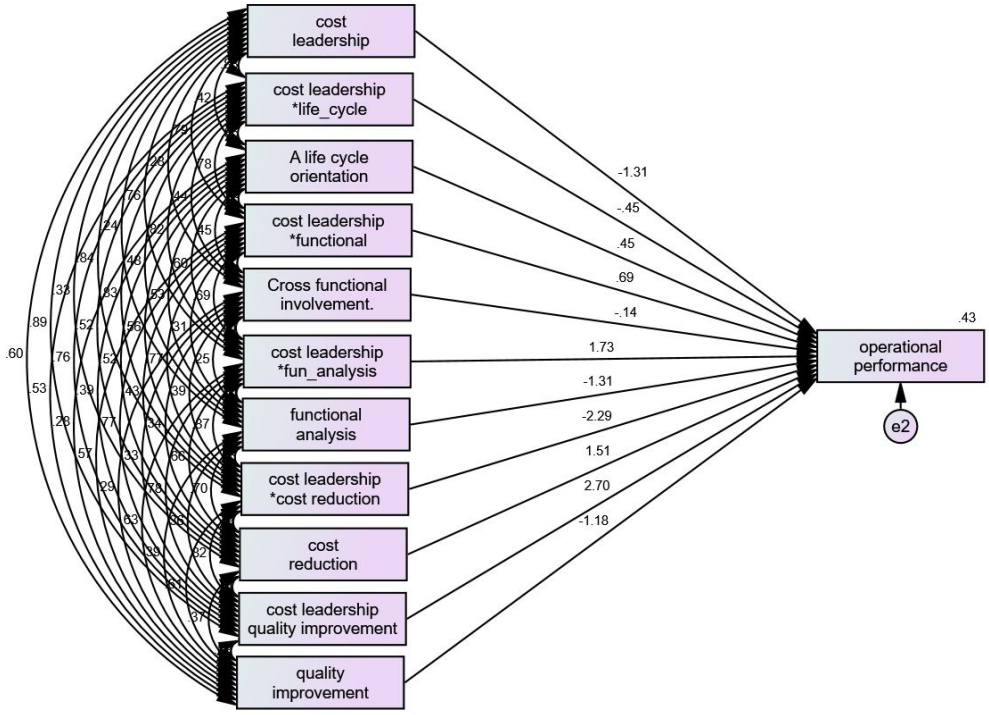
Source: AMOS2 4output

In an attempt to assess whether or not cost leadership strengths the relationship between financial performance and (functional analysis, cost reduction and quality improvement) based on tables (4.3.5), (4.3.6) and (4.3.7). It appears that Cost leadership dampens the positive relationship between functional analysis and financial performance, dampens the negative relationship between cost reduction and financial performance and dampens the negative relationship between quality improvement and financial performance. It is clear that the paths between financial performance and (functional analysis, and cost reduction) are not significant. With p-values of (0.407**,** 0.886,) (p> 0.05) in the group analysis. Path between financial performance and quality improvement is significant. With p-value of (0.055**,**) (p> 0.05) Hence, hypothesis **H2b is** not supported

H2c Cost leadership strengths the relationship between target costing and operational performance

Figure (4.3.4) shows. The results of path analyses showing Model fit parameters consistent with those recommended. The full AMOS output (Regression Weights) is displayed in the followed tables

Figure (4.4): The Relationship between target costing and operational performance



source: AMOS2 4 output

Table (4.3.8).Regression Weights: Cost leadership moderate the relationship between life cycle orientation and operational performance

			Estimate	S.E.	C.R.	P	Label
operational_performance	<--	life_cycle	.459	.661	.695	.487	par_1
operational_performance	<--	cost_leadership	-1.487	.857	-1.735	.083	par_6
operational_performance	<--	cost_leadership_life_cycle	-.087	.208	-.418	.676	par_62

Table (4.3.9).Regression Weights: Cost leadership moderate the relationship between Cross-functional involvement and operational performance

			Estimate	S.E.	C.R.	P	Label
operational_performance	<---	Functional	-.210	.760	-.277	.782	par_2
operational_performance	<---	cost_leadership	-1.487	.857	-1.735	.083	par_6
operational_performance	<---	cost_leadership_x_functional	.201	.233	.862	.388	par_63

source: AMOS2 4output

Based on Tables (4.3.8) and (4.3.9) Cost leadership dampens the positive relationship between life cycle orientation and operational performance and dampens the negative relationship between Functional and operational performance. , it is clear that the paths between operational performance and (life cycle orientation, cross-functional involvement) are not significant. With p-values of (0.676 and0 .388) (p> 0.05) in the group analysis. Hence, hypothesis H2c also is not supported

H2e Cost leadership strengths the relationship between value engineering and operational performance

Figure (4.3.4) shows. The results of path analyses showing Model fit parameters consistent with those recommended. The full AMOS output (Regression Weights) is displayed in the followed tables

Table (4.3.10).Regression Weights: Cost leadership moderate the relationship between functional analysis and operational performance

			Estimate	S.E.	C.R.	P	Label
operational_performance	<---	fun_analysis	-1.384	1.035	-1.337	.181	par_3
operational_performance	<---	cost_leadership	-1.487	.857	-1.735	.083	par_6
operational_performance	<---	cost_leadership_x_fun_analysis	.368	.306	1.203	.229	par_64

source: AMOS2 4output

Table (4.3.11).Regression Weights: Cost leadership moderate the relationship between cost reduction and operational performance

			Estimate	S.E.	C.R.	P	Label
operational_performance	<---	cost_reduction	1.795	1.195	1.502	.133	par_4
operational_performance	<---	cost_leadership	-1.487	.857	-1.735	.083	par_6
operational_performance	<---	cost_leadership_x_cost_reduction	-.467	.348	-1.341	.180	par_65

source: AMOS2 4output

Table (4.3.12).Regression Weights: Cost leadership moderate the relationship between quality improvement and operational performance

			Estimate	S.E.	C.R.	P	Label
operational_performance	<---	quality_improvement	-1.245	.645	-1.931	.054	par_5
operational_performance	<---	cost_leadership	-1.487	.857	-.735	.083	par_6
operational_performance	<---	cost_leadership_x_quality_improvement	.478	.199	2.402	.016	par_66

Source: AMOS2 4 output

Based on tables (4.3.10), (4.3.11) and (4.3.12). It appears that Cost leadership dampens the negative relationship between functional analysis and operational performance, dampens the positive relationship between cost reduction and operational performance and negative relationship between quality improvement and operational performance. It is clear that the paths between operational performance and (functional analysis, cost reduction) are not significant. With p-values of (0.229 & 0.180,) ($p > 0.05$) in the group analysis. And path between operational performance quality improvement is significant with p-values (.016) ($p < 0.05$). Hence **H2e** is partially supported.

H2f Differentiation strengths the relationship between target costing and financial performance

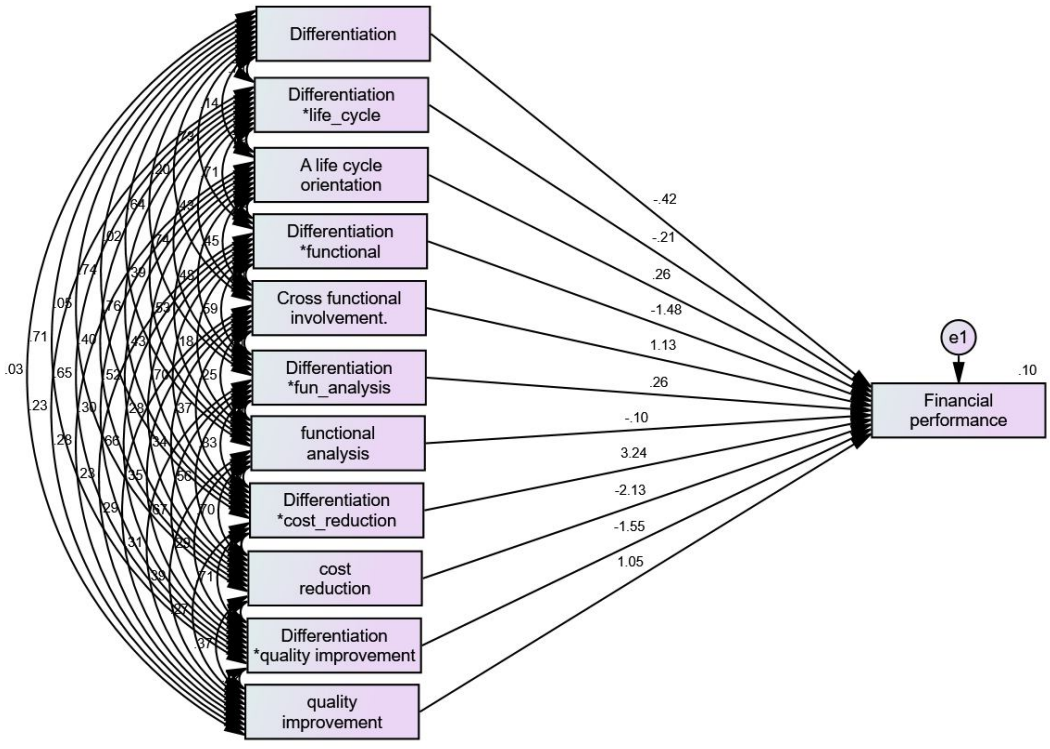
Figure (4.3.5) shows. The results of path analyses showing Model fit parameters consistent with those recommended. The full AMOS output (Regression Weights) is displayed in the followed tables

Table (4.3.13).Regression Weights Regression Weights: Differentiation moderate the relationship between lifecycle and financial performance

			Estimate	S.E.	C.R.	P	Label
Financial_performance	<---	life_cycle	.368	1.383	.266	.790	par_1
Financial_performance	<---	Differentiation	-.575	1.520	-.378	.705	par_6
Financial_performance	<---	Differentiation_X_life_cycle	-.053	.336	-.158	.875	par_62

source: AMOS2 4output

Figure (4.3.5): **The Relationship between Differentiation interaction and financial performance**



source: AMOS2 4output

Table (4.3.14).Regression Weights Regression Weights: Differentiation moderate the relationship between lifecycle and financial performance

			Estimate	S.E.	C.R.	P	Label
Financial_performance	<---	Functional	2.353	1.436	1.639	.101	par_2
Financial_performance	<---	Differentiation	-.575	1.520	-.378	.705	par_6
Financial_performance	<---	Differentiation_X_functional	-.529	.347	-1.525	.127	par_63

source: AMOS2 4output

In an attempt to assess whether or not Differentiation strengths the relationship between financial performance and (life cycle orientation, and cross-functional involvement) based on tables (4.3.13), (4.3.14), it appears that Differentiation dampens the positive relationship between life cycle orientation and financial performance, dampens the positive relationship between cross-functional involvement and financial performance. It is clear that the paths between financial performance and (life cycle orientation, and cross-functional involvement) are not significant. With p-values of (0.875, 0 .127) ($p > 0.05$) in the group analysis. Hence, hypothesis **H2f** is not supported.

H2d Differentiation strengths the relationship between value engineering and financial performance

Figure (4.5) shows. The results of path analyses showing Model fit parameters consistent with those recommended. The full AMOS output (Regression Weights) is displayed in the followed tables

Table (4.3.15). Regression Weights: Differentiation moderate the relationship between functional analysis and financial performance

			Estimate	S.E.	C.R.	P	Label
Financial_performance	<---	fun_analysis	-.154	1.719	-.090	.929	par_3
Financial_performance	<---	Differentiation	-.575	1.520	-.378	.705	par_6
Financial_performance	<---	Differentiation_X_fun_analysis	.070	.401	.174	.862	par_64

source: AMOS2 4output

Table (4.3.16). Regression Weights: Differentiation moderate the relationship between cost reduction and financial performance

			Estimate	S.E.	C.R.	P	Label
Financial_performance	<---	cost_reduction	-3.529	2.054	-1.718	.086	par_4
Financial_performance	<---	Differentiation	-.575	1.520	-.378	.705	par_6
Financial_performance	<---	Differentiation_X_cost_reduction	.853	.483	1.766	.077	par_65

source: AMOS2 4output

Table (4.3.17). Regression Weights: Differentiation moderate the relationship between quality improvement and financial performance

			Estimate	S.E.	C.R.	P	Label
Financial_performance	<---	quality_improvement	1.551	1.093	1.419	.156	par_5
Financial_performance	<---	Differentiation	-.575	1.520	-.378	.705	par_6
Financial_performance	<---	Differentiation_X_quality_improvement	-.391	.265	-1.476	.140	par_66

source: AMOS2 4output

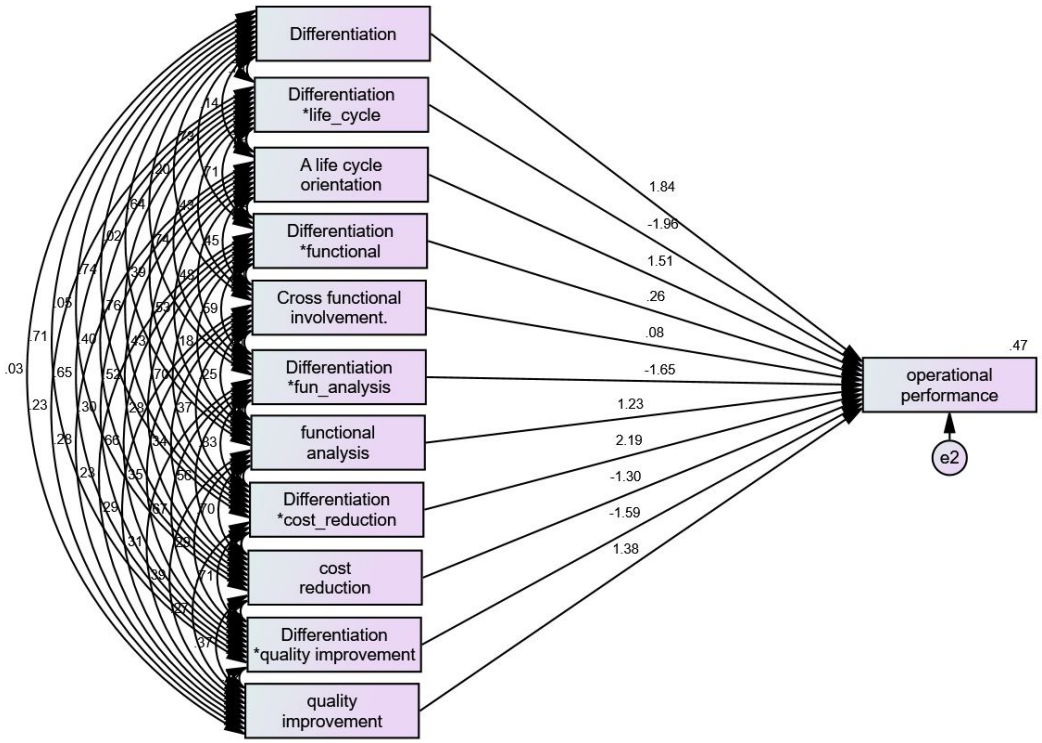
Based on tables (4.3.16), (4.3.17) and (4.3.18). It appears Differentiation dampens the negative relationship between functional analysis and

financial performance, dampens the negative relationship between cost reduction and financial performance and positive relationship between quality improvement and financial performance. It is clear that the paths between financial performance and (functional analysis, cost reduction and quality improvement) are not significant. With p-values of (0.862, 0.077, 0.140) (p> 0.05) in the group analysis. Hence, hypothesis **H2d** is not supported

H2m Differentiation strengths the relationship between target costing and operational performance

Figure (4.6) shows. The results of path analyses showing Model fit parameters consistent with those recommended. The full AMOS output (Regression Weights) is displayed in the followed tables

Figure (4.3.6) **The Relationship between Differentiation interaction and operational performance.**



source: AMOS2 4output

Table (4.3.18). Regression Weights: Differentiation moderate the relationship between quality life cycle orientation and operational performance

			Estimate	S.E.	C.R.	P	Label
operational_performance	<---	life_cycle	1.535	.757	2.029	.043	par_1
operational_performance	<---	Differentiation	1.798	.832	2.161	.031	par_6
operational_performance	<---	Differentiation_X_life_cycle	-.347	.184	-1.889	.059	par_62

source: AMOS2 4output

Table (4.3.19) Regression Weights: Differentiation moderate the relationship between quality cross-functional involvement and operational performance

			Estimate	S.E.	C.R.	P	Label
operational_performance	<---	Functional	.113	.786	.143	.886	par_2
operational_performance	<---	Differentiation	1.798	.832	2.161	.031	par_6
operational_performance	<---	Differentiation_X_functional	.067	.190	.351	.726	par_63

source: AMOS2 4output

Tables (4.3.18), (4.3.19), it appears that Differentiation dampens the positive relationship between life cycle orientation and financial performance, dampens the negative relationship between cross-functional involvement and financial performance. It is clear that the paths between financial performance and (life cycle orientation, and cross-functional involvement) are not significant. With p-values of (0.059, 0.726) ($p > 0.05$) in the group analysis. Hence, hypothesis H2m is not supported.

H2n Differentiation strengths the relationship between value engineering and operational performance

Figure (4.3.6) shows. The results of path analyses showing Model fit parameters consistent with those recommended. The full AMOS output (Regression Weights) is displayed in the followed tables

Table (4.3.20). Regression Weights: Differentiation moderate the relationship between functional analysis and operational performance

			Estimate	S.E.	C.R.	P	Label
operational_performance	<---	fun_analysis	1.305	.941	1.387	.166	par_3
operational_performance	<---	Differentiation	1.798	.832	2.161	.031	par_6
operational_performance	<---	Differentiation_X_fun_analysis	-.315	.219	-1.439	.150	par_64

source: AMOS2 4output

Table (4.3.21).). Regression Weights: Differentiation moderate the relationship between cost reduction and operational performance

			Estimate	S.E.	C.R.	P	Label
operational_performance	<---	cost_reduction	-1.538	1.124	-1.368	.171	par_4
operational_performance	<---	Differentiation	1.798	.832	2.161	.031	par_6
operational_performance	<---	Differentiation_X_cost_reduction	.413	.264	1.563	.118	par_65

source: AMOS2 4output

Table (4.3.22).). Regression Weights: Differentiation moderate the relationship between quality improvement and operational performance

			Estimate	S.E.	C.R.	P	Label
operational_performance	<---	quality_improvement	1.456	.598	2.435	.048	par_5
operational_performance	<---	Differentiation	1.798	.832	2.161	.031	par_6
operational_performance	<---	Differentiation_X_quality_improvement	.287	.145	1.980	.015	par_66

source: AMOS2 4output

Based on tables (4.3.20), (4.3.21) and (4.3.22) . It appears Differentiation dampens the positive relationship between functional analysis and operational performance, dampens the negative relationship between cost reduction and operational performance. It is clear that the paths between operational performance and (functional analysis, cost reduction) are not significant. With p-values of (0.150, 0.118) ($p > 0.05$) in the group analysis**.** But the path between operational performance and quality improvement is significant with p-values of (.015) ($p < 0.05$) .Hence, hypothesis **H2n** is partially supported

CHAPTER FIVE

Conclusions

5.1 chapter Over view

This chapter summarizes and discusses the main findings emerging from the study, followed by the study's contributions and Managerial implications. The final section outlines the research limitations and makes suggestions for future research.

5.2 Summary and Discussions of the Research Findings

This section discusses the findings of hypotheses of the study. The hypotheses were tested with the path analysis that discloses the effect of independent variables on dependent variable and the effect of moderator in relationships between variables through the structural equation modeling (SEM) using AMOS

5.2.1 Findings Related to the integration's effect of target costing and Value engineering

Data analysis here relates to the first research objective (*To highlight the effect of integration between the target costing and value engineering on manufacturing firm's performance)* and the first research question about the Integration of Target Costing and Value Engineering affects the firms' performance? It is noted that the integration only affects the operational performance. Table 5.2.1 summarises and presents the results of the related hypotheses tests.

Table _5.2.1 Summary of Hypotheses Tests related the integration's effect of target costing and value engineering

H1a: Integration of Target Costing and Value Engineering has significant effect on the financial performance`	not supported
H1b: Integration of Target Costing and Value Engineering has significant effect on the operational performance	partially supported

The findings in Table 5.2.1 show that:-

1- The integration of (TC) and VE) were Conceptualised in the perception of Sudanese firms' managers as having five dimensions Cross-functional involvement, , life-cycle orientation, functional analysis, and cost reduction, and Quality improvement which were considered as more important in their firms . The importance of quality is being visualized means of manufacturing efficiency by matured economies will force Sudanese firms to think more towards TC and VE practices focusing on the cost reduction and Quality this partially consistent with (Rehab 2011) who noted that life cycle contribute to the high quality and low cost products in Sudanese industrial companies. So change that will influence the perceptions of managers certainly lies in the Strategy of the firm that focuses more on bridging the gap in perception of the managers in quality- improvement practices with lower costs. So a cross-functional team responsible for the entire product from initial concept through final production according to allowable and Life cycle costing considers all costs of owning a product over its life, are essential in improving the operational performance of Sudanese manufacturing firms. Therefore the mentioned integration enhance the operational performance

2- Sudanese manufacturing firms cannot achieve financial performance from such integration.

5.2.2 Findings Related to the Moderating Role of competitive strategy on the Relationship between Firms' performance, target costing and value engineering

This part of the analysis stands for the interaction fit approach as formulated in hypothesis 2.to achieve the second research objective (*To explore the moderation role of competitive strategy on Firms' performance according to integration of target costing and value engineering*).Competitive strategy is used as moderator. It is noted that

only a few interaction effects of moderating on the relationship between target costing, value engineering and firm performances have been detected**.** Table 5.2.2 summarise and present the results of the related hypotheses tests.

Table _5.2.2 Summary of Hypotheses Tests Related to the Moderating Effect of Competitive strategy

Hypotheses	***Comment***
H2a: Cost leadership strengths the relationship between target costing and financial performance	not supported
H2b: Cost leadership strengths the relationship between value engineering and financial performance	not supported
H2c: Cost leadership strengths the relationship between target costing and operational performance	not supported
H2e: Cost leadership strengths the relationship between value engineering and operational performance	partially supported
H2f: Differentiation strengths the relationship between target costing and financial performance	not supported
H2d: Differentiation strengths the relationship between value engineering and financial performance	not supported
H2m: Differentiation strengths the relationship between target costing and operational performance	not supported
H2n: Differentiation strengths the relationship between value engineering and operational performance	partially supported

The findings in Table 5.2.2 show that:-

1-cost leadership strategy only moderates the relationship between value engineering and operational performance. Differentiation strategy moderates the relationship between value engineering and operational

performance. So, the findings partially consistent with study of Li et al. (2006) who mentioned that upper levels of competitive capability can lead to better organizational performance and Rukia(,2015) who found cost leadership, differentiation have significant relationship with manufacturing firm performance. It is clear that firms pursuing a cost leadership strategy achieve operational benefits from quality improvement. Also operational benefits can be easily achieved by manufacturers that creating differentiation. Furthermore, the cost leadership strategy provides Price based on internal efficiency and maintains tight control over production and overhead costs that helps quality improvement to enhance operational benefits. Differentiation strategy provides Value to customers by technical assistance to them, targets a segment of the market and advertises of products all are help quality improvement to enhance operational benefits.

2- competitive strategy does not moderates value engineering and financial performance this may because the reliability construct was rather weak for the financial performance

3- competitive strategy does not moderates the relationship between target costing and firm performance and this could be partly attributed to the relatively small sample size of 122. The limited sample size reduces the statistical power of the test performed, moderation analyses require large sample sizes, the use of continuous variables could have also reduced power due to studies of (Aguinis, Beaty, Boik, & Pierce, 2005; McClellan d & Judd, 1993) a sample size of at least 185 would be required.

It can be concluded that the results of this study indicate that VE enhance operational performance through integration with the target costing, also VE impacts operational performance indirectly through the competitive strategy this is due to the association of value engineering

with cost reduction, product quality improvement and improving resource efficiency competing more successfully in marketplace and functions achieved

5.3 Research Contributions

Research on management accounting practices in Sudan is currently limited. This study adds to the limited knowledge of management in Sudan. It represents a survey and explanation of target costing and value engineering as contemporary techniques in Sudan, which is an emerging economy. The main contributions of this research are to examine the integration of target costing and value engineering currently in manufacturing companies in Sudan as well as its benefits to Khartoum firms, and to explore the relationships among key constructs including target costing , value engineering, and competitive strategy in order to enhance firms performance.

This research also extends the body of knowledge that uses a contingency theory framework to explore the significant relationships among key variables.

The interaction approach has been adopted as the basis to develop the hypotheses. It focuses on a competitive strategy as an important contingency factor. No previous studies have incorporated this strategy variable with related to target costing and value engineering. It may inspire other researchers as well to go on with this method in target costing to further explore this phenomenon.

5.4 Recommendations

This study leads to several managerial implications & recommendations

- It implies that Integrations representing (life cycle orientation and quality improvement) and (cross- functional involvement and quality improvement) are providing relatively benefit to the responding firms

which leads to improving operational performance in Sudanese firms. Therefore the use of integrated Target Costing and value engineering assures that the firms will just obtain positive operational results so the general recommendation is to use target costing and value engineering at integrated manner.

- The managers should pay more attention to dimensions related to integration of target costing and value engineering that have achieved excellence for their firms, and to enhance the operational performance. Are cross-functional team that enables the design and implementation of solutions to complex problems, Identifying functional analysis to explore improvements and cost reduction by identifying the major cost centers, these may be purchasing, production, sales and marketing, finance and administration to determine areas where the firm could save costs. And quality improvement by analysis of performance and systematic efforts to improve it.
- From the findings Sudanese manufacturing firms cannot achieve financial performance from the integration of TC&VE .The researcher therefore, recommends that manufacturing firms should be more proactive to improve financial performance by thinking of scale (e.g. Use fixed resources fully, Consider retiring, if appropriate, Consider merging with another firm), employment(e.g. Add labor-intensive enterprises with low-capital requirements, Move to part-time working status), efficiency (e.g. Improve marketing skill and performance, Improve firm record keeping and analysis), and leverage(e.g. Identifying and selling unproductive/unprofitable assets; reduce and restructure debts, Avoid high-cost borrowing, such as overdrafts, Establishing minimum level of new investments for the financial performance)

- The managers of the Sudanese manufacturing firms should be aware of the capability of target costing and value engineering combined with the fit various competitive strategies. They should be aware that achieving strategic fit between competitive strategy and TC&VE may lead to higher performance. Therefore, their strategy should match environment for superior performance. A focus on more ways of dealing with the other challenges faced is also imperative for a growth in (ROI) and growth in market share.
- The effects of VE on operational performance become moderated by cost leadership and differentiation strategies. As a result, managerial decisions are affected by competitive factors as pursuing economy of scale, reducing the costs of interrelated activities with each and determine of product segments, advertising of products, Hiring employees and marketing research. So the managers in manufacturing firms should evaluate strategies factors continuously and make appropriate reactions
- Train employees with courses to enhance their skills and experience in target costing and value engineering techniques to meet the challenges of new environment.

5.5 Limitations and Future Research

This research is subject to a number of limitations and provides suggestions for future research. These are presented bellow.

- Several target costing factors were left out in order to keep the model simpler. Based on the results it is possible the further extension of the model, e.g. by price-led, focus on design, value-chain involvement, although it would need other sources beyond the questionnaire as well.
- The study sample is of manufacturing firms therefore the findings could not be generalized to other organizations in other industries such as service or to companies in another country. So, replicating of this

study on different industries in Sudan or other countries would increase the possibility of generalizing the findings.

- The responding firms fall into different ownership categories (i.e. individual company, Partnership), making it difficult to generalize the findings across all firm types. Hence, future research may consider investigation of ownership type on the relationships examined in this study
- The generalization of results is limited. because the analysis is cross-sectional in nature and provides snapshots of competitive strategy-performance relationships It is important to conduct longitudinal studies to evaluate the effects of competitive strategy on firm performance.
- Future research might be directed at the relationship between other types of competitive strategy and firm performance as well as their mediating effects on the relationship between firm performance and integration of target costing and value engineering
- This research focuses on competitive strategy. It would be interesting to include other contingency factors (e.g. Environment, Size, Technology) to explore their relationships with target costing, value engineering, and firms performance in the future studies.
- The some dimensions of financial performance such as Growth in (ROI) is measured subjectively by means of questionnaire, whereas, the measurement with objective data results in more acceptable findings. Therefore, there is a need for future research using objective measures of financial performance
- The reliability construct was weak for the financial performance therefore the construct could be tested with new data and refined with additional measuring items.

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APPENDIXES

Appendix 1: List of Reviewers

	Name	academic position	Specialization	Title
1	Dr .Mustafa Najm Al – Bishari	Associate Professor	Accounting	Sudan University of Science and Technology - **Sudan**
2	Dr. Siddiq Bllal	Associate Professor	Business Administration	Dean of the Faculty of Business Studies **Sudan** University of Science and Technology - **Sudan**
3	Dr. Ismail Hussein Ahmro	Associate Professor	Business Administration	Dean of the Faculty of Business Middle East University **Amman - Jordan**
4	Dr Majeed Al-Maryani	Associate Professor	Accounting	Head of Department of Accounting, Faculty of Administration and Economic, University of AlQadisiya- **Iraq**
5	Dr .Abdul Hafeez Ali Hasaballah,	Associate Professor	Business Administration	Qassim University- **Saudi Arabia**
6	Dr.El Hahdi Adam	Associate Professor	Accounting	Neelain University - **Sudan**
7	Emad Issa	Lecturer	statistics	Sudan University of Science and Technology - **Sudan**

Appendix2: Research Questionnaire

Sudan University of Science & Technology

College of Graduate Studies

Dear Participant

I am a Ph.D. student at the Sudan University of Seines &technology currently preparing my doctoral thesis on

Integration's effect of Target Costing and Value Engineering on manufacturing firms' performance: moderating role of Competitive strategy

This research aims to explore and understand the intricate relationship between Competitive strategy, performance and the role Of Integration of Target Costing and Value Engineering in manufacturing companies in Sudan This aim cannot however be achieved without your and other respondents' co-operation in completing the enclosed questionnaire and providing valuable information about Target Costing and Value Engineering Techniques in practice. The questionnaire has been carefully designed for this study and is informed by current knowledge in this field, including recent empirical studies in both developed and developing countries. Please answer all the questions that are relevant to your company and make any additional comments using the space provided or additional sheets if necessary. If you feel you are not the right person to complete the questionnaire, please pass it on to the relevant person in your company. I would like to reassure you that your response will be treated as strictly confidential and will only be used for the purposes of this research. It will not be disclosed to third parties under any circumstances Should you need further information or clarification regarding this study, please do not hesitate to contact me or my Supervisor of studies at the addresses below.

Thank you for your co-operation in completing this questionnaire.

Yours sincerely
Nafisa Alamir
Ph.D. Candidate
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Glossary

- **target costing:** is a comprehensive cost planning, cost management and cost control concept used to influence or to have an impact on product cost structures primarily at the early stages of product design depending upon the requirements drawn from the market. The target costing process requires the cost-oriented co-ordination of all product related organizational functions (Horvath, 1993).
- **value engineering:**"a powerful problem-solving tool that can reduce costs while maintaining or improving performance and quality requirements
- **Competitive strategy:** Is about how to compete successfully in particular markets in order to deliver corporate level strategy, for example through:

- Cost leadership = the ability to make quality products at lower cost.
- Product Differentiation = the ability to build unique features into products to offer more choice to customers.

I. General Data

a) **Data relating to the person who fills out the questionnaire**

1. Job Title

Director general		Planning and Quality Director		Production Manager		Financial Manager		Head of Costs Division		Head of accounting Department	

2. Educational Level

Bachelor		Master		Higher diploma		Doctorate		Others	

3. University Specialization

Business Administration		Cost and management accounting		Accounting		engineering		Other *please specify*	

6. Experience in the Specialization Field

Less than 5 years		From 5 to less than 10		From 10 to less than 15		15 years and more	

b) Data relating to the company.

1. The type of industry the company belong to

Food Industry.		Textile industry	
Leather industry.		Chemical industry and medicine	
. oils and soap industry.		Engineering industries.	
manufacture of construction materials and refractories		Packaging and printing materials industry.	

2. Duration of the company in the field of industry

Less than 5 years		From 5 to less than 10		From 10 to less than 15		15 ears and more	

II. The Target costing technique : Please Tick the Appropriate Answer (√)

	Item	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
	1)Price-led					
1	The management of the company determines the target costing of the product by Subtracting target profit margin for the product from the selling price.					
2	allowable costs are dependent on the market price					
3	The price is set first then the target product cost is determined					
	2)Focus on customers.					
4	There are Opened communication channels with customers to know their preferences					
5	products designed to satisfy customers demand					
6	products sold at a price customers are willing to pay					

Item		Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
	3) Focus on design.					
7	The company focuses on product design before begins production					
8	engineering design eliminates costly features					
9	design minimizes the need for engineering changes after production begins					
	4)Cross-functional involvement.					
10	The Company form teams from different functions					
`11	A cross-functional team responsible for the entire product from initial concept through final production according to allowable cost					
12	A cross-functional team include outside participants					
	5)Value-chain involvement					
13	Value chain outside members help to focus cost reduction efforts					
14	The company is making					

Item		Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
	efforts to eliminate costs that do not add value					
15	Efforts are making to bring the product cost down					
	6)A life-cycle orientation					
16	Life cycle costing considers all costs of owning a product over its life,					
17	The company's strategy is to minimize costs for the customer					
18	The company is in the follow-up to minimize production costs					

III. Value engineering technique: Please Tick the Appropriate Answer (√)

Item		Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
	1)functional analysis					
1	The company lists the component parts of the product.					
2	The company determine the total cost of each component parts					

	Item	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
3	The company determine the value of each component by comparing the characteristics of similar products					
4	The company eliminates un necessary function to the customer					
5	for existing product The company finds component alternatives for reducing costs without risking value					
	2)cost reduction					
6	The company systematically evaluating cost by gathering up all the relevant data of every part in the product					
7	The company tracking small errors that magnify with product volume					
8	The company knows where most of the cost of a product occurs.					
9	The company understands the cost environment for the product					
	3)Quality improvement					
10	The company is increasing					

Item		Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
	the system complexity that improve quality					
11	The company is using more expensive materials					
12	The company is increasing the labor consumption especially for finishing					

IV. Competitive strategy

Please indicate the importance of the following competitive capabilities to your company

Item		most important	important	Moderately Important	un important	most un important
	1)Cost leadership					
1	boosting operational efficiency					
2	Purchases of raw material related with production volume					
3	Pricing products below competitors					
4	Pursuing economy of scale					
5	The use of high-efficiency distribution channels					
6	Reducing the costs of interrelated activities with each					
7	concern of learning curves					
8	The use of electronic work techniques					
	2)Differentiation					
9	Providing product with					

Item		most important	important	Moderately Important	un important	most un important
	unique features					
10	Targeting high-priced product segments					
11	Advertising of products					
12	Control of distribution channels					
13	Hiring specialists-employees					
14	Focus on advanced marketing research					
15	Provide technical assistance to the customer					

V. Performance

How does your company perform compared with your major competitors?

	Item	much better	better	Moderately better	Worse	much worse
	1)Operational performance					
1	Overall product quality					
2	Customer service level					
3	Pre-sale customer service					
4	Product supports					
5	Responsiveness to customers					
6	Delivery speed					
7	Delivery dependability					
8	Volume flexibility					
9	Product mix flexibility					
10	New product flexibility					
	2)Financial performance					
11	Return on Investment (ROI)					

	Item	much better	better	Moderately better	Worse	much worse
12	Return on Sale (ROS)					
13	Market share					
14	Growth in(ROI)					
15	Growth in(ROS)					
16	Growth in market share					