INTRODUCTION AND DESIGN OF THE STUDY
CHAPTER - I

INTRODUCTION AND DESIGN OF THE STUDY

INTRODUCTION

Today marketing has become very competitive and complex due to the changing taste and fashion of consumers. Introduction of substitutes and availability of cheaper and competitive goods in the market has changed the approach of many business houses. The old dictum of 'produce and sell' has given way to 'produce only what the consumers want'. Due to the advent of fast computers and the modern extent of telecommunications the world has been made into one global community. This has given rise to the pursuit of organisational objectives in an international setting transcending the boundaries of nations. The reality of the situation in global environment is highly competitive with ever-increasing demand for goods and services. Consumers become more and more aware about the market and this awareness poses special problem for an organisation in satisfying and retaining them.

Not all organisations are successful. Those successful firms have certain characteristics which create a climate of success for themselves. They understand that competition is a reality which
cannot be avoided. No firm has any control over what other firms do but only to anticipate what they will do in the market. Having established the fact that the competition is an inevitable element, a company should design ways to meet the challenge. In doing so the first step is to determine how to compete. A firm can compete with others in many aspects, namely in quality, quantity and price. In the present scenario of liberalization, rapid changes take place in the market and almost all the producers provide these ingredients with their products and services. "To retain and upgrade our customers, it is becoming imperative for us to offer them better and better value," said R. Kant, Marketing Manager, LML.

Corporate growth is a complex phenomenon even for well-reputed companies. They find it hard to register continuous growth due to the globalisation of economy and the entry of multinational corporations. A majority of contemporary organisations provides quality.

Owing to this approach, a company must make an attempt to be competitive in the internal efficiency of system. Accordingly every firm must check the capabilities in their operations, correct them wherever necessary and improve them whenever possible.

The objectives in themselves do not mean anything unless firms have adequate resources and means to achieve those objectives. Firms must provide quality goods at cheaper prices in order to attract and retain customers and a firm can not be going on reducing the prices of its products below a certain level. Some organisations fail in getting the resources and some others do not achieve success in optimum utilisation of available resources. Productivity is the best means available to fight competition, reduce cost and increase profit in all the circumstances. The purpose of major productivity related endeavors is to bring about lasting improvements in meeting competitive pressures. Improving and sustaining the productivity of the organisation is essential for its survival in a very competitive world. An appropriate organisational system of productivity measurement will motivate the management to find better and cheaper way of doing a job or producing a product. This will urge the manufacturers to utilize the available resources to maximum satisfaction of consumers. The secrets of prosperity of many petroleum refineries lie in proper productivity measurement.
1.1 PRODUCTIVITY IN PETROLEUM INDUSTRY

It is action time now for the Indian petroleum industry, which was plagued by the government control for decades. A booming market with ever-increasing demand for oil products coupled with a very vibrant transport sector has injected a new dimension into the industry. 'Despite the intense competition in the oil industry, it is still way ahead of its nearest competing infrastructure industry. And given the way the industry keeps reinventing itself to remain a leader, it could be difficult for others to close'.

Indian refining sector, in particular has shown excellent growth in production aspect in recent times. The going has been good for the refining companies with enhanced refining capacities. The refining capacity of 132 million tones is ahead of consumption of 115 million tones in 2005-2006. With current additions being made, the refining capacity is expected to increase to 160 million tones by the middle of 2007. Against this the demand is anticipated around 120 million tones only. Thus, there will be surplus of 40 million tones available for exports'.

2 'The New – Non fuel push', Business world, special issue, 5.3.2007 p.36.
As long as the current condition of a robust economic growth, controlled inflation and strong political stability continues, it augurs well for the Indian petroleum companies to look at the globe. Major oil companies have announced plans for making a foray into the refinery and petrochemicals business in countries like Turkey, Africa, Turkmenistan and Common Wealth of Independent States with a huge investment. Many of the oil giants are looking at investment opportunities in abroad. They are planning to bid for major stake in Africa, Central Asian countries and west Asia. The oil major in India IOC is scouting for upstream exploration and production opportunities in Kazhakstan and Turkmenistan.

Modern consumer of oil products is very discriminating and knowledgeable and the success of a petroleum company is determined by the value it provides to customers. ‘A product is everything the purchaser gets in exchange of his money’ defined Lawrence Abbot. Productivity in work will give a worthy product, which satisfies the consumers at will. A well-designed product, made out of productive attempts, will create value to the

4. IOC to set up a refinery in Turkey, The Hindu, 28.03.2007, p.20.
5. Lawrence Abbot, Quality and Competition, 1955, p.9.
customers and will be easy to price, promote and distribute to them. Value is created when the value of production exceeds the value of inputs used to produce the same. Petroleum refineries, which create more and more, value than their peers deliver superior performance in all areas. They survive in the market by having good financial results and win the competitive game of dominance in the market place.

High operation cost, poor infrastructure and the snail phase of deregulation in India seemed to have adversely affected the growth of petroleum companies for years. Only in recent times, mind boggling advances are taking in the performance of these companies due to the lifting of Administered Pricing Mechanism (APM). Hence the main focus of present oil companies in India is to maximise the efficiency of capital by investing it in a profitable way and making attempts to improve productivity in operations. This will subsequently, increase the profitability of the companies, which will ensure larger pie of wealth for distribution. Oil organisations in India needs to analyse the growth of real productivity in the post liberalisation period and assess whether there was any beneficial impact of the growth on the development of company. For this to happen, a clear system of productivity measurement, which is unambiguous to all, is to be used in the enterprise.
1.2 STATEMENT OF THE PROBLEM

In many companies, a majority of time and energy is devoted to activities that do not add any value to any one. It is very difficult to detect the areas and efforts which add value to the enterprise and which do not. The growth and complexities of modern business organisations brought out new methods of production and marketing and achieving excellence in performance in the ever-changing business environment is not easy. Technological advancements have led to new styles of operations, new ways of production and usage of new machines in operations. Many organisations find it hard to seek competitive advantage through production function.

In Indian Oil Industry, availability of quality crude at affordable price has always been a major problem for refineries. They are facing the problem of using available resources to the maximum utilisation. Developmental projects are continuously initiated in these companies for enhancing performance of crude products. However getting success in the ever-growing industry is always difficult for these companies unless they make attempts in their internal operations to create value based productivity. An analysis of Indian Oil Companies’ performance in the international petroleum scenario suggests that they rank low on the scale of
competitiveness. Creating value for the products produced is the necessity for any company and petroleum companies can do it by consistently reorienting themselves in productivity area. In an era of value based competition, competitive advantage of firms depends not only in the market place but also on value created through productivity.

In troubled enterprises where management's resources are scarce, value based productivity is helpful in allocating available means in the most appropriate manner. However, in practice a petroleum refinery cannot be best on all the aspects of value creation in any product. It may be difficult to get the best choice of alternatives, which produce larger output for the given application of raw materials. In the oil industry, projects with long gestation periods and uncertain returns are common and this will keep down the productivity till they become fully productive. Owing to this, management may prefer to postpone the projects and this will make harmful effects on the performance of the company.

1.3 REVIEW OF LITERATURE

This part briefly reviews the various studies of value added in different industries and other studies in petroleum companies connected directly and indirectly with the present study. The review of literature was highly useful to design the present study
as it indicated the research gap in the

tivity

measurement in petroleum industry.

EDWIN MANSFIELD (1980) in his article “Basic research and productivity increase in manufacturing” indicated that R&D expenditures have been directly related to productivity of firms. He found a positive relationship between industry’s rate of productivity increase and the amount of basic research it performed.

CATHERINE J. MORRISON (1985) studied the use capacity utilization measures to compare the output in the U.S. Automobile Industry. They used primal-output and dual-cost measures for the study. They also provided explicit inferences as to how exogenous variables affect capacity utilization and value creation in the production system.

MARTIN NEIL BAILY (1986) in his article “Productivity growth and materials use in U.S manufacturing” examined the importance for the measurement of productivity growth in the

production function. He felt that any bias in the measurement of productivity could account for an important fraction of slowdown in productivity growth. He concluded that economy in the purchase of materials may result a small hike in value-added based productivity measures.

ROBERT E. HALL (1988) reveals that U.S. Industries have marginal cost well below price due to the fact that variations in labor input are small compared to variations in output. The paper documents the disparity between price and marginal cost and reveals that U.S. companies produce more output and sell it for a price that exceeds the costs of added inputs. Thus, they create value for their products.

WERNER ROEGER (1995) in his article "Can imperfect competition explain the difference between primal and dual productivity measures" indicates that under the assumptions of constant return to scale, the primal and dual productivity measures should be highly correlated. The apparent lack of correlation is usually attributed to fixed factors of production. He

suggests new methods for estimating a markup of prices over marginal cost in order to avoid certain difficulties inherent to some existing methods of computation.

GAUTAM AHUJA and SUMIT K MAJUMDAR (1996)\textsuperscript{11} examined the performance of 68 State-owned enterprises in the manufacturing sector. They opined that firm level analysis within the state-owned sector is useful to generate pragmatic policy guidelines. They also underlined the need for improved performance measure in the light of increased economic liberalization.

LORIN M. HITT and ERIK BRYNJOLFSSN (1996)\textsuperscript{12} have attributed large productivity improvement in many firms to Information Technology. Their findings indicated that IT has increased productivity of companies and created substantial productivity value for customers.

\textsuperscript{11} GAUTAM AHUJA and SUMIT K MAJUMDAR, "An Assessment of the performance of Indian State-owned Enterprises", \textit{Graduate School of Business University of Texas}, pp.40-46.

\textsuperscript{12} LORIN M. HITT and ERIK BRYNJOLFSSN, "Productivity, Business Profitability and Consumer surplus: Three different measures of IT value"

PURAN MONGIA and JAYANT SATHAYE (1998) in their survey on productivity growth highlighted the role of productivity growth on the process of economic growth of an institution. They disclosed that the use of sophisticated econometric techniques for the analysis of productivity growth resulted in accuracy of calculation.

ROBERT E. HALL (1999) documented that the productivity of enterprises are driven by differences in social infrastructure. He discussed the role of social infrastructure; location and other factors of production in reaching to value based productivity.

JOYASHREE & Group (1999) in their article on productivity trends disclosed that price-based policies could have a negative long run effect on productivity area. They recommended further research to find productivity using more reliable system of measurement and suggested that the challenge for future studies remain in deriving results from a model based on the assumptions of constant returns to scale and perfect competition.

VINISH KATHURIA (2000)\textsuperscript{16} in his paper presented a view that the presence of foreign owned firms and foreign technical capital stock in a sector leads to reduced dispersion inefficiency in the industry. Dispersion being relative concept of productivity in an industry, the fall of productivity in an enterprise will result in its reduced dispersion on various inputs.

JOHN PARSONS (2000)\textsuperscript{17} made the distinction between performance measurement system and any other measurement system. He opined that productivity measures represent a sub-set of performance measures. He underlined the critical role of productivity measurement in the wake of organizational transformation.

Prof. MASAYOSHI SHIMUZU (2000)\textsuperscript{18} opined out that improving productivity means increasing value-added and there is a need to constantly review the adequacy of measurement techniques for improving firm based productivity at micro level. He

\begin{itemize}
\item \textsuperscript{16} VINISH KATHURIA, “Productivity spillovers from technology transfer to Indian Manufacturing firms” \textit{Gujarat Institute of Development Research, gidr@dvl.vsnl.net.in, pp.1-4}
\item \textsuperscript{17} JOHN PARSONS, “Current Approaches to Measurement within service sector/white collar Institutions”, \textit{Symposium on productivity measurement, Asian Productivity Organisation}, August 2000, pp.11-37.
\item \textsuperscript{18} Prof. MASAYOSHI SHIMUZU, “Productivity measurement: Macro and Micro Linkages” report on \textit{Symposium on productivity measurement in the service sector, Asian Productivity Organisation}, August 2000, pp.54-62.
\end{itemize}
BISWANATH GOLDAR and ANITA KUMARI (2001) found decelerated TFB in the Indian Manufacturing sector in the 1990's. They indicated that the lowering of protection to industries favourably affected the productivity growth. Their analysis reveals that underutilization of industrial capacity was the important cause of productivity slowdown.

SATISH CHAND and KUNAL SEN (2002) quoted that the impact trade liberalization on productivity growth is still unclear on the direction of any such association. They disclosed that liberalization of intermediate goods sector has a larger favorable impact on total factor productivity growth than that of the final goods sector.

SCHREYAR and PAUL (2002) revealed that there is neither a unique purpose for, nor a single measure of productivity. In spite of the frequent explicit or implicit association of productivity growth with other variables, the measurement and interpretation of productivity remain challenging.

measures with technical change, the link is not straightforward. They point out that productivity measurement concerns at industry level will shift production towards more efficient establishments.

LORIN.M. HITT and ERIK BRYNJOLFSSN (2003)\textsuperscript{22} observed that contributions of computerizations has been omitted in conventional calculations of productivity. They disclosed that productivity and output contributions associated with computers are higher over long period.

DEB KUSUM DAS (2003)\textsuperscript{23} disclosed that capital goods sector is only one to register a positive growth in productivity. He revealed the fact that consumers’ goods sectors had shown negative growth in TFP during his study period between 1980-81 and 1999-2000. He concluded that productivity performance seemed to worsen as the pace of trade reform gathered momentum.

SANKAR.B (2005)\textsuperscript{24} in his article “Winning customer confidence” felt that ensuring customer satisfaction, given the sea

\begin{itemize}
\item \textsuperscript{23} DEB KUSUM DAS, “Manufacturing Productivity under varying Trade Regimes. \textit{India in the 1980’s and 1990’s,} July 2003 p.35.
\item \textsuperscript{24} SANKAR.B, “Winning Customer confidence”, Opportunities, \textit{The Hindu}, January 26, 2005, p.2.
\end{itemize}
changes in terms in their expectations is a daunting but most rewarding task. He concluded that majority of manufacturing firms have an easier time dealing with customers due to the possibility standardizing their processes and produces a perfect product which will give real value to the customers.

Dr.GANAPATHY.V. (2005) in his article entitled "Economic value added concept vis-a-vis corporate governance pinpoints that value added concept enable the investors to judge the corporate performance in a more accurate manner. He reveals that EVA concept helps all the players in corporate governance mechanism in evaluating and improving performance.

Dr.GANASHETTY.R.V. and SHIV KUMAR DEENE (2007) in their paper entitled "Economic value added and its drivers in select companies of consumer product sector" point out that value added technique will improve allocation of resources more discriminately and subsequently leads to efficiency in production system. They revealed that value added is a superior metric performance measurement and it is gaining contemporary importance.


Dr. SELVAM. M. RAJA. M. and YAZHMOZHI. P., (2007)\textsuperscript{27} felt that value added measure is not new. There are many models accepted and employed all over the world to evaluate the performance and value added is popularly used one. They opined that measuring parameters like ROI, EPS etc., have failed to consider the most important aspects of "value" in operations.

Dr. BANUMATHY. S. and PONNEIN SELVI. M (2007)\textsuperscript{28} confirmed that knowing what customer want is never simple. But by adding some value to his product or service, the manufacturer can better sell his products.

SHANTA PRIYA. B (2007)\textsuperscript{29} in her project report on Economic value added to the share holders of CPCL, found that there is a high correlation between EVA as a percentage of capital employed and return on capital employed. She described that there is a positive relationship between NOPAT, EPS and value added in the company.

\textsuperscript{27} Dr. SELVAM. M., RAJA. M., and YAZHMOZHI. P "EVA and Shareholders Wealth(value) creation" Book of Abstracts, ISGBOC.-2007, p.54.

\textsuperscript{28} Dr. BANUMATHY. S. and PONNEIN SELVI. M, "Value Addition Techniques of Tailoring units" Book of Abstracts, ISGBOC.-2007, p.92.

\textsuperscript{29} SHANTA PRIYA. B, "A study on Economic Value Added to the Shareholders in Chennai Petroleum Corporation Limited" Magnus School of Business, pp.78-79.
NARESH.K (2007) in his project report expressed that the Stand Alone Refinery CPCL has benefited the maximum out of the deregulation process. The company has devised strategies to withstand the competition from the private players. He found that the company is progressing well on value addition by improving yields of high value products.

With regard to the research work done earlier on this topic, the researcher found that there are no major studies related to value addition in production function in Indian petroleum industry. Almost all the previous studies were connected to EVA concept related to the growth of capital and increase of Shareholders wealth. The present study differ from earlier studies by focussing on value added with due consideration in production function.

1.4 SCOPE OF THE STUDY

The present study is an attempt to examine the value added productivity measurement in two of the southern petroleum refining companies namely, Chennai Petroleum Corporation Limited and Kochi Refineries Limited (now BPCL-KRL). The

approach of the study is from the point of view of creating value based productivity in the production function is the responsibility of these two refining companies. The size of petroleum sector is very wide covering both the upstream and downstream sectors. Similarly, productivity is a growing and developing aspect giving huge opportunities for research. The present study is confined to the application of value added productivity measurement in the selected petroleum refining corporations. The study covers only production based value creation in these companies.

1.5 OBJECTIVES OF THE STUDY

This study has been undertaken in order to evaluate the, 'value addition' created by the selected petroleum refining companies. The main objectives of the study are:

1. To measure the value addition of Chennai Petroleum Corporation Limited and BPCL-Kochi Refineries Limited.
2. To examine the effect of various infrastructure facilities on the productivity of companies selected.
3. To ascertain the influence of manpower deployed on the productivity of the companies.
4. To analyse the reasons for difference, if any, in value addition between two companies.
5. To identify the changes in value added in the study companies when control government's decontrol took place during late 1990's.

6. To assess the impact of sales and profit on the amount of value-added in the study companies.

1.6 NEED FOR THE STUDY

Every manufacturing organization is transforming inputs like raw materials, human resources and energy into finished goods or services. In the process of conversion, the firm must take into consideration the dynamics of internal variables and yield better performance from them. In a petroleum refinery, the quality of oil products is the degree to which they conform the expectations of consumers. The closer their conformance, the higher is the degree of value. Conversely, if the product deviates significantly from the customers' preference then the output is of poor value.

In the present tough competitive environment prevailing in petroleum industry, every company must monitor the value they create on goods and services. Owing to the heterogeneity nature of products produced by a refinery, it must ensure the value creation of various products at different stages, which is quite difficult. There must be a good system for measuring the productivity in order to meet the growing needs of the customers.
Traditionally, the net profit to capital employed is used to know the effectiveness of an enterprise's operations. In the changed scenario, this approach may not be much useful due to the fact that profit is connected to many factors in and outside the business. It is not created only from the productivity of the enterprise. Undoubtedly, productivity will be one of the major concerns of firms which wants to be competitive in the globalised market and there should be a reliable and integrated system for its measurement. Since the conventional yardsticks hardly determine the real productivity in the optimum and effective use of resources it is necessary for a petroleum refinery, in particular, to devise an advanced measure of productivity.

The present study emphasises the view that 'Value Added Productivity Measurement' (VAPM) is a better tool for a petroleum refinery focusing attention on improving the efficiency of business process. VAPM is a systematic way computing the surplus value created on raw materials. Normally the output of a refinery is measured in terms of crude processed during a given period. Along with this quantity, production value is considered for comparison with inputs value. This method of measuring the value creation, can identify the growth of refinery on short term and long term basis. Petroleum companies may use this
measurement technique as the basis for planning a continuing productivity improvement.

1.7 CRITERIA FOR SELECTION OF THE COMPANIES

For the purpose of conducting the research, the researcher selected two petroleum-refining companies situated in south India. This is exhibited in figure 1. The companies are selected on the common criterion that they are Stand Alone Refineries. Both the companies predominantly carry out refining activities and are of comparable capacities. Chennai Petroleum Corporation Limited is located in Manali, Chennai, Tamil Nadu and BPCL-Kochi Refineries Limited is located at Ernakulam district in Kerala.

1.8 CHANGE OF NAMES OF THE COMPANY

The shareholders of the erstwhile Madras Refineries Limited (MRL) have approved the change of name of the company from Madras Refineries Limited to Chennai Petroleum Corporation Limited (CPCL). After obtaining necessary statutory approvals the name change came into force from April 1, 2000.

Similarly the Extra Ordinary General Meeting held on May 29, 2000 approved change of name of the erstwhile Cochin Refineries Limited (CRL) as Kochi Refineries Limited. Accordingly, with effect from May 31, 2000 the company's name was Kochi
Refineries Limited (KRL). Following the merger of the company with Bharat Petroleum Corporation Limited, the company is known as BPCL- Kochi Refineries Limited from the financial year 2006-2007.

1.9 PERIOD OF THE STUDY

The study has been conducted in the refineries for a period of ten financial years between 1995-96 and 2004-2005. Due to the merger Kochi Refineries with BPCL, the separate annual reports of the former are available only up to 31.3.2005, which have been used in the research. The company, however published unaudited financial results for six months ended 30th September 2005. The data for the same period have been collected from the records of Chennai Petroleum Corporation Limited. Whenever possible the half-yearly data have been used to have maximum latest data possible for the research.

1.10 RESEARCH DESIGN AND METHODOLOGY

The present study is based on secondary data and analytical method of research has been followed. Required data were collected from the annual reports of both the companies for the last fifteen years. However, the data from the financial year 1995-96 have been used in the study taking 2000 as the base year for comparison between pre-decontrol and post-decontrol.
Besides, data were collected from standard books, articles, journals, unpublished sources and websites of both the selected companies.

1.11 FRAME WORK OF ANALYSIS AND STATISTICAL TOOLS APPLIED

For the analysis, the data collected from the annual reports were arranged systematically and tabulated in simple tabular statement. Simple statistical tools like percentages and ratios expressed are used almost in all the cases.

'Mean', the best measure of average, is used to find the average value added created by the companies during the study period. It is helpful in comparing the value added between the selected companies.

In order to examine the relationship between the variables namely, profit before tax, sales (Total Operating Revenue); number of employees, personnel expenses on one side and value added on the other, Correlation Analysis was used. It represents a useful method of data obtained from the annual reports. Coefficient of Correlation is a measure of degree of relationship between variables.

Linear Model is applied to assess the rate and degree of growth of value added in both the companies selected for the study. Actual amount of value added earned by the companies is
compared with the fitted values to check whether there is linear growth in the value added in the companies during the study period.

Multiple Regression Analysis has been used to check the influence of 'Total Operating Revenue and Profit Before Tax' on the amount of value added in the companies. Value added is a dependent variable and Total Operating Revenue and Profit before Tax are independent variables for the purpose of this study. Student 't' distribution is used to test the significance of model. R-square values have been arrived for assessing the significance of influence of independent variables (Total Operating Revenue and Profit Before Tax) on dependent variable (value added).

Coefficient of determination is used to find the closeness of the fit of the regression line to the actual points. It is denoted as $R^2$. The closer the value of $R^2$ to 1, the smaller is the scatter of the points about the regression line and better is the fit.

Bar diagrams and pie diagrams have been used to represent the performance and growth of the selected companies in production and finance area.

1.12 LIMITATIONS OF THE STUDY

1. All the information provided in the annual reports were taken as the basis of analysis.
2. Due to the merger of one of the companies selected for the study, in the middle of 2005-2006, the data could not be collected for the full financial year. Half-yearly data have been used wherever possible, which may result in estimation errors. Due care was taken for cross verification in this regard.

3. As there were many factors leading to value addition in companies, it was difficult to generalize the results.

4. The judgment and opinions of the parties making it normally affect any method of valuation. The present study considers value-added as the difference between value of production and value of inputs. Intangible factors connected production such as consumers' responsiveness, competitive trends in the market, etc., are not considered because of inadequate and unauthenticated data.

1.13 CHAPTER SCHEME

The present study is organized into six chapters. The first chapter deals with Introduction, Productivity in Petroleum Industry, Statement of the Problem, Review of Literature, Scope of the Study, Objectives of the study, Need for the study, Criteria for the selection of companies, Period of Study, Research design and Methodology, Framework of Analysis, Limitations of the Study and the chapter scheme.
The second chapter pertains to an overview of the productivity measurement which includes various traditional and modern techniques of measuring productivity.

In the third chapter, application of value added productivity measurement (VAPM) in petroleum refineries is discussed.

The fourth chapter deals with the value added productivity measurement respondent companies before decontrol.

The fifth chapter discusses the value added productivity measurement respondent companies after decontrol.

In the last chapter, the major findings of the study are recapitulated in an orderly form. Based on these findings, a few suggestions are also recommended for improving the value added in the study companies.