EVALUATING THE REFINING CAPACITY IN LOGISTICS MANAGEMENT OF INDIAN OIL CORPORATION LIMITED.

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Abstract

Logistics management in the petroleum industry is a unique type of management which contains various challenges, specifically in the logistics area, that are not present in most other industries. The logistics problems influence the activities of oil companies. Logistics is the detailed organization and accomplishment of complex operations. The entire process consists of managing inventory, fulfilling orders, and shipping packages. It is a service industry thatis integral to supply chain management.

Oil refining is an essential process for transforming crude oil into marketable products such as fuels, lubricants, and kerosene. A typical oil-refining process consists of several processing units such as distillation, cracking, coking, reforming, and post treatment and refining of the products. In this empirical study the author would like to emphasis on the Refining Capacity in Logistics Management of Indian Oil Corporation Limited.

It includes an organization of professional activities such as planning, controlling, managing, directing, coordinating, forecasting, warehousing, and transporting. It is the skillful organization of time and cost of the better operation of all modes of transport. It involves the integration of information, transportation, warehousing, inventory management, and manufacturing or materials management. It also involves a variety of value-added services.

The purpose of this article is to empirically analyze and evaluate the refining capacity in logistics management of IOCL

Keywords: accomplishment, integral, upstream, downstream

[1] INTRODUCTION

The IOCL produces base Oil, formula Products, Lubricants, Greases, and other Petroleum Products from crude oil. It organizes into three divisions such as the refineries division, The Pipelines division, and The Assam Oil Division. The logistics management will cover Production Facilities engineering, refining which includes Complex operation and its output is the input to marketing and marketing. It includes the retail sale of Gasoline, Engine Oil, and other refined oil.

Indian Oil Company experienced major benefits on account of improved visibility into its supply chain process across the selected refineries investment analysis for refining units, pipelines, etc. Analysis to formulate strategies to meet future scenarios like change in specifications faster, more effective decision making on exchange strategies, Imports and Exports improved response and execution capability. An oil refinery is an industrial plant that transforms, or refines crude oil into various usable petroleum products such as diesel, gasoline and heating oil's. Oil refineries essentially serve as the second stage in the crude oil production process following the actual extraction of crude oil up-stream, and refinery services are considered to be a down-stream segment of the oil and gas industry. The IOCL produces base Oil, formula Products, Lubricants, Greases, and other Petroleum Products from crude oil. It organizes into three divisions such as the refineries division, The Pipelines division, and The Assam Oil Division.

Diagram of a typical crude oil distillation units as used in petroleum crude oil refineries
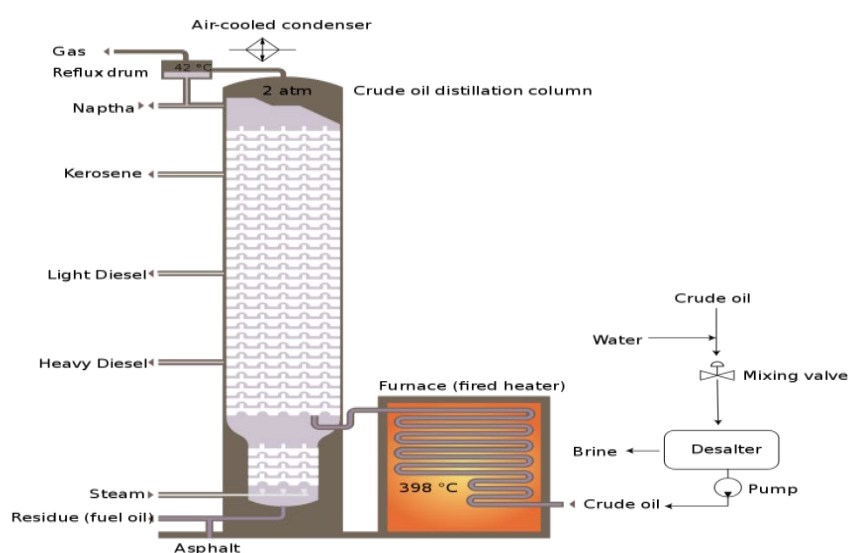
Source: https://en.wikipedia.org/wiki/Oil_refinery#/media/File:Refine.svg

[4]. PROFILE OF INDIAN OIL CORPORATION LIMITED

The *Indian Oil Company Ltd* was incorporated on 30th June 1959 and merged with Indian Refineries Ltd on 1st September 1964. It is the Government Company under section 617 of the Companies Act, 1956. It is administrated by the Ministry of Petroleum and Natural Gas, Government of India. The Government of India disinvested about 90% of its holding in the company in favor of Banks, Mutual funds, Financial Institutions, and employees of the company during 1994-95. IOCL is listed in Bombay Stock Exchange (BSE) Mumbai, National Stock Exchange (NSE). It is having an authorized share capital of Rs 2500 crores and a paid-up capital of Rs1213.97 Crores.

It is also the leading Indian company in Forbs "*Global 500*". IOCL is India's flagship oil company having huge responsibility to meet the energy needs of the world's second-largest country in terms of population. IOCL group of companies owns and operates 10 out of India's 22 refineries with a combined refining capacity of 65.7 Million Metric Tons Per Annum (MMTPA), 1.30 million barrels per day approx.

[3]. REVIEW OF LITERATURE

The literature review is the basis to understand the length and depth of the subject, So far there are a very few research studies have been done in this area. The review of literature is done to identify the appropriate research gap.

 The following are the few important samples of literature in this area.

Choon et.al. (1999) "Supply chain management: an empirical study of its impact on performance" This article determines the *impact of quality management, supply base management, and customer relations practices on corporate performance*. Managing the supply base has a significant impact on growth but not on overall performance.

Micheal Tracey (2005) "Impact of supply chain management capabilities on business performance" The article *examined the product value, customer loyalty, market performance, financial performance which influence in supply chain management*. It is hypothetically tested and concluded that the SCM capabilities are an important determinant of a firm's business performance.

Soo Wook Kim (2006) "Effects of supply chain management practices, integration and competition capability on performance" This article examined that *the role of SCM integration as a critical intervening variable between SCM practice of competition capability and firm performance is highly emphasized.*

Read Hussain (2006) "Supply chain management in the petrol industry: challenge and opportunities" In this article, the author *described that supply chain management in the petrol industry contains various challenges in the logistics area*. The increasing demands global for oil and petrochemicals to reach more customers and increase their market share and profitability.

 Victor N M (2007) "On measuring the performance of national oil companies (NOCs)" This article *conducted a comparative study to quantitatively evaluate the performance of National Oil Companies (NOCs) with International Oil Companies (IOCs) using a univariate linear egression*. This study evidenced that states' governments are the owners of the most important oil and gas reserves, and directly restrict the corporate access to these reserves. Moreover, the big companies have better performance in using the gas and oil reserves

Menhat et al., (2019*) "Challenges in managing oil gas supply chain – An exploratory study"* This article suggested that around the world, the oil and gas industry has been severely

impacted by the current value of oil price per barrel. In this exploratory study, five interviews were conducted amongst industrial practitioners involved directly in supply chain management. High logistics costs, long lead times, uncertainties in supply chain distribution among others are traced. The supply chain emphasis on external collaboration with the supplier, customer, and business partner but it must be supported by collaboration between departments to make it successful.

Margeretaet.al., (2019) *"Sustainable supply chain management strategy influence on SCM functions in the oil and gas distribution Industry"* This article examined strategies like supplier selection, product stewardship, logistics management, functions like planning, execution, coordination, and collaboration in the oil and gas distribution Industry.

[5]. OBJECTIVES OF THE STUDY
1. To understand the logistics practices of IOCL in refining process in India
2. To study about the refinery capacity of IOCL
3. To access the problems and suggestions of refinery activities in IOCL

[6]. HYPOTHESES OF THE STUDY
Hypothesis
H_0: "The refining capacity in logistics management of IOCL has not significantly grown"
H_1: "The refining capacity in logistics management of IOCL has significantly grown"

[7]. RESEARCH METHODOLOGY

A research design is the sequence of condition for collection and data analysis in a systematic manner a descriptive   research design has been used for the study.

Secondary Data: The secondary data has been collected to highlight the conceptual analysis. The Information has been collected through annual reports of the company, Report of Indian petroleum and natural gas statistics, the data has been collected from the oil companies. This study has examined the refining capacity of IOCL on the basis of Indian Petroleum and Natural Gas Report of 2019-20. The data has been collected from 2013-14 to 2019-20 and analyzed in SPSS. The following research tools were used in this article.

1. Compounded value Annual Growth Rate - (CAGR):- It is the mean annual growth rate of the variable over a specified period. It is the nth root of the total with n is the number of years.

2. Regression curve estimation with compound value:- It is the estimation procedure that produces curve estimation regression statistics. It estimates the Compound value of growth and the significance of the growth.

[8]. DATA ANALYSIS AND INTERPRETATION

This study has examined the refining capacity of IOCL on the basis of Indian Petroleum and Natural Gas Report of 2019-20. The data has been collected from 2013-14 to 2019-20 and analyzed in SPSS as follows.

Table No 1:Year-wise refining Capacity of IOCL with total capacity   (In TMT)

| Years	IOCL	Total
2013-14	54.20	90.50
2014-15	54.20	90.50
2015-16	69.20	105.50
2016-17	69.20	109.40
2017-18	69.20	112.50
2018-19	69.20	112.50
2019-20	69.70	113.00
CAGR	**4.50**	

(Source: Report of Indian Petroleum and Natural Gas Statistics 2019-20).

Note   1:   TMT = Ten Million Tonnes.

2: CAGR = Compound Annual Growth Rate

The above table presents the year-wise *refining capacity* of IOCL, the total capacity in India and the percentage of IOCL refining capacity.   The refining capacity during 2013-14 was 54.20 TMT and it has increased to 69.70 TMT in the year 2019-20 at a Compounded Annual Growth Rate of 4.50 percent.

Graph No .1: Year-wise refining Capacity of IOCL with total capacity
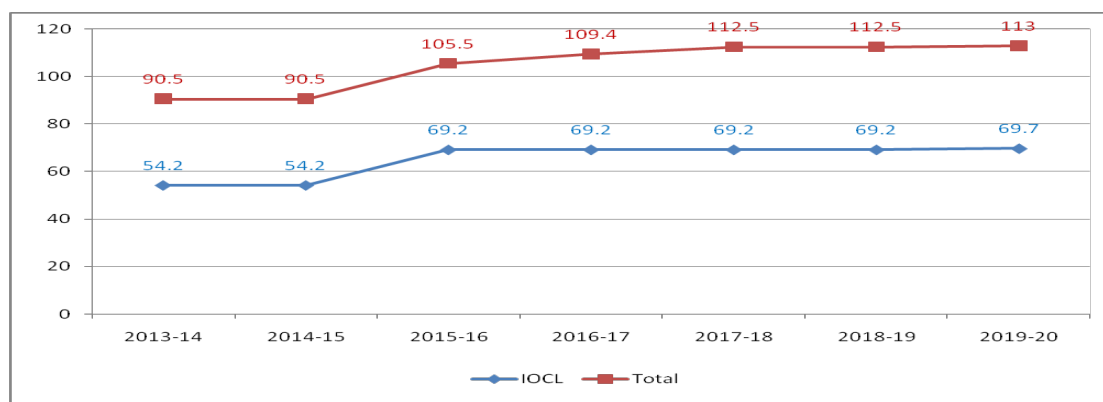
(Source: SPSS output)

The above graph presents the year-wise *refining capacity* of IOCL, the total capacity in India and the percentage of IOCL refining capacity.

Table No 2: Percentage of share of IOCL in refining Capacity   (In Percentage)

Years	Share of IOCL refining Capacity
2013-14	59.89
2014-15	59.89
2015-16	65.59
2016-17	63.25
2017-18	61.51
2018-19	61.51
2019-20	61.68

(Source: Report of Indian Petroleum and Natural Gas Statistics 2019-20).

The above table presents the year-wise Percentage of share of IOCL refining Capacity of IOCL, the total capacity in India and the percentage of IOCL capacity. The percentage of IOCL refining capacity in total capacity was 59.89 percent in the year 2013-14 and it has increased to 61.68 percent in the year 2019-20.

Graph No 2: Year-wise Percentage of share of IOCL in refining Capacity
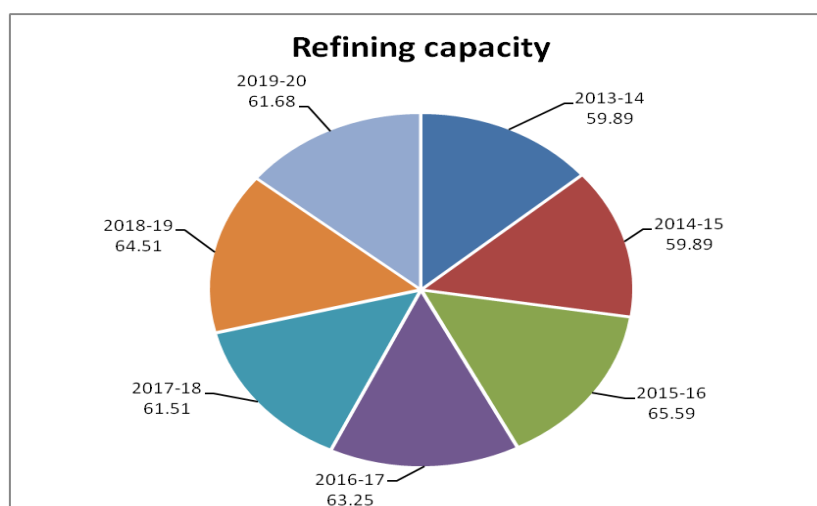
(Source: SPSS output)

The above graph represents the refining capacity of IOCL with total capacity. It is found from the table and graph that the refining capacity of IOCL and the percentage of IOCL capacity in total capacity have significantly grown.

Hypothesis

H_0: "The refining capacity in logistics management of IOCL has not significantly grown"

H_1: "The refining capacity in logistics management of IOCL has significantly grown"

The refining capacity of IOCL has tested by regression curved estimation test to examine the significance growth in SPSS software. The result is as follows.

Graph No 3: Observed compound value of IOCL refining capacity
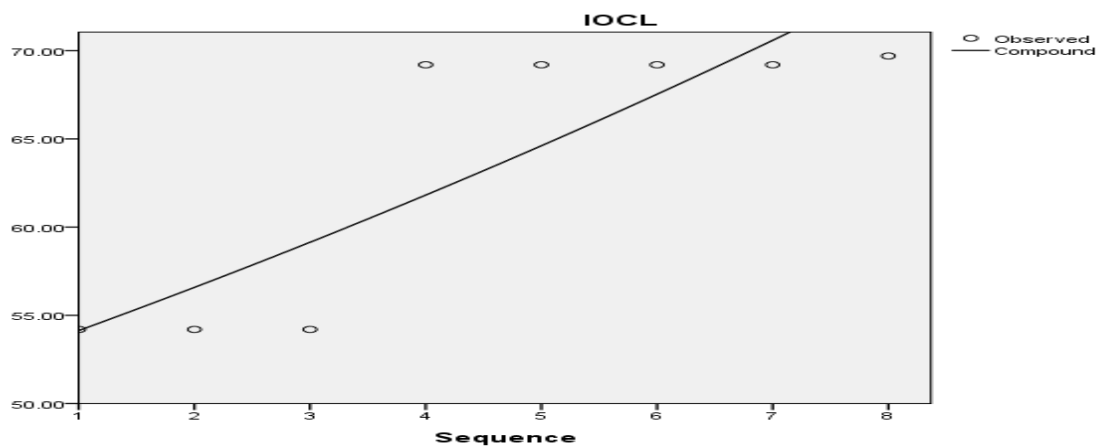
(Source: SPSS output)

Table No 3.Regression curved estimation test results for refining capacity of IOCL

	Un standardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Case Sequence	1.045	.012	2.343	89.975	.000
(Constant)	51.793	2.907		17.818	.000

The dependent variable (IOCL).

(Source: SPSS output)

It is found from the graph, table and regression curved estimation test that the refining capacity of IOCL has been significantly grown with 4.5% (1.405*100=104.5 -100= 4.5)

Inference –The secondary source data has collected and tested by Regression Curved estimation test for the period of 2013-14 to 2019-20.

Since *the p value of 0.000 is less than 0.05.* It indicates strong evidence against the null hypothesis. Therefore reject the null hypothesis and accept the alternative hypothesis.

Therefore, it is concluded that the *refining capacity* in logistics management of IOCL has significantly grown.

[9]. FINDINGS

The refining capacity of IOCL during 2013-14 was 54.20 TMT and it has increased to 69.70 TMT in the year 2019-20 at a Compounded Annual Growth Rate of 4.50 percent **(Table No 1) & (Graph No 1)**

It is found from the table that the share of IOCL *refining capacity* has increased from 59.89 to 61.68 percent. So the growth rate of IOCL *refining capacity* has significantly grown **(Table No 2) & (Graph No 2).**

Therefore, it is concluded that the *refining capacity* in logistics management of IOCL has significantly grown**. [Hypothesis] (Table No 3) & (Graph No 3).**

[10]. SUGGESTIONS

1. It has been found that BPCL and HPCL are fast-growing and giving tough competition to IOCL in terms of consumption capacity. Therefore it is suggested that IOCL has to incorporate effective logistics management in the refining of oil products. So as to keep up with the trend in competition by other two oil Corporations.

2. It is suggested to create a platform to bring together all members of the industry for sharing the industry news and to plan for the future.

3. The company has to discuss and review the status of the short and medium-term projects undertaken by the industry in respect of refining.
4. The company has to take stock of the previous month's performance, finalize next month's the crude requirements for the industry and match the next month's production and requirements for the industry.

[11]. CONCLUSION

Logistics industry needs to focus on infrastructure and border management for the growing development, demand for inbound and outbound activities. Customs department requires the difficult task of an effective border management system towards implementing advanced information technology, paperless as well as regulation related to logistics and minimizing of informal payments.

The refining of crude oil takes place all over the world. In the early days of the petroleum refining industry, production of desired gasoline and kerosene products was by means of simple distillation, with up to fifty percent of the crude oil feedstock being discarded. Oil refining is an essential process for transforming crude oil into marketable products such as fuels, lubricants, and kerosene. A typical oil-refining process consists of several processing units. The operation of these processes requires large amounts of thermal energy and results in the release of significant amounts of CO_2 from different sources in the refinery,

[12]. BIBLIOGRAPHY

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