

**Sudan University of Science and Technology  
College of Graduate Studies**



# **Impact of Budgetary Systems on Petroleum Refining Cost Control**

**Field Study: Khartoum Refinery Co .Ltd**

**أثر أنظمة الموازنات في رقابة تكلفة تكرير النفط  
دراسة ميدانية: شركة مصفاة الخرطوم المحدودة**

**Thesis for Master degree in:  
Cost and Management Accounting**

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بسم الله الرحمن الرحيم

## إِسْتِهْلَالٌ

قال الله تعالى:

﴿وَلَوْلَا فَضْلُ اللَّهِ عَلَيْكَ وَرَحْمَتُهُ لَهَمَّتْ طَائِفَةٌ مِنْهُمْ أَنْ يُضِلُّوكَ وَمَا يُضِلُّونَ إِلَّا أَنْفُسَهُمْ وَمَا يَضُرُّونَكَ مِنْ شَيْءٍ وَأَنْزَلَ اللَّهُ عَلَيْكَ الْكِتَابَ وَالْحِكْمَةَ وَعَلَّمَكَ مَا لَمْ تَكُن تَعْلَمُ وَكَانَ فَضْلُ اللَّهِ عَلَيْكَ عَظِيمًا﴾

صدق الله العظيم

سورة النساء الآية (١١٣)

# **Dedication**

To My Mother, My Father and My Wife.

# Acknowledgements

First of all Praise be to Allah, Lord of the Worlds and Lord of the Great Throne who guided me and supported me to perform this thesis. After that my great thanks to Sudan University of Science and Technology for giving me this chance and concern with my thanks to Dr.Fatahelraman Elhassan, Dr.Elgilani Eltahir who assisted me. My extent thanks to Khartoum Refinery Co.Ltd especially Engineer Ali AbdElrahman the deputy general manager and Mr. Omer Khalafallah Mohamed the Finance Dept.manager. Finally my especial thanks to my sincere friend Mr. Mohamed Elgaili Mohamed.

## **Abstract**

This research studies the Impacts of Budgetary Systems on Petroleum Refining Cost Control. The study problem is the ignorance of the role of well preparing to the budgets in optimizing the cost of refining petroleum in addition to what extent budgetary software can be helpful in petroleum refining cost control besides the role of the users in budgeting controlling.

The objectives of the study are to give Khartoum refinery easy and traced steps for budget preparation. To maximize the role of modern software in Khartoum Refinery in order to control the refining cost. To emphasize the big role of the users in Khartoum Refinery towards cost control.

The study includes three hypotheses specified as follows:

- 1- Well preparing for the budget effects on the variances.
- 2- Stricted software effects on the production cost.
- 3- Users (employees) are considered as one of the important effective factors in budget exceeding.

The researcher followed in this study the methodology of historical approach in ordering the periods of the previous studies, deductive approach for picking the facts and descriptive approach for the analyzed data by statistical package for social sciences (SPSS).

The study results are:

- 1- The great role of budget preparation in Khartoum Refinery helping in controlling the refining cost.
- 2- The updated restricted software in Khartoum refinery contributes in cost control in each production stages even in management and financial transactions.
- 3- Contributions of the staff in budget preparation and implementation made them very careful in processing their jobs and controlling their budgets spontaneously.

Finally the study recommended that:

- 1- Providing training courses for the budget users both staff and managers to enlighten them by the important role of budgeting process.
2. Khartoum refinery should have well knowledge committee for choosing the new software and even when updating the old ones to justify the installation and licenses cost in order to compare it with the yields and the benefits of using this software.

## مستخلص الدراسة

يقوم هذا البحث بدراسة أثر أنظمة الموازنات في رقابة تكلفة تكرير النفط. مشكلة هذه الدراسة هي تجاهل دور الإعداد الجيد للموازنة في ترشيد تكلفة تكرير النفط والتي أي مدى يمكن لأنظمة الموازنة الالكترونية المساعدة في رقابة تكلفة تكرير النفط بالإضافة إلي دور العاملين في التحكم في الموازنة.

لذا فإن أهداف هذه الدراسة هي إعطاء شركة مصفاة الخرطوم خطوات واضحة لإعداد الموازنة و زيادة دور أنظمة الموازنات إلي أقصى ما يمكن في شركة مصفاة الخرطوم المحدودة لرقابة تكلفة تكرير النفط والتأكيد للدور الكبير للعاملين بمصفاة الخرطوم في تخفيض التكلفة. وقد اشتملت الدراسة علي الفرضيات الآتية:

- 1- الإعداد الجيد للموازنة يؤثر على انحرافات الأداء.
  - 2-
  - 3- أنظمة الموازنة الالكترونية ذات إمكانات الضبط العالية تؤثر في التكلفة الإنتاجية.
- يعتبر العاملون أحد العوامل المهمة المؤثرة في تجاوز تقديرات الموازنة.

وقد اتبع الباحث في هذه الدراسة المنهج التاريخي في ترتيب الدراسات السابقة والمنهج الإستنتاجي لاستنباط الحقائق والمنهج الوصفي للبيانات التي تم تحليلها باستخدام برنامج الحزمة الإحصائية للعلوم الاجتماعية. وكانت نتائج الدراسة كالتالي:

الدور الكبير لإعداد الموازنة في شركة مصفاة الخرطوم يساعد في التحكم في تكلفة التكرير. أن الأنظمة الالكترونية المستخدمة في شركة مصفاة الخرطوم تساهم في رقابة التكلفة في جميع مراحل الإنتاج و حتى في العمليات الإدارية والمالية. إشراك العاملين في إعداد وتنفيذ الموازنة جعلهم يتوخون الحذر في أداء مهامهم والتحكم في الموازنة تلقائياً.

أخيراً لقد أوصت الدراسة بالآتي:

- 1- إعطاء مزيداً من الكورسات التدريبية لكل من العاملين والمدراء لتتويرهم بالدور المهم لعملية الموازنة.
- 2- ينبغي أن يكون لشركة مصفاة الخرطوم لجنة مؤهلة لاختيار الأنظمة الإلكترونية وحتى عند ترقية النظم القديمة لتبرير تكلفة الترخيص والتشغيل بمقارنتها بالعائد وحجم الاستفادة من استخدام هذه النظم.

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# **Introduction**

## **Preface:**

Oil industry is still one of the most powerful factors in the growth of nations. Oil refineries are essential part in this sector, since they have been supplying the markets with finished products such as gasoline, diesel fuel, asphalt base, heating oil, kerosene, jet fuel and liquefied petroleum gas. These products are facing great challenges because of the high competition in their both quality and prices.

From technical view there is huge leap on processing technology for the refinery operations such as distillation, demerization , Isomerization and alkylation not only the operations side but also there is great jump in the managerial and financial sector for instance there are plenty of software for processing control, budgetary control, accounting and human resource. This incredible change makes the importance of studying these technologies and get their benefits in improving the performance of management accounting especially the budgetary control.

In recent years there are many studies covering the software impact on improving the management accounting performance. This study sharing with the previous ones this role but it is unique in concentrating in petroleum refinery and taking Khartoum refinery as a field study.

Eventually refinery competence work is growing day by day for getting best benchmarking among the rest refineries both locally and internationally. However one of the shortest ways to get this aim is through cost optimization and products quality.

## **Firstly: Methodological Framework**

### **The research problem:**

Processing cost of oil refineries is one of the main key performance indicators. There are still some variances between the actual costs and budgeted costs from one side and the international processing cost from another side, in addition to the absence of well knowledge about budgetary systems (software). Furthermore we can summarize the study's problem as the following questions:

- 1- What is the role of well preparing to the budgets in optimizing the cost?
- 2- To what extent budgetary software can be helpful in petroleum refinery cost reduction?
- 3-What the role of the users in budgeting controlling?

### **The importance of the research:**

To spot the light on the budgetary systems which are so many now a days In addition to show choices to the oil refineries for controlling their processing cost. Moreover the importance of this study is to fill the knowledge gap in connecting budgetary system in oil refinery with modern technology.

Furthermore Drawing foots step to be applied in Khartoum refinery to assist managers in well planning; budgeting preparation and budget follow up by using the existing software.

### **The objectives of the research:**

- 1- Giving Khartoum refinery easy and traced steps for budget preparation.
- 2- To maximize the role of modern software in Khartoum Refinery in order to control the refining cost.

3- Enhancing the participation of planning budgets in optimizing the refining cost.

4- To emphasize the big role of the users in Khartoum Refinery towards cost control.

### **The Scope of Research:**

The scope of the research is in the petroleum refinery but it is specified in:

Khartoum Refinery Co .Ltd

Period Year 2012

### **Research methodology:**

The methodology of the study relied on gathering the data by questionnaire and personal interviews. Frequency distribution, growth rates, Chi squared and standard deviation. Then the researcher used these instruments of analysis relying on statistical package for social sciences SPSS program for descriptive methodology for the collective information. Furthermore the researcher used different scientific methodologies to conduct this study such as historical approach in ordering the periods of the previous studies, deductive approach for picking the facts.

### **The Source of Data:**

The information and data of the study has been collected form the primary source (interviews with the concern persons and bodies including manager, systems administrators, budget originator even the end user) beside the secondary sources such as references, books, periodicals, published theses, dissertations, reports, international scientific conferences and web sites.

### **Research hypotheses:**

The study includes three hypotheses specified as follows:

Well preparing for the budget effects on the variances.

Stricted software effects on the production cost.



Employees are considered as one of the important effective factors in budget exceeding.

### **Research Structure:**

The researcher divided the research as follows:

Firstly there is the introduction which contains the conceptual framework of the study and the previous studies. The conceptual framework covers the research problem, importance, objectives, methodology, data source and the hypothesis. Also previous studies this covers the previous theses and dissertations which touched this study in any parts of it.

Secondly there is Chapter one: Budgets and Budgetary Control and this part of the study covers budgets and budgeting term. So it shows in detail the budget's definition and structure, Basic characteristics, implications and uses of budget. Budget types (techniques) and preparation. Budgetary control Budget process and cost control.

Thirdly there is chapter two Petroleum Refining cost & Systems. This chapter mainly spots the light on the refining costs starts with historical background about refineries. Then explain the major products, common processing units which laterally will be the cost centers. Then spread information about costing in some details such as costing methods, costing systems by differentiating between them according to their advantages and disadvantages. Moreover this chapter clarifies the implications and obstacles of each system. This chapter also is about the software its benefits, implications, basic characteristics, integration (mutual relationship).

Fourthly Field Study:

This chapter is divided in to two sections. The first one is about Khartoum Refinery Co ltd profile (work nature, products, units, departments and contributions among the community.

The second section about collecting the study data, analyze it and test the hypotheses.

Finally Findings and Recommendations

This part is about the conclusion of the study (results, finding, Recommendations and further studies).

### **Secondly: Previous studies**

Thus the researcher returned to libraries, web sites and Khartoum refinery Co Ltd and he come with the following studies:

#### **Elgabr 1997 <sup>1</sup>**

He made study on Proposed Method for Reducing The Costs in Industrial Firms. His study problem is the ignorance of the responsible people for cost reduction while they doing great efforts for maximizing the profits.

The Objective is doing analytic study for the cost reduction scope in industrial companies for suggesting base through it create a scientific project for cost reduction.

To realize his objectives he made the Hypothesis as Cost reduction is considering as strategic goal in the current stage. There are many other substantial factors for cost reduction.

The Findings the researcher got are the responsibility of cost reduction is on every person in the organization if he is top manager or staff. Increasing the intention of inventory reduction among the employees

Finally the recommendations are cost reduction should be the responsibility of all company member. Cost reduction program have to be strategic goal.

From this study we got the idea of cost reduction from all staff and activities but the gap it left is the applied connecting

between technology and management accounting especially budgeting.

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1. Elgabr A.Nabeeh "Proposed Method for Reducing The Costs in Industrial Firms" Journal of Financial and Business Studies, Cairo University. Vol .3.1997 . p:138

**Yousif 2002** <sup>1</sup>

This study was named Proposed Frame Work for the Role of Organizational Culture in Applying the Modern Cost Reduction Methods. The study Problem is all the efforts concentrating on cost reduction during the production stage and it has less importance than the stages before that especially the administrative decisions concerning design and nature of the products.

His study aimed to study and analyze all modern costing methods for cost reduction and the organizational culture to know the goals, values of organizational culture relating to these methods.

He used the Deductive and inductive methodology among his study.

The Hypothesis assumed that it is possible to suggest framework for the elements and the variables organizational culture with relating in applying the modern methods for continues cost reduction.

His study found out that not only the modern cost methods can reduce the cost but the organizational culture of the employees besides changing their attitudes and direction towards the firm.

The researcher recommended that all the companies which are intended to have and apply the modern methods for the continues cost reduction to specify the similarities of its organizational culture and the modern methods.

The study made enlightens on cost reduction but left the gap of connectivity of the software and its role in cost reduction.

**Mohammed Ibrahim 2005** <sup>2</sup>

His study named Suggested model for costing system for production costing in plastic factory.

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1. Yousif Mohamed Abubakr. "Proposed Frame Work for the Role of Organizational Culture in Applying the Modern Cost Reduction Methods. Journal of business researches and Studies. University of Zagazeeq. Vol.2.22.2002.p:685
2. Mohammed Ibrahim Dirar , Suggested model for costing system for production costing in plastic, unpublished MSC in Cost and Management Accounting, Sudan University of Science and Technology, College of Graduate Studies,2005

The research problem in most industrial established in plastic sector lack of cost system which supply the information about production operation which lead to decisions , the research amid which help method in deduction , development it is abilities and achieving its goal to face international competition by reducing cost to the minimum .

Aimed which help method in deductive development it is abilities and achieving its goals to face international competition by reducing cost to the minimum. Methodology historical and descriptive.

Hypothesis are applied a good cost system based on measurement of the production cost precisely to protect the establishment to issue wrong decision based on information supplies for the decision maker. The suggested model is the favorite one for measurement of cost in Khartoum petrochemical company.

His Study Results are the formation of the cost section inside the established with help to achieve its goals. The formation of the integrated cost system will help provide information to help the administration to take rational decisions. The cost system

marks as supervision tool to the performance and cost factor. The good cost system help in performance revolution. Providing enough authorities and full support to help to perform its ideal functions performance.

The important recommendations he had showed are the industrial establishment must care about providing integrated cost system. Satisfaction of providing information important form the good cost function and making factor in supervision and planning in each function and making decision. The necessary coordination and correction between cost section and other section is necessary particularly operation and production section.

Thus his study set up the costing system and its benefits while this study focus on the budgetary systems and its benefits on cost reduction.

### **Mahmoud 2005 <sup>1</sup>**

The study title is the Importance of Computerization of the Cost Accounting System of Industrial Complexes. The research problem is the need of Industrial Complex for a computerize costing system to back decisions in field of planning and follow up of the cost of the execution of the industrial process, the monitoring of the huge data of costing that should be integrated with other systems in the Industrial Complexes.

The objectives of the study are giving concept and objectives for costing systems especially the computerized for the organizations as general and especially for the industrial

ones. Showing the effects of computerized costing systems on the costing elements accurately.

He chose some methodologies to conduct this study such as historical approach in ordering the periods of the previous studies, deductive approach for picking the facts and descriptive approach for the analyzed data by statistical package for social

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1 Mohammed Mahmoud Bilal Mahmoud , The Importance of Computerization of The Cost Accounting System of Industrial Complexs. Unpublished MSC in Cost and Management Accounting, Sudan University of Science and Technology, College of Graduate Studies,2005

sciences (SPSS).

The hypotheses are the computerized costing systems are vital for supporting administrative decision in such industrial complexes. The computerized costing systems are far better than the manual one in terms of accuracy, speed and cost.

Through his research he has got these findings. The Importance of Computerized Cost Accounting System for the administration of such Industrial Complexes. The research problem is the need of Industrial Complex. It is undoubtedly that Computerized System is far better than the manual one in regard to its use in these industries. Computerization of the Cost Accounting System is accompanied by the Computerization of all other systems related to the costing system at the complex.

The complexity of the work at Industrial Complexes has forced the administration to make use of computerized system rather than the manual ones.

Thus he made the following recommendations: The importance of workers early training. The factories administration should depend on cost accounting for supporting the decision. The industrial firms should encourage carrying out researches and make use of them. There is a need for collaboration between engineering and cost accountants in the industrial firms.

The current research got many additional facts from this study but it is adding and putting the consideration on budgeting in oil refineries.

**Mohamed 2008**<sup>1</sup>

The title of his study is Accounting Model for using the Modern costing system in product costing in Sugar Industry. The study's

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1 A.Allah A Moneim Mohamed, Accounting Model for using the Modern costing system in product costing in Sugar Industry ,Unpublished P.H.D thesis in Accounting, Sudan University of Science and Technology, College of Graduate Studies,2008

Problem is represented in that failure of conventional methods in measuring the cost of sugar in comparison lead to the higher cost of sugar in comparison with the competitive companies in the world market.

The methodologies of the study are descriptive method in case study and historical method previous attempts.

Then the hypotheses are the application of modern system of allocation of cost asset specifying the cost of production in the sugar sector and spanning accurately. The basic component of application of suggests sample of modern cost system are available in sugar sector.

Findings are the conventional methods of allocation cannot enable measuring cost of production in an accurate manner in the sugar sector in Sudan. The application of modern system of allocation of cost asset specifying the cost of production in the sugar sector and spanning accurately.

Finally Recommendations are the importance of the application of modern system of allocation of cost to measure the unit cost the sugar sector. The importance of the application of the Activity Based Costing responsibility principle in sugar sector.

This study show the role of modern costing methods, but the current one specifies the budgetary system as part of the whole costing system.

**Mohamed 2010**<sup>1</sup>

The study's title is Role of planning Budgets in estimation of the costs of factors of production projects.

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<sup>1</sup> Elsiddig Ahmed Idris Mohamed, Role of planning Budgets in estimation of the costs of factors of production projects. unpublished MSC in Cost and Management Accounting, Sudan University of Science and Technology, College of Graduate Studies,2010

The study's problem was how they were using the scientific approach to budget planning in the develop costs of factors of production in the manner which enables its use as a planning tool and the implementation of and follow-up within the project.

The study aimed to explain the importance of the role of Planning budgets and how the methods of preparation and to highlight the role of planning budgets in the estimation of the costs of factors of production projects.

The researcher used the historical, deductive, inductive and descriptive approaches.

The hypotheses are planning budgets can help in the proper appreciation of the needs of the project of productive resources. Planning budgets is the best way to estimate the cost of factor of production projects.

The Results of the study are: Planning budgets is suitable for all projects whether small or large and help the administration in ensuring the validity of the exploitation of resource and conservation project from loss. There are no planned budget



separately for each of the sections and thus done exclusively for the accounting liability for deviation of this plant.

Recommendations: Not to over-estimate the cost and production element for the preparation of budgets and planning even be utilized to guide the performance. Must know the section of the causes of deviation between actual performances and planned to address them and avoid them in the future. You try to apply statistical methods to predict the budget figures to be more accurate and realistic.

The current study is filling the gap of knowledge while it concentrates deeply in how these stages of budgeting can be computerized.

### **Ibrahim 2011 <sup>1</sup>**

The problem of study was the need for security of administration decisions based on the cost accounting information under different aspects of the activities of construction companies.

Aimed to identify the benefits that derive from its reliance on established cost accounting information in decision making process, and study the active role of cost accounting information in the regulatory process.

Hypothesis are provide cost accounting information to assist in improving the quality of decisions.

Reliance on financial accounting information doesn't meet the needs of decision making.

The study concluded that top management rely on detailed information in making decisions more than information of the

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1 Mohamed Hashim Ibrahim, Role of cost accounting information in improving decision making construction companies, unpublished MSC in Cost and Management Accounting, Sudan University of Science and Technology, College of Graduate Studies, 2011

product and the process of making decision to the actual information and keep up a stagnated of events and facts more than historical information . Also reached to divide the cost centers established to contribute to the activation of control and contribute actively in the decision making.

Recommendations:

The need to address training and qualification of human recourse , to achieve a good level of performance and the need to computerize the system costs at the facility in order to activate the control factor and also to spit the need to establish cost centers a whole , not only for the cost accounting , which facilitates the process of censorship.

The current study added to this point the general combination between the budgeting, costing and the modern computer software.

**Hammad 2011** <sup>1</sup>

The research problem is the great revolution in the field of building and construction and that need planning in order to

accomplish the objective which is to investigate the impact of budgets on performance appraisal in Sudanese contracting companies by using Shirian Alshamal as a field study.

methodologies to conduct this study such as historical approach in ordering the periods of the previous studies, deductive approach for picking the facts and descriptive approach for the analyzed data by statistical package for social sciences (SPSS).

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1 Mohammed Hassan Mohammed Hammad, The Impact of Budgetary on Performance Appraisal In Sudan Contracting Companies, unpublished MSC in Cost and Management Accounting, Sudan University of Science and Technology, College of Graduate Studies, 2011

The hypothesis are the weakness of performance of Shirian Alshamal company's employees might lead to use resources inefficiently.

The researcher has got these findings: The budgetary planning that's set by the company doesn't consider as a strategic planning; because it contains many items demonstrate unrealistic objectives and that demonstrate a fake favorable.

The general performance of the company's employees is poor, due to lack skills of identify and achieve the company objectives. The Company uses much recourses and the final productivity is too low.

The recommendations are the company has to create performance appraisal system, because appraisal system is a mean for both setting and organizing the achievement of goals, a more tangible reason for effective performance appraisal is that it can be very helpful in achieve objectives.

This study supports the researcher by discussing budget issues while the current study covering the cost reduction issues.

### **Ahamed 2011<sup>1</sup>**

The study's problem is represented in need to develop the traditional methods to face the needs of enterprises for indispensable information to achieve the best utilization of available resources.

The main objective is to identify the impact of modern methods application of cost accounting in western Sinnar and Asalia sugar factories on control over cost and administrative decision making.

Researcher adopted the deductive, inductive, historical approaches in addition to descriptive approach.

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1Mohamed Elbashir Ibrahim Ahmed , Modern Methods of Cost Accounting and its Role in Cost Control and administrative Decision Making, unpublished Thesis for P.H.D in Cost and Management Accounting, Sudan University of Science and Technology, College of Graduate Studies,2011

The researcher made the hypothesis Applications of traditional methods of cost accounting in western Sinnar and Asalia sugar factories doesn't help the help management in performing its functions. Application of modern methods of cost accounting in western Sinnar and Asalia sugar factories helps determine and measure the sugar cost of production in a just accurate manner.

The Findings are applications of traditional methods of cost accounting in western Sinnar and Asalia sugar factories doesn't help the help management in performing its functions. Application of modern methods of cost accounting in western Sinnar and Asalia sugar factories helps determine and measure the sugar cost of production in a just accurate manner.

The recommendations are utilization of modern methods of cost accounting in western Sinnar and Asalia sugar factories to determine and measure the sugar cost of production.

Treatment of impacts arising from using traditional methods of cost accounting in western Sinnar and Asalia sugar factories in determining.

### **Ayman 2011<sup>1</sup>**

The research problem is the non adbotion of Sudanese oil production companies of modern cost accounting techniques, these technquies become of the requirement of the modern industries.

The objective of the study are knowing modern industrial environment through study of management and to know these techniques could achieve as far as their advantages during the application.

The research methodologies are deductive, inductive, descriptive and historical approaches.

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IHamad Elneel Taha Ayman "Assessment of Effectiveness and Efficiency of a modern cost accounting Methods in Petroleum Production Companies in Sudan" unpublished Thesis for P.H.D in Cost and Management Accounting, Sudan University of Science and Technology, College of Graduate Studies,2011

The research hypotheses are the development in the modern techniques of management and production in petroleum sector effect on the traditional cost accounting techniques. The application of modern cost accounting techniques provide precise information about cost. the choice of one of the modern cost accounting techniques in way agree with the nature and site of petroleum company.

The research findings are the development and change in modern management and production systems in petroleum sector must be applied. The petroleum companies in Sudan did not apply the modern costing techniques.

The recommendations are as ABC technique is suitable to the nature of the applied management and production system, in petroleum producing company in Sudan. It is important to have a precise and efficient financial accounting system.

From these studies the researcher got his way in between management accounting and cost accounting to fill the gap of knowledge and sharing with others the prosperity.

