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Performance improvement of SERVO® supply chain network through fuel retail outlets -a Case Study

(Lubricant sale through fuel retail outlets is declining for Indian Oil Corporation Ltd. This is an attempt to analyze the lubricant sales process through retail outlets from an operational perspective with a view to resurrect this unique distribution channel.)

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Abstract

SERVO Brands of lubricants, from Indian Oil Corporation Limited, is one of the market leaders in Indian lubricant market. Of the two market segments – industrial and automotive, the company is comfortably the leader in the industrial segment. It however holds the second position in automotive lubricant segment and is under severe competition from various national and multinational companies.

SERVO lubricant contributes significantly to the bottom line of the company and is under management focus. In India, the automotive sector is rapidly growing and promises good potential of profit for lubricants. The main channel for sales of lubricant products was through petroleum retail outlets. The sales from this channel have declined considerably over time. Refocusing on retail outlets for lubricant sales will result in better asset utilization and increased profitability.

I have started the project with a structured interview of retail and lubricant sales executives. Based on their insights into the problem, I have tried to understand the root cause of the decline in sales from retail outlets. I have done a footfall study of the customers in the retail outlets and have tried to answer the key question as to why some retail outlets are better in selling lubricant products than others. One of the most interesting outcomes of this project is that the layout and design of retail outlets has a major impact on the lubricant sales. In order to complete a changed service delivery model, I have conducted customer survey and have analyzed the results. Based on these studies, I have prepared a management report on best utilization of retail outlet network for lubricant sales.

This study has been made with the objective of increasing lube sales through retail outlets. But the results are generic and can be extended to other non-oil sales as well.

1. Introduction

1.1 Motivation- The competitive scenario:

The SERVO Brand of lubricants from Indian Oil is the market leader in the Lubes and Grease market in India. It commands 38% share of the 1.6MTPA (Million Tons Per Annum) market. The principal part of this share comes from the industrial customer segment. In the retail segment however, the company only commands a 17-19% market share, with the leading position currently being held by CASTROL at 20-22%. One major competitive advantage of SERVO is the presence of a vast well-established retail network of more than 16,000 fuel retail outlets. But sale through this channel, once the mainstay of lubricant sales, is declining.

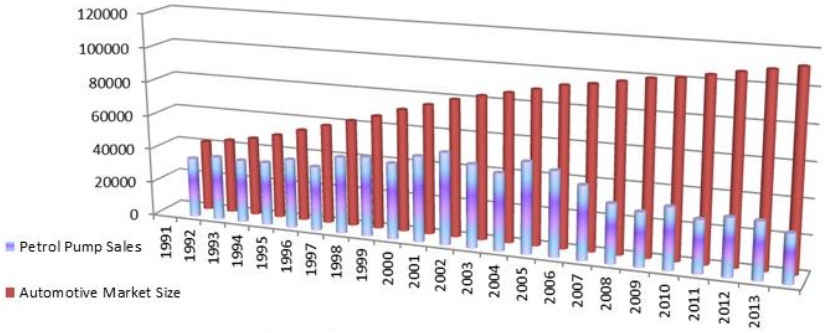

Figure – 1.1.1 Fall in Servo sales from Retail Outlets against rise in automotive sector

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India is presently the sixth largest lubricant market in the world, with a historical CAGR of 3% as against the global rate of 2%. The automotive market has a current CAGR of 11.1% and is expected to grow strongly -- pushed by a burgeoning middle class. SERVO contributes to around 8% profit for the company though occupying only 0.5% of the total product volume handled and is a major area of management focus.
Though the fuel retail segment offers a unique advantage to SERVO as compared to its "lube-only" competitors like CASTROL, its potential as a retail channel is under-utilized. Inventory of unsold lubricant products regularly pile up at the retail outlets indicating the poor health of the supply chain through this channel. Efficient utilization of the existing retail network will translate into increased profit and market penetration for the company.

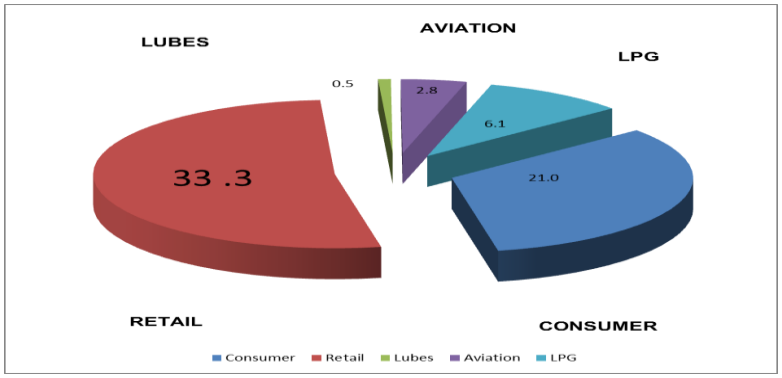


Figure – 1.1.2 Servo: Volume Share only of .5% but profit share of 8%

1.2 Background

1.2.1 Preamble

SERVO was launched by Indian Oil, India's flagship petroleum refining and marketing company, in 1972. The brand entered the market in collaboration with Mobil. After 1974, when the collaboration ended, SERVO went into an expansion mode. It developed an extensive marketing infrastructure, supported by one of Asia's most advanced research and development centres. Established in Faridabad, a suburb of New Delhi, in 1972, the R&D centre is a world-class facility that has to its credit several significant breakthroughs. Today, the brand SERVO is marketed through Indian Oil's nationwide retail outlets and other channels, now numbering over 50,000. Concurrent to these developments is the huge supply channel that has been put in place. The network comprises six ISO certified lubricant blending plants, a grease manufacturing unit and several "small can-filling stations" spread across the country. Since the operation was massive a dedicated distributor set up was put in place to cater to the requirements of the retail outlets and sales points. Having achieved distinction in India, SERVO has also made inroads into the highly competitive global markets. Today, it has signed in with its footprint in 20 global destinations. It has successfully captured market shares in Bangladesh and Nepal. With Indian Oil's fully owned subsidiaries in Sri Lanka, Mauritius and the Middle East, it is seen as a growing brand in the UAE, Oman, Qatar and Bahrain. SERVO today is a global brand.
Retail outlets, colloquially called petrol pumps, have been the main channel for selling lubricant products, historically contributing 60-70% of sales. For two stroke vehicles (e.g. old scooters), lubricant pouch is emptied into the fuel tank right during the time of refuelling. In the era of two stroke vehicles thus, the lubricant sales were automatically complemented by fuel sales. Earlier cars like Fiat, Ambassador etc. required a large supply of lubricant, which was refilled regularly along with fuel top-ups. Like fuel, lubricant was also an undifferentiated product not perceived to be of a highly technical nature. Thus, when lubricant sales were de-regulated in 1991, the PSU fuel retailers had no difficulty in maintaining its market leadership position in retail lubricant sales. With 25 million litres sales at 2003, SERVO 2T Supreme was the largest selling 2T oil in India.
In the last decade however, there has been major changes in the way lubricant is sold in the market. Two strokes engines have almost become obsolete, giving way to more efficient four stroke counterparts. Four stroke vehicles are provided with a separate lubricating chamber, which need not be opened during refuelling. The lubricant requirement of a modern car has reduced, requiring less frequent changes of oil. The number of owner driven vehicles has also grown substantially. Owners are much more brand-conscious

and prefer "technologically superior" products for their modern cars. Further, the function of lubricating a car engine is now perceived to be a skilled job, which cannot be performed by regular pump attendants. Car owners of modern hi-tech cars rather prefer to refill their lube stocks at the time of servicing their vehicles, in the hands of expert mechanics, rather than during refuelling. Long queue build-up during rush hour traffic at petrol pumps also deters vehicle owners from accessing any additional services, other than basic refuelling.

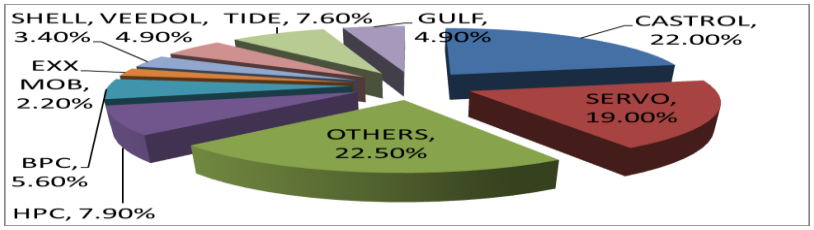


Figure – 1.2.1.1 Share of Servo Lubricants in Automotive Segments

1.2.2 **Automotive Segment:** Right from deregulation since 1991, this segment is flooded with multinationals, nationals, PSUs & Local Brands. About 8 major players namely SERVO, CASTROL, MAK (BPCL), Laal Ghoda/Milcy (HPCL), Shell, Veedol, Gulf & Elf etc. are commanding Market Share in excess of 80%. In this segment CASTROL with about 20 to 22% Market share is leader and SERVO is second with about 17 to 19% Market share. In this segment CASTROL is also perceived to be the technology Leader.
Automotive lubricants constitute 65% of the total lube market. Of this, the commercial vehicle segment accounts for half of the volume, while the passenger car segment – the image-builder for lubricant brands – constitutes a mere 7%. However, this segment is also the driver of commercial vehicle lube segment influencing buying decisions. The 2-wheeler segment, witnessing explosive growth, constitutes about 25%. The balance 18% is split between agriculture equipment, stationary engines and other miscellaneous applications.

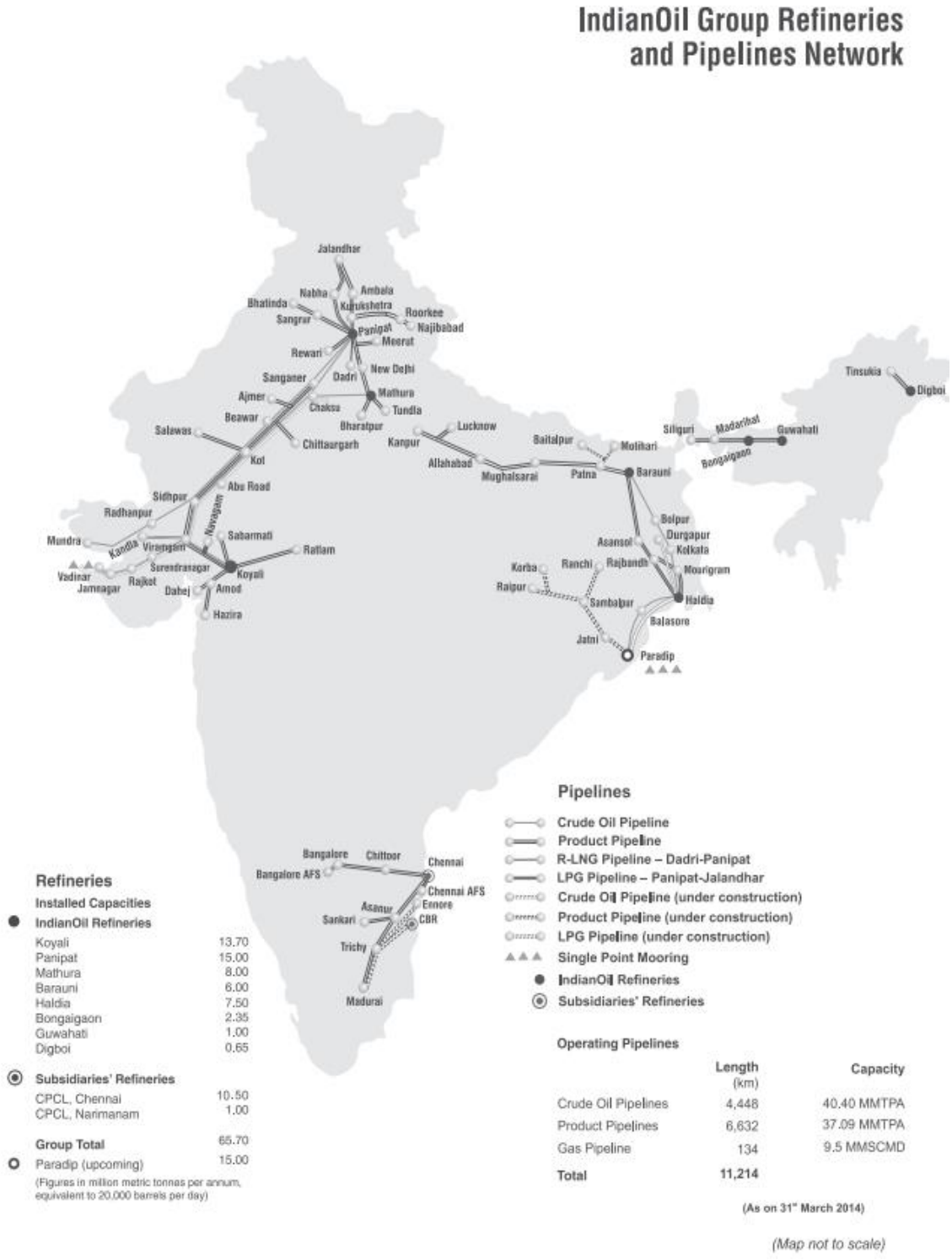
1.2.3 The Lubricant Supply chain

Figure – 1.2.3.1 Servo Supply Chain: Value flow

Lubricants are prepared by mixing base oil, which provides the basic lubrication and additives which provides additional features like anti corrosion, anti-freeze etc. Base oils are generated from the distillation process of crude oil. Additives are chemicals, either imported or developed indigenously. The formulation of the mixture is proprietary and is developed at the R&D facility.
The supply chain of lube products start from Base Oil and Additive procurement. Some of the raw materials are indigenously manufactured. Specialized plants, called blending units, are dedicated to manufacturing lubricant products. In these plants, the base oil is mixed with additives in various thermal and pressurized containers. There are seven lubes and one grease manufacturing plant of the company, located across India. For retail segment, specialized packaging plants called "Small Can Filling Plants" or SCFPs package the product into smaller packs – ideal for consumption for the retail segment. Several such SCFPs are strategically located across the country. The company appoints Servo Stockists separately for Industrial and Automotive products. The retail segment is catered to by Servo Stockists Automotive called SSAs. SSAs purchase product directly from the company and maintain their own storage and manpower. SSAs cater to all distribution channels like retail outlets, bazaar traders, SERVO shops etc. These channels independently forecast demand and place indent accordingly.

Market information flows from SSA representatives taking indents from downstream channel partners like retail outlets, bazaar etc. They are consolidated at SSA level and passed on to the Lube sales department of the state. During a monthly coordination meet, the market information is consolidated at a central level and

an aggregated forecast is prepared. The forecast is then translated to manufacturing plan and strategically distributed across the six manufacturing plants.



Fogure-1.2.3.2 Indian Oil Lube Supply Network including refinery and pipelines

1.2.4 Fuel retail outlet and lubricant sales:

With the decontrol of diesel pricing and fall in petroleum crude prices, India is poised to experience a major upheaval in fuel retail business. Private players like Reliance, Essar and Shell are expected to expand their presence in India at a rapid pace. One of the major sources of revenue in retail fuel business, which will be critical to survive in this intense competition, is non-fuel sales.

Lubricant sales through retail outlets have the potential of fulfilling the non-fuel revenue requirement. It will also complement the fuel sales by increasing the customer footfalls. However, the sale must be accomplished by establishment of a service station in retail outlets, as lube changing is a specialized activity requiring trained technician and machinery. The challenges associated with this are

1. Space management
2. Establishment of a trusted service brand
3. Extension to an all India chain to maximize customer value
4. Quick and efficient service, focused on preventive maintenance
5. Non-interference with regular fuel operations

1.2.5 Information Systems:

The company has implemented ERP SAP for its core operations. For demand forecasting and scheduling, a separate information systems called I2 demand planner is in place. The company is also implementing SSMS or Servo Stockist Management System by M/S Sify for automating the information flow process and making it more responsive to market dynamics. SSMS has been designed to seamlessly connect to SAP and I2 system.

1.2.6 Organizational Structure and internal performance measures:

The executive directors of both lube and retail fuels sales report to the director marketing of the company. At the state level lubricant sales is handled by two independent executives. One of them looks after the industrial sector and the other looks after the automotive sectors. Fuel sales likewise is headed by separate independent senior executives – one for industrial sales and another for retail sales. The entire state is headed by a senior executive, usually an executive director. The state head has direct accountability to the board members for the performance of the state. The performance is measured through different parameters for different functions as retail fuel, lube, human resource etc. Performance parameters are usually not shared across functions – each function will be responsible for a unique set of parameters.
The performance criterion for lube sales through retail outlets is called the lube to fuel ratio or LFR. As on date, LFR is no longer a mandatory performance criterion for retail fuel sales executives or of lube sales executives.

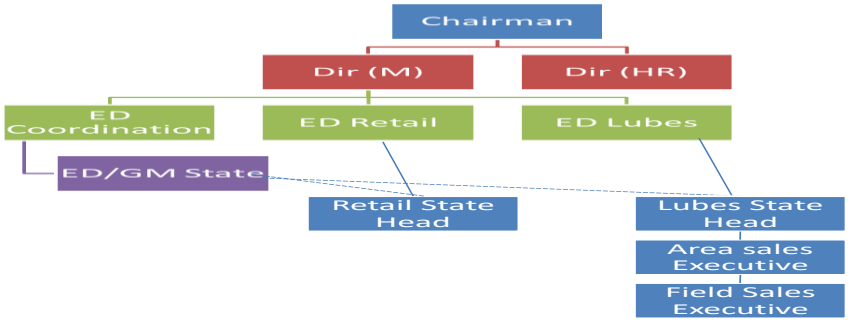


Figure – 1.2.6.1 Organizational structure showing the lube and retail hierarchy

1.2.7 Distribution channels

The retail distribution channels of SERVO lubricants are as follows

1. Petrol Stations and Kisan Sewa Kendras
2. SERVO Stockists: SSAs as mentioned earlier. They are responsible for a large sales area. Small states typically have two SSAs while bigger ones can have as many as six.
3. SERVO express Stations : Quick Service facilities at select Indian Oil Retail outlets
4. Bazaar Outlets and SERVO Shops : providing customers a one-stop shop for all Servo products guaranteeing genuine oils at very competitive prices,
5. Auto Spare Parts and servicing centres
6. Gramin SERVO stations: To cater the farmer's need of tractor oil, pump set oil etc.

Indian Oil has placed its lubricant products in intensive channel, in line with FMCG goods. It operates in an integrated multichannel mode utilizing all the marketing channels simultaneously.
Changes in the retail lube business, as mentioned in the preceding section, has put fuel retailers out of their monopoly position in the retail channel. Their inventory turns have reduced and they are finding their capital being blocked into unsold SERVO inventories. The main fuel business of these fuel distributors is very cash intensive. A typical city outlet would require about 20 lacs per day only for the fuel inventory. Blocked funds in unsold lubricant stocks are thus affecting their main business lines -making them unwilling to sell lubricants.
Further, city outlets are typically small due to high land cost. Making vehicles wait for refuelling while lube oil replacement is being done, will affect the main business line adversely.
Major marketing initiatives have been undertaken by Indian Oil and various incentive schemes have been designed. But the declining trend of lube sales through retail outlets has not been arrested. I propose to investigate into the problem from operations perspective and find suitable solutions.

2. Literature Review

2.1 Scholarly Papers

Subject	Author	Year	Journal	Comments
A hierarchical AHP/DEA methodology for the facilities layout design problem	*Taho Yang, Chunwei Kuo Institute of Manufacturing Engineering, National Cheng Kung University, Tainan 701, Taiwan*	*26 February 2002*	*Robotics and Computer-Integrated Manufacturing*	*The basic concepts of this paper have been applied to the practical problem. In absence of software suggested in the paper, complete analysis of alternatives could not be made.*
Data Envelopment Analysis	*Wei Quanling Institute of operations research and mathematical economics, China*	*2001, August*	*Chinese Science Bulletin Vol 46 no 16*	*Explores the background of DEA and develops its theoretical framework*
Multiple-attribute decision making methods for plant layout design problem	*Taho Yang, Chih-Ching Hung*	*20 December 2005*	*Robotics and Computer-Integrated Manufacturing*	*Area has been considered as the only input parameter as in a typical manufacturing setup. However, in extending the concepts to retail outlets, other factors like market, proximity to highway etc. had to be considered*
Competitive Stocking and coordination in a multiple channel distribution system	*Tamer Boyaci, Faculty of Management, McGill University, 1001 Sherbrooke St. West , Montreal, PQ, H3A 1G5, Canada*	*23 Feb 2007*	*IIE Transactions*	*Studies a multiple-channel distribution system in which a manufacturer sells its product through an independent retailer as well as through his wholly-owned channel. Considers the stocking level of the products*
Coordination and manufacturer profit	*Charles A. Ingene University of*	*1995*	*New York University, Journal of Retailing,*	*Explores wholesale pricing behaviour*

maximization - the multiple retailer channel	*Washington Mark E. Parry University of Virginia*		*Volume 71, Number 2, pp. 129-151, ISSN 0022-4359*	*within a two-level vertical channel consisting of a manufacturer selling through multiple independent retailers.*
Managing channel coordination in a multi-channel manufacturer -retailer supply chain	*Ruiliang Yan School of Business & Economics, Indiana University Northwest, 3400 Broadway, Gary, IN 46408, United States*	*14 Jan 2011*	*Industrial Marketing Management*	*Focuses on the strategic roles played by differentiated branding and profit sharing in a multi-channel manufacturer–retailer supply chain*
Multi-Channel Strategy in business-to-business markets: Prospects and problems	*Bert Rosenbloom LeBow College of Business, Drexel University, Philadelphia, Pennsylvania, USA*	*28 July 2006*	*Industrial Marketing Management*	*Talks about multi-channel coordination activity taking into view online and brick-mortar channels of sale.*
Supply chain coordination under channel rebates with sales force efforts	*Terry A. Taylor Graduate School of Business, Columbia University, New York, New York 10027*	*2002*	*Institute for Operations Research and the Management Sciences (INFORMS)*	*When demand is influenced by retailer sales effort, a properly designed target rebate and returns contract achieves coordination and a win–win outcome*

2.2 Books & Periodicals

- Supply Chain Management: Strategy, Planning and Operation BY Sunil Chopra, Peter Meindl, and DV Kalra.
- Marketing Management : A South Asian perspective : Phillip Kotler, Kevin Lane Keller, Abraham Koshy, Mithileshwar Jha
- Operations Management : Processes and Supply Chains : Lee J Krajewski, Larry P Ritzman, Manoj K Malhotra, Samir Kumar Srivastava
- Operations Research : Taha : Operations Research : An introduction

3. The Problem

Retail outlets have been designed primarily with the focus of petrol and diesel sales. Later, add on facilities like convenio stores, ATMs etc. have been added to the design. However, urban retail outlets are facing an unprecedented rise in vehicular traffic. Long queue build-up from the main refuelling operations puts pressure on non-oil sales. But on the other hand non-oil sale is much more profitable than fuel retail sales. The problem statement can be stated as: ***How to efficiently use the existing fuel supply network for sale of lubricant products*****?**

3.1 Expert Interview

In order to gain insight into the nature of the problem, I held face to face and telephonic interview with executives both from the fuel retail sales and lubricant sales group. Based on their initial understandings, a semi-structured questionnaire was designed and presented in electronic format to all sales executives (Annexure-I). More than 40 responses have been received from across India (Annexure-II). The key questions that were asked were:

a. Do resellers buy lube from retail outlets?
b. Are retail outlet owners really enthusiastic about lube sales? If not, why?
c. For lube change, which one is more important to the customer: service or material used?
d. Are car owners sensitive to their lubricant brands used?
e. Are two wheeler owners only sensitive to cost of lube?
f. How well are the existing service stations in retail outlets performing?
g. Is the margin obtained from lube sales lucrative?
h. Are branded service stations, from OEMs like Honda, Toyota etc. established inside a retail outlet, more popular than generic service stations?
i. Do you think a service station chain running pan-India will be beneficial to customers?
j. Does the layout of retail outlet have any bearing on its lubricant sales?
k. What are the most important issues that impact lube sales from retail outlets?
l. Any other points you wanted to mention.

Responses were collected from the experts and the data was compiled. The details of the source of data are as follows.

S. No	Parameter	Remarks
1.	*Source of Data*	*Electronic survey form submitted to respondents*
2.	*Date Range*	*20.11.2017 to 03.12.2018*
3.	*Place*	*Form presented to 100 respondents from across the country*

3.2 Responses

Responses have been collected from sales executives from all across the country. Some of the key points that emerge out of the questionnaire are as follows:

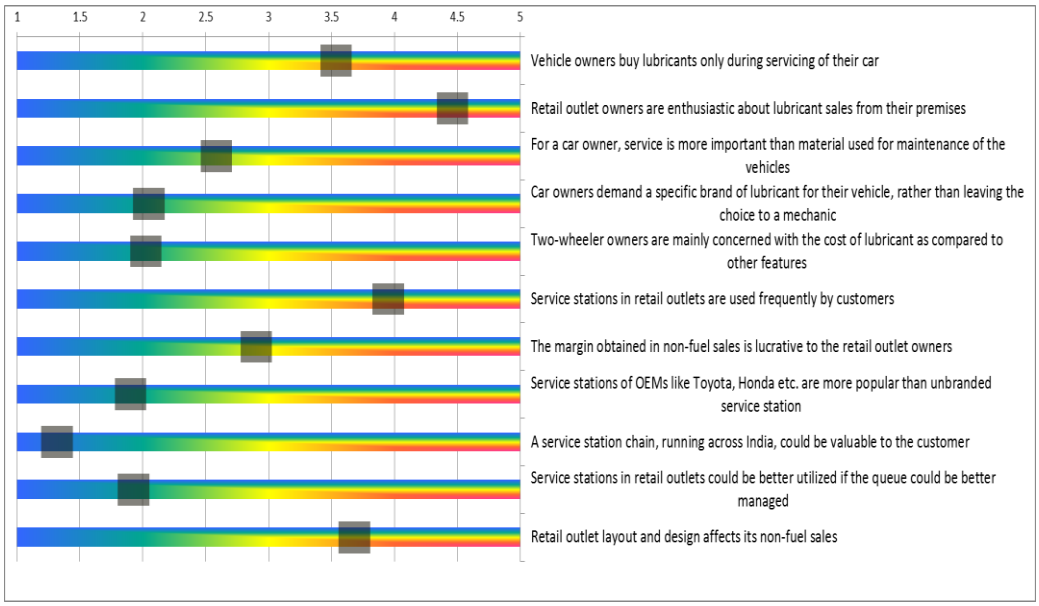


Figure – 3.2.1 Mean of responses from Questionnaire

a. Not only end consumers, but resellers also buy from retail outlets.
b. Retail outlet owners are not enthusiastic about lube sales. The reasons include lack of product knowledge, lack of sales effort, better pricing available outside, customers not interested etc.
c. Service is valued more than material by customers for lube change in vehicles.
d. Car owners are sensitive to the brand of lubricants they use
e. Two wheeler owners are more sensitive to price than to the quality of the product
f. Non-branded service stations are not doing well in retail outlets
g. Lube sales margins are somewhat lucrative
h. OEM branded service stations in retail outlets performs somewhat well
i. A service station chain will be of value to the customer
j. The layout of a retail outlet does not affect its lubes sales

k. The ranking of parameters affecting lube sales through retail outlet in order of importance is as follows:

Issue	Rank
Non-participation of retail outlet owner	1
Intense competitive pressure	2
Lack of trained mechanics	3
Lack of available space within the outlet	4
Large traffic build-up in the pump	5
Non-branded automobile service	6
Lack of sales promotion effort	7
Poor quality of product/packaging	8
Lack of customer knowledge	9
Lack of trust from customer	10

Table – 3.2.1 Rank of parameters affecting lube sales (1-Affecting most profoundly 2- Least effective)

Considering the result of the interview, the most important operational issues faced by retail outlet executives are the lack of space and the queue build-up inside the retail outlet premise.

3.3 Efficiency analysis of retail outlets based on DEA model

In order to understand the operational issues involved in the problem, I have collected data from IOCL's ERP system and sales data from executives. The details of the collected data are tabulated below.

S. No	Parameter	Remarks
1.	*Source of Data*	*Fuels Sales – SAP* *Lube Sales – Retail sales executives*
2.	*Date Range*	*01.04.2015 – 31.03.2017*
3.	*Place*	*Retail outlets of West Bengal – Six sales areas in southern Bengal. Total 237 Retail Outlets.*

Table – 3.3.1 Input Data for DEA Model

It was observed that some retail outlets have done considerably better in lube sales, though they have similar area and cater to similar markets as others.

In order to quantify the relative performances of the retail outlets, I have adopted the DEA model. DEA is a benchmarking tool for comparing the performance of production and service units that use similar inputs to produce similar outputs. Retail outlets selling fuel and lubricants can be modelled as such service units for performance ranking.

3.3.1 Overview of DEA

DEA is a research tool which synthesizes operations research, management science and econometrics. It was first proposed by Charnes et al in 1978. DEA is a mathematical programming approach to provide a relative efficiency assessment for a group of "decision making units" or plants etc. The plants have more than one inputs or outputs. A DMU is fully efficient if it lies in the "frontier" of the production possibility set. This concept has been extended into many area of managerial science today and is an effective tool where the traditional method of efficiency fails.

I have used the "BCC output-oriented model" as a basic DEA model available in DEA Solver Pro 8 software. The Banker, Charnes and Cooper model with variable returns to scale (VRS) is beneficial as the scale of operations of retail outlets is widely different. The choice of output oriented model is because I want to maximize the output (lube sales) for a given level of input (fuel sales).

3.3.2 Inputs, outputs and assumptions

There are four different fuel sales that are executed through the retail outlets. They are 1. MS (Petrol) 2. HSD (Diesel) 3. XtraPremium (Branded Petrol) and 4. XtraMile (Branded Diesel). The lube sales from retail outlets can be categorized into 1. Normal Lube and Greases 2. 2T oil for two stroke vehicles and 3. 4T oil for four stroke vehicles.

The sales from a retail outlet depend on several parameters as size, position, proximity to highway, visual appeal, market potential etc. Fuel sales from retail outlets can be considered to be an approximate representative parameter that summarizes the above dependencies. Hence, I have taken the four fuel sales figure as four inputs to the DEA model. The outputs are intuitively the sales volume of three categories of lubricants.

Fuel sales figures is a function of size, market potential etc. and hence it approximately acts as a digest to these indicators. Thus the assumption of fuel sales figure as input to DEA model is intuitively justified. The detailed working of DEA has been attached as Annexure – A

3.3.3 Rank Sum Test (Mann–Whitney U test)

Based on the scores, I have ranked the retail outlets and converted the scores to ordinal values. In case of tie, I have averaged the ranks. Considering the concerns expressed by the retail and lube sales executives in the expert interview, the major operational hurdle in lube sales from retail outlet is queue build-up and lack of available space. I can assume that several influencing parameters like size, position, proximity to highway etc. affect fuel sales as well as lube sales. So, for comparing two retail outlets for lube sales efficiency, the category variable that is most suitable is the layout of the retail outlet. Layout refers to the way in which fuel and non-fuel facilities are spatially arranged in a retail outlet. There are two categories of layout in a retail outlet i.e. horizontal and vertical. A detailed discussion on layouts is provided in subsequent section 5.3.

I have compared the category variable layout with the ranks using the Mann–Whitney U test. The U test is more widely applicable than independent samples Student's t-test in case the data is ordinal but not interval scaled, so that the spacing between adjacent values cannot be assumed to be constant. Reviewing the available literature, U test is generally better applicable for DEA score results.

The general assumptions of the formulation of rank sum test are as follows:

1. All the observations from both groups are independent of each other. This is valid as lube sales from one retail outlet is largely independent on sales from other.
2. The responses are ordinal. This has been ensured by ranking the scores.
3. The distributions of both groups are equal under the null hypothesis, so that the probability of an observation from one population (X) exceeding an observation from the second population (Y) equals the probability of an observation from Y exceeding an observation from X. That is, there is symmetry between populations with respect to probability of random drawing of a larger observation.
4. Under the alternative hypothesis, the probability of an observation from one population (X) exceeding an observation from the second population (Y) (after exclusion of ties) is not equal to 0.5. The alternative may also be stated in terms of a one-sided test, for example: $P(X > Y) + 0.5\ P(X = Y) > 0.5$.

The detailed working of DEA has been attached as Annexure – B.

3.3.4 Customer Survey for service design

In order to align our solution with the customer requirements, I have undertaken a customer survey. The objective of the survey was to bring out customer voice into the end design.

A Structured questionnaire was designed and presented in electronic format to customers (Annexure-III). More than 500 responses have been received from across India (Annexure-IV). The key questions that were asked were:

1. What is the type of vehicle that you own?
    1. Two Wheeler – Two Stroke
    2. Two Wheeler – Four Stroke
    3. Three Wheeler – Two Stroke
    4. Three Wheeler – Four Stroke
    5. Car – Hatch Back

6. Car – Sedan
7. Car – SUV
8. Car – Other
9. Heavy vehicle
10. Other vehicle

2. What is the fuel type of your vehicle?
    1. Petrol
    2. Diesel
3. What is the age of your vehicle?
    1. Less than 2 years
    2. More than two but less than four years
    3. More than four but less than six years
    4. More than six years
4. What time of the day do you normally visit a retail outlet?
5. Where do you normally buy lubricants for your vehicle from?
    1. Service Stations
    2. Fuel Stations
    3. Bazaar Shops
    4. Local Mechanic
    5. Others
6. How frequently do you change your lubricant oil on an average?
    1. More than thrice a year
    2. Twice a year
    3. Once a Year
    4. Once in 1.5 Years
    5. Once in 2 Years
    6. Less than once in 3 years
7. What are the most important parameter(s) in choosing lubricant for your vehicle?
    1. Brand of the product
    2. OEM certification of the product
    3. Price
    4. Skill of the service personnel
    5. Service rendered
8. How do you primarily choose your service station?
    1. OEM station of your vehicle
    2. Proximity to your workplace/home
    3. Quality of service rendered
    4. Value for money
9. What is your most frequent reason for a service station visit?
    1. Major Repair
    2. Fixing of dents and scratches
    3. Cleaning and routine checking
    4. Others
10. Which of the allied facility (ies) do you frequently use in a retail outlet?
    1. ATM
    2. Convention Store
    3. Parking
    4. Air filling
    5. Service Station
    6. Cleaning Station
    7. Other
    8. None
11. How has been your experience in using the allied facilities?
    1. Satisfied
    2. Dissatisfied – Too crowded
    3. Dissatisfied – Poor Service

4. Dissatisfied – No parking space
5. Dissatisfied – Others

Responses were collected from customers and the data was compiled. The details of the source of data is as follows:

S. No	Parameter	Remarks
1.	*Source of Data*	*Electronic survey form submitted to customers*
2.	*Date Range*	*17.12.2016 to 15.03.2017*
3.	*Place*	*Form presented to 6000 customers from across the country*

Table – 3.3.4.1 Details of Customer Feedback report

4. Results and analysis

4.1: Summary of DEA score

The summary of DEA score is given in the table below:

Descriptive Statistics of DEA Scores				
Mean	**Standard Deviation**	**Coefficient of variation**	**Maximum**	**Minimum**
0.452757	*0.317849017*	*0.702029762*	*1*	*0.00298727*
LAYOUT TYPE 1				
0.701562	*0.294808749*	*0.4202176*	*1*	*0.12960626*
LAYOUT TYPE 2				
0.362699	*0.275680317*	*0.760080262*	*1*	*0.00298727*

Table – 4.1.1 Summary of DEA Score

As the result shows, the average score of Layout Type 1 retail outlets is about 1.93 times that of Layout Type 2 retail outlets. The minimum score is also substantially greater in case of layout type 1 retail outlets. The coefficient of variation (SD/mean) in case of Layout Type 1 is about half of that of Layout Type 2.
What these results suggest is that the Retail Outlets of Layout Type 1 on an average better at selling lubricants to a comparable Retail Outlet of Type 2. Next I investigate the statistical significance of these results through the Rank Sum test

4.2: Results of Rank sum test

Null hypothesis: The distributions of both groups are equal, so that the probability of an observation from one population (X) exceeding an observation from the second population (Y) equals the probability of an observation from Y exceeding an observation from X. That is, there is symmetry between populations with respect to probability of random drawing of a larger observation. Alternative hypothesis: the probability of an observation from one population (X) exceeding an observation from the second population (Y) (after exclusion of ties) is not equal to 0.5. The alternative may also be stated in terms of a one-sided test, for example: $P(X > Y) + 0.5\ P(X = Y) > 0.5$.

Rank Sum	Rank Sum	Test	Standardized	p Value	Inference
3766	*20987*	*1996*	*-6.652898759*	*0.000000000014*	*Null Hypothesis is rejected at significance level .0000000029*

Table –4.2.1 Results of Mann–Whitney U test – to test for similarity of distribution of DEA scores of the two groups

According to the test result, I have to accept the alternate hypothesis that there is statistically significant difference in between the two scores of the two layout groups. ROs under Layout Type 1 outperform those under Layout Type 2 in terms of lube sales.

Ther**4.3: Layout and footfall patterns in retail outlet**

There are two types of approved layout in a retail outlet as shown in figure 4.3.1 and 4.3.2. The most common type of layout is in which the dispensing units are stacked vertically from the entrance. This type of layout has been demarcated as layout type 2 in data. The add-on facilities like ATM, service station etc. has been kept parallel to the fuelling facilities, such that the fuel customers necessarily need to go through the front of the entrance of these facilities. In the other type of layout (layout type 1 in the data), the fuel facilities and the non-fuel facilities are clearly demarcated. Fuel customers need not go through the entrance of the non-fuel facilities while exiting the retail outlet. Further, customers who are only interested in non-fuel sales can reach their service point with minimal interference with the refuelling crowd.

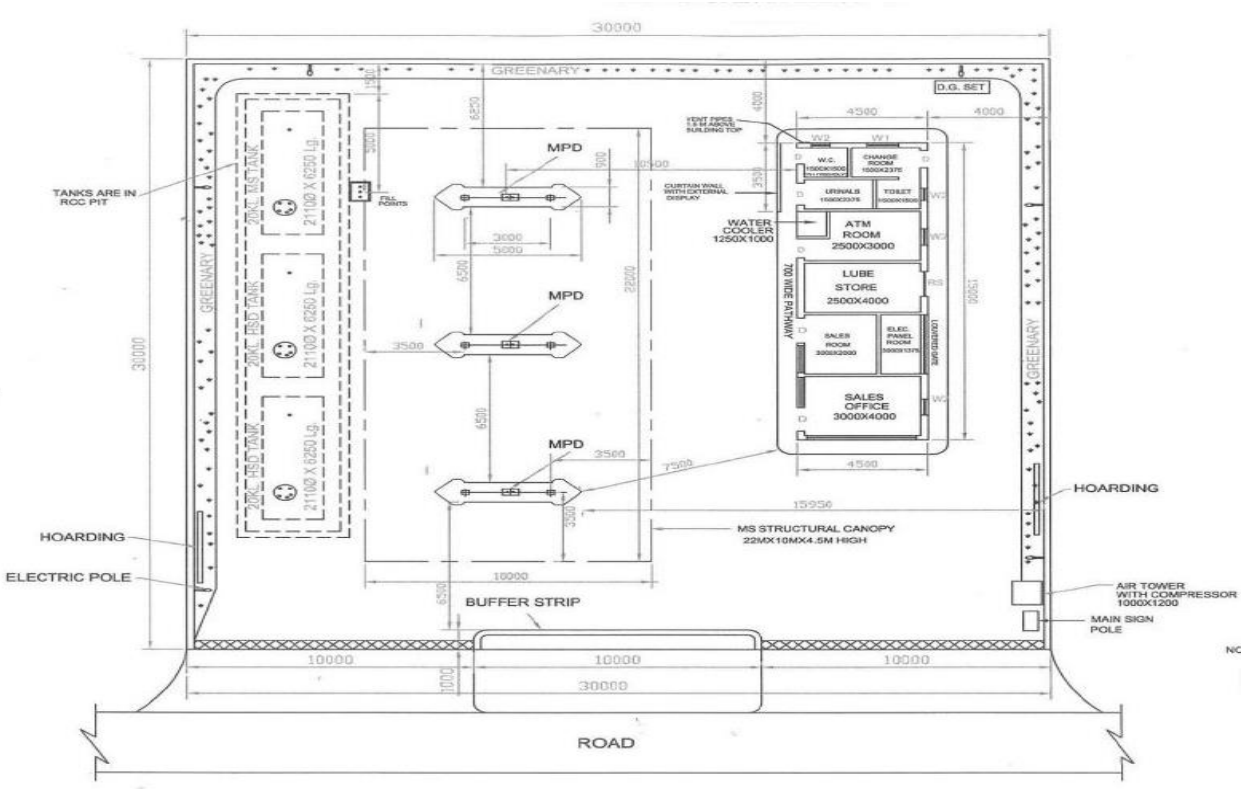


Figure – 4.3.1 Layout of retail outlet type – 2. This is the most common type

Thus in the layout type 1, the customer experience is much better both for refuelling and non-refuelling transactions

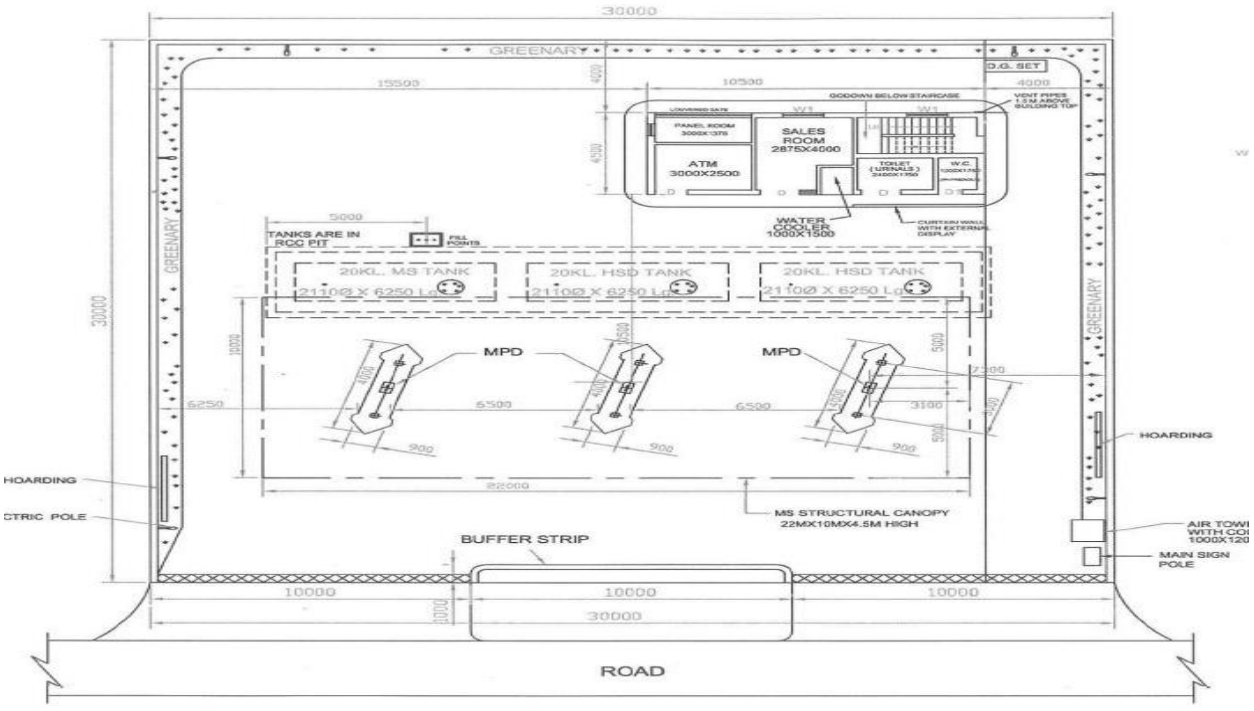


Figure – 4.3.2 Layout of retail outlet type – 1.

As can be corroborated by the DEA analysis and Rank Sum test, retail outlets with layout type 1 clearly outperforms retail outlets of layout type 2 in efficiency of Lube sales. 20 out of 59 retail outlets of category 1 are at the efficiency frontier as compared to only 10 out of remaining 163 retail outlets of category 2.
The Retail outlets design has not been done keeping in mind non-oil sales. The non-oil sales premises have been added late as an afterthought. Crowd distribution between the two types of services, fuel and non-fuel, needs to be analyzed.

The customers entering the retail outlet are of the following types.

a. Entered to buy fuel, additionally buying non-fuel items(Marked in Brown)
b. Entered for non-fuel purchase only.(Marked in Green)
c. Entered for fuel purchase only (marked in Blue).

The two footfall patterns can be seen in figure 5.3.3 and 5.3.4 for the two types of retail outlets.

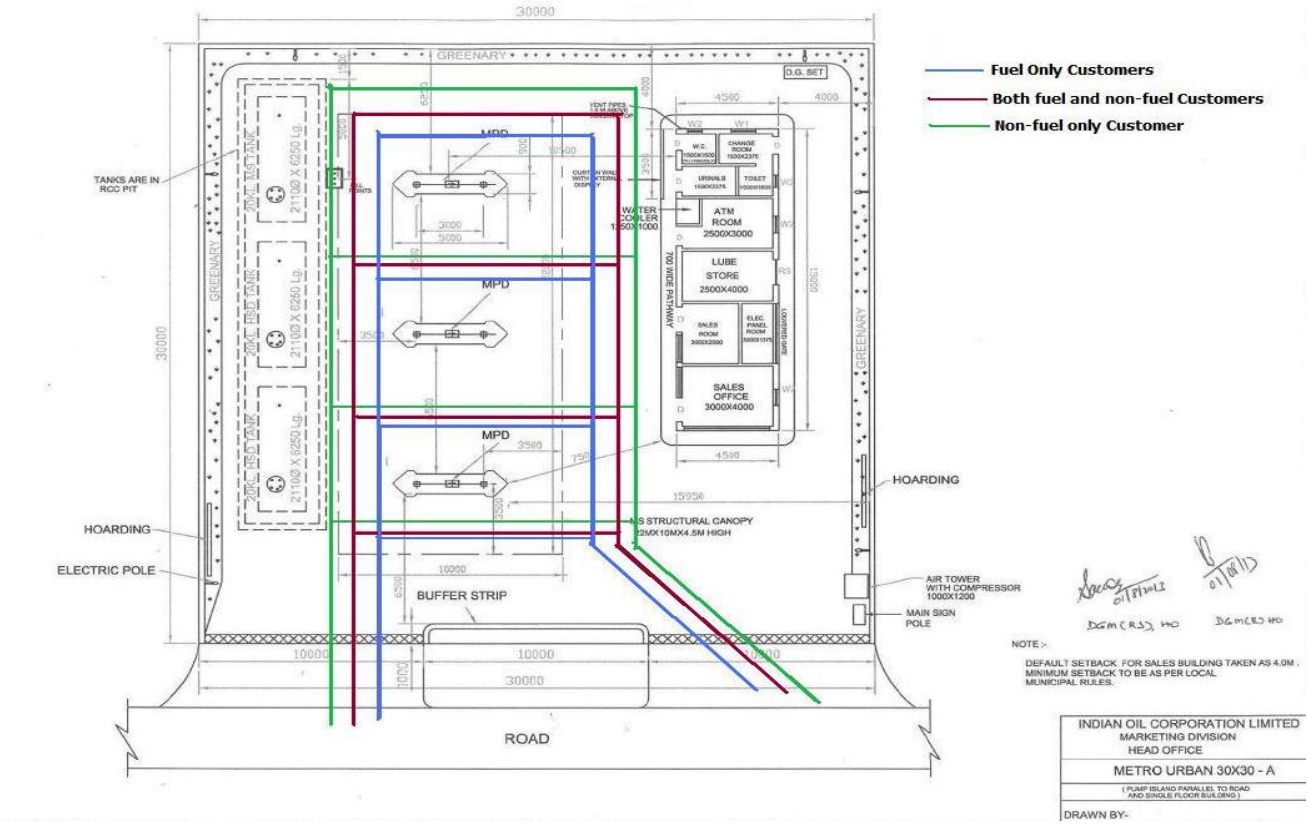


Figure – 4.3.3 Footfall pattern for three types of customer in retail outlet layout type – 2.

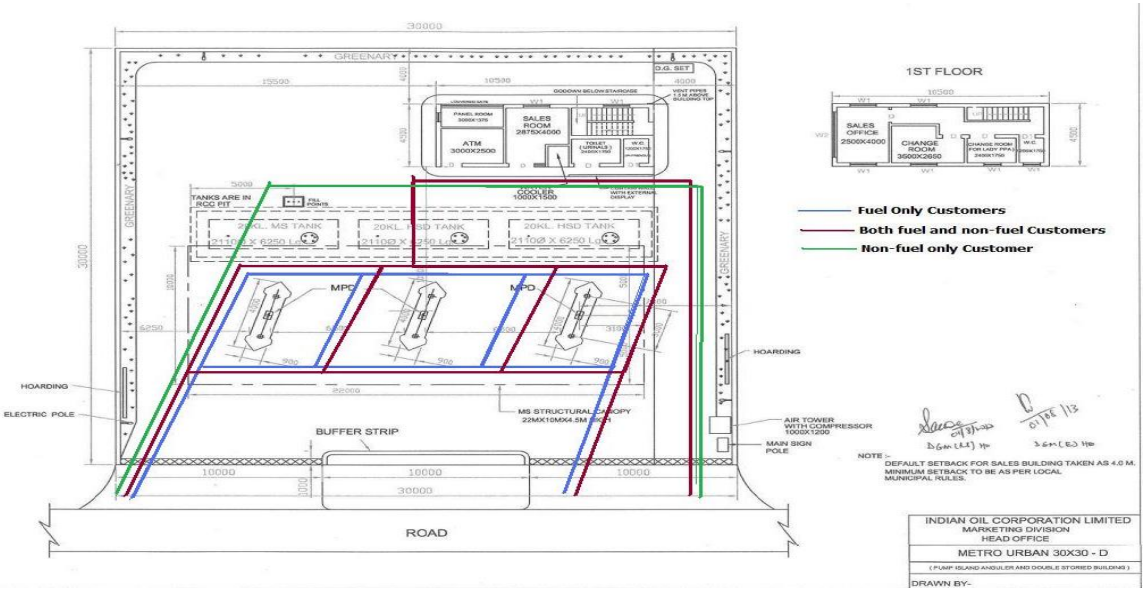


Figure – 4.3.4 Footfall pattern for three types of customer in retail outlet layout type – 1.

As can be seen in the footfall patterns, there is a clear segregation of footfall patterns in the layout 1. Customer types a and c can use the premises with little obstruction to Customer type b. Customer type a can migrate from fuel area to non-fuel area without causing a traffic snarl inside the retail outlet. However, in the conventional arrangement of layout 2, the customers merge through most of their activities. Thus the chances of traffic snarl, overcrowding and space crunch are higher in the case of Layout 2.

They key conclusion that can be drawn from this is that crowd management and segregation is of utmost importance inside a retail fuel station. This will positively impact both the fuel and non-fuel sales.

4.4 Customer survey responses summary

The summary of customer survey responses is tabulated as below. The results can be seen online with the application of different filters to understand the distribution of customer responses.

The summary results are printed below:

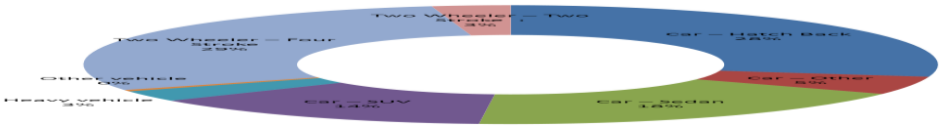


Figure – 4.4.1 Type of vehicle as % of responses

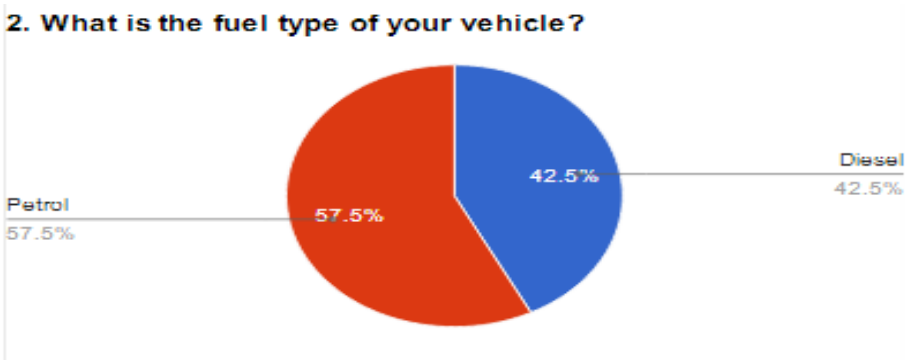


Figure – 4.4.2 Fuel type of vehicles

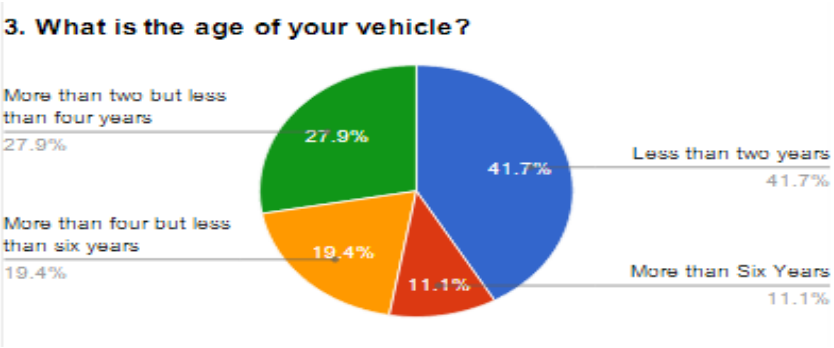


Figure – 4.4.3 Age profile of vehicles

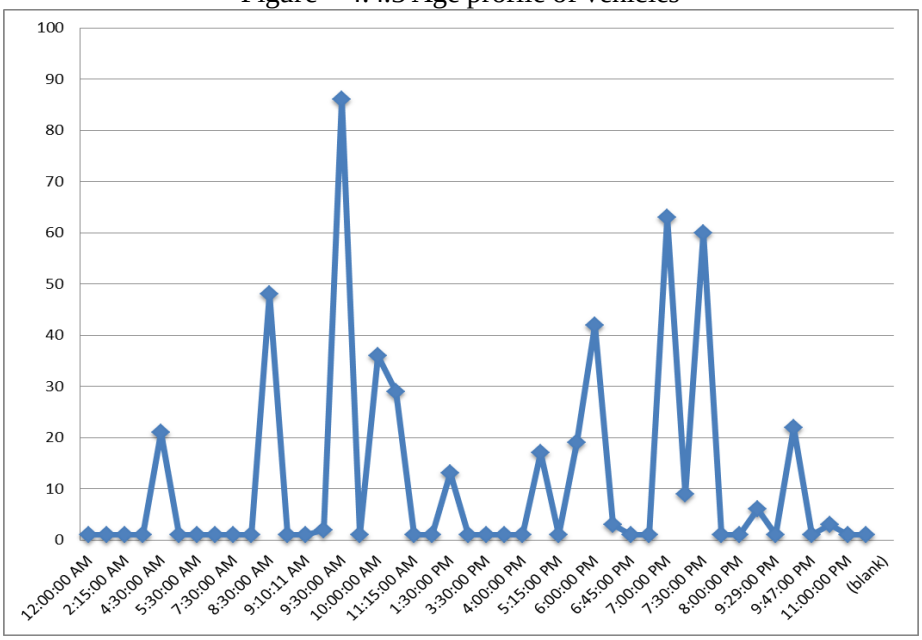


Figure – 4.4.4 Time of visit to Retail Outlets

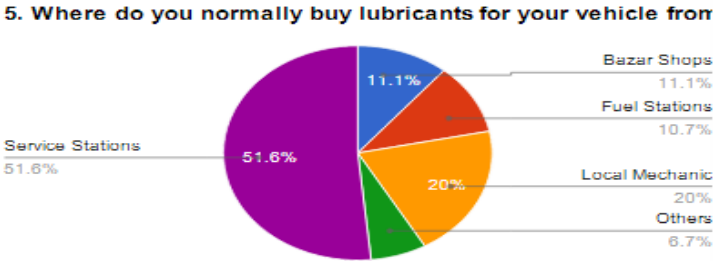


Figure – 4.4.5 Preference of buying lubricants

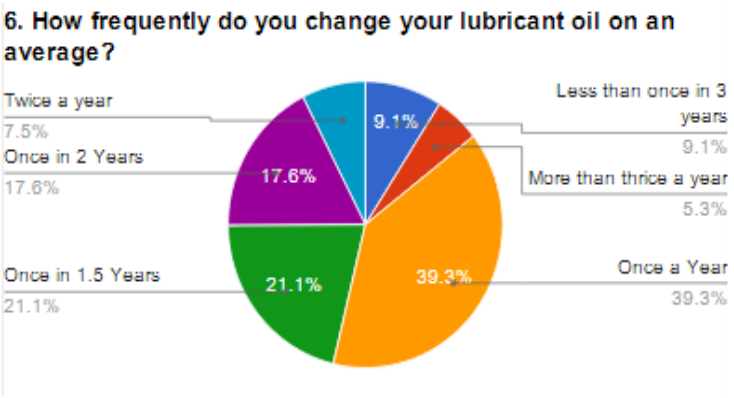


Figure – 4.4.6 Frequency of change of lubricants

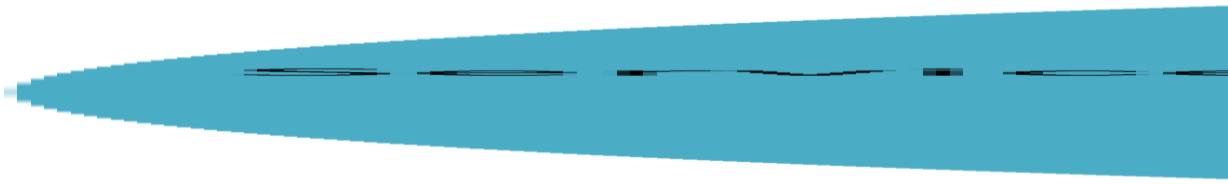


Figure – 4.4.7 most important service parameters

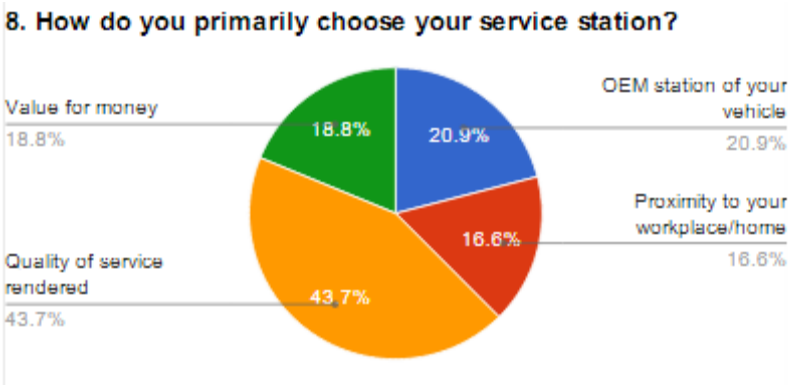


Figure – 4.4.8 Most important parameters for choosing service station

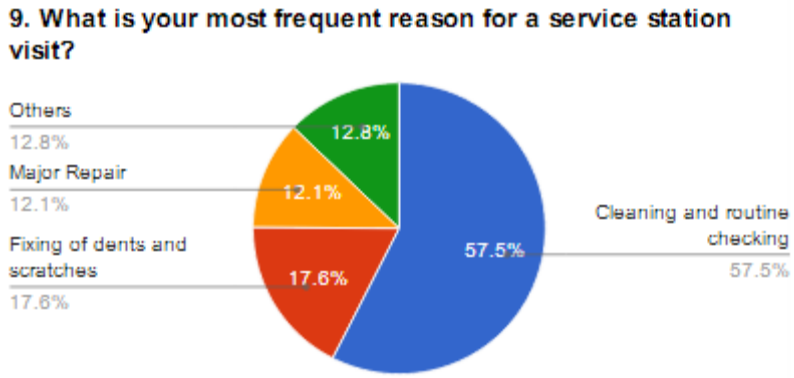


Figure – 4.4.9 Most frequent reason of visit to service station

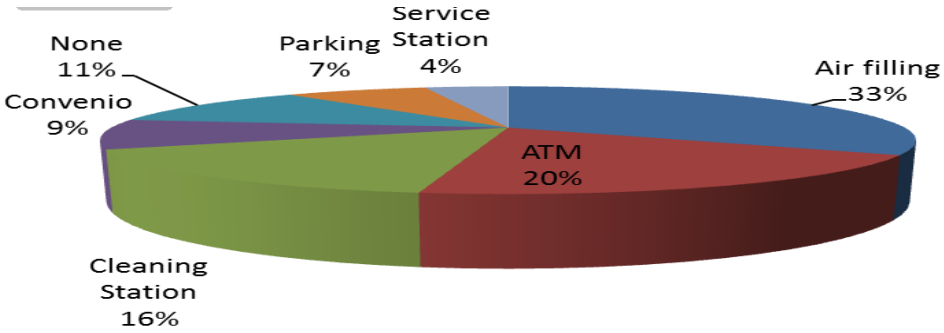


Figure – 4.4.10 most important facilities used in a Retail Outlet

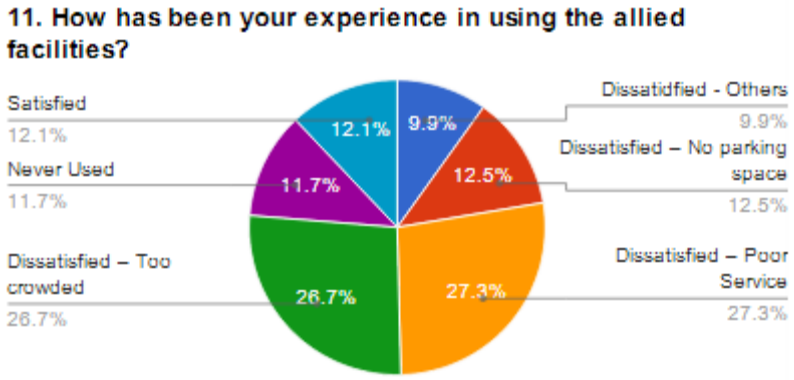


Figure – 4.4.11 most important facilities used in a Retail Outlet

4.5: Analysis of customer survey response

The key points that may be noted from the survey are as follows:
1. As can be seen from the Fig. 5.4.4, the customer inflow into retail outlets happens in bursts, with an approximate bimodal distribution. More than 80% of the traffic visits the retail outlets in between 7:30 and 10 AM and 5:15 and 8 PM on an average. This implies that

a. Because of the pattern of customer arrival, there is a possibility of major crowd congestion in improperly managed outlets.

b. Assuming 16 hours of operation from 6AM to 10PM, the utilization of the premises for fuelling is 32.8% on an average.

2. More than half of the respondents (51.6%) bought lubricants from Service Stations while 10.7% bought from fuel retail outlets. However, considering only two stroke two wheelers, 40% of these customers buy from fuel retail outlets. The figure drops to 18.5% considering both two stroke and four stroke two wheelers.

3. 73.9% of customers change lubricants within one and half years. Even considering vehicles which are relatively new (0-4 years), the percentage of such customers is 73.4%. Modern car manuals suggest a much less frequent change of oil. As for example, the Ford 2013 manual suggests change of oil only after 7500-10,000 miles. This is in contrast with change suggested on 3000 miles earlier in 2008. But mechanics nearly always change the lube of a car during scheduled maintenance of the vehicle irrespective of the vehicle condition. It will be an important value proposition if the service station can provide customized advice to the vehicle owner regarding lube change. Along with quality and quantity assurance, appropriate service – only when required- will be an important cornerstone in the service delivery process.

4. "Service rendered" is the most important parameter in choosing lubricant for vehicle. This is considered more important than "Brand of product" and "Price" combined by the customers. Thus, the acceptance of SERVO as a product will be much more, if it comes with a service promise too. The next logical step in the development of SERVO should be to build the product as service. Further, skill of service personnel is also an important consideration point.
5. the most frequent reason for visit to a service station is "Routine cleaning and checking". As compared to "Major Repairs" which is only 12.1% "routine checking and cleaning" commands 57.5% of the customer requirements. Thus, building small service stations having basic facility of cleaning and routine checking inside the limited space of a retail outlet will have a major impact in the sales of lubricants.
6. ATM and Air filling facility are the two most important services that draw customers to retail outlet apart from refuelling. One interesting aspect to note is that "cleaning stations" with a limited setup are more used by customers (16%) than full-fledged "service stations" (4%) inside a fuel retail outlet. This implies that customers prefer OEM service stations for more detailed servicing jobs, but will not mind smaller jobs to be done inside a retail outlet.
7. Customers are mostly dissatisfied with the allied facilities inside a retail outlet, or they may have never used it ever (total 87.9%). Customers who are dissatisfied mainly claim that poor service, lack of space and excessive crowd are the major put offs for them against using the retail outlet facilities. This once again emphasizes the importance of increasing the operational efficiencies at the retail outlets.

4.6: Management report

The salient points that have emerged from this project which requires management attention are listed below. I are confident that addressing these operational issues in the retail outlet will result in increase of both lubricant sales and fuel sales for the company.

1. The most important operational issue that needs to be addressed is the arrangement of service facilities inside a retail outlet. Retail outlets are structurally optimized considering only fuel sales. But for other services to coexist, new layout plan must be designed.
    a. Newer retail outlets be constructed preferably with layout type 2
    b. Wherever possible, it would be advisable to convert the existing retail outlets to layout type 2
    c. Development of an ideal layout should be taken up as an engineering problem with collaboration from both lubricant and retail team professionals. Innovative layouts like a separate floor for service station related activities, conversion of existing refuelling bays to service station units etc. may be considered.
    d. There should be a dedicated lane for accessing allied services. The lanes should be clearly demarcated in the floor of retail outlets.
    e. Incentive schemes like "happy hours", "privileged customers", "car pick and drop facility" etc. can be designed to ease out the traffic.
2. The focus of sales of SERVO lubricants need to be shifted from a "product" model to a "product service combination" model. This needs to be done by increasing the service component of SERVO.
    a. Building of a strong service brand with the following unique selling points
        - All India Presence
        - Trained and Certified mechanics
        - Specialist in Preventive Maintenance

- Integrity: Change oil only when needed
- Customized service – based on vehicle condition
- Not attached to a particular brand
- Complimentary allied services like pollution checking, cleaning etc.

b. The required human resource can be developed in stages by imparting a structured course on basic lubricant change operations. The course may be designed centrally but implemented through individual retail outlets.

5. Conclusion and scope for further work

5.1 Limitations of the study

- 1. The DEA analysis has been done only on retail-outlets of a portion West Bengal. It has been assumed that the basic parameters remain the same across India.
- 2. There were about 22 retail outlets which did not have any lube sales. These outlets were rejected by the DEA software from calculation and could not be a part of the efficiency calculation. These outlets had a zero value of output or lube sales.
- 3. Most of the customer responses were collected through the Internet. Though the Internet penetration has increased substantially in our country, still the survey will be considered to be having a bias towards urban average income group.
- 4. This project only indicates that there exists a better layout in the Retail Outlets for combining lube and fuel sales. However, due to lack of software, the best possible layout could not be designed and is left as a subsequent engineering problem.

5.2 Scope of further work

- 1. Finding the best layout solution for a mixed fuel and non-fuel operation in a retail outlet – a mixed engineering and management problem.
- 2. Demographic study which will indicate whether there is a scope for specialized retail outlets like “car only retail outlets” “bikes preferred retail outlets” etc. so that crowd can be managed across neighbouring retail outlets
- 3. Service management parameters for branded chain of preventive maintenance outlets
- 4. HR challenge of development of suitable trained and certified manpower for the job.

5.3 Conclusion

- The problem of falling lube sales in retail outlets has been considered as an operational and service design problem in this project. In spite of considerable incentives for sales, sales promotion activities etc., retail outlets are not selling lube products. The sales executives consider the problem of falling sales as “lack of interest”. As a result, an alternative retail channel, namely bazaar traders and servo shops has been established.
- I have taken a fresh perspective of this problem in this project. I have considered the operational aspects and have found sufficient evidence that the loss of sales is in part due to a major layout problem with designs, which do not segregate fuel sales and non-fuel sales area leading to chaotic traffic build-up and consequently poor customer experience. On the other hand, I have delved into the possibility of increasing the service component of the product so as to leverage the all India network of retail outlet supply chains to deliver SERVO as a branded service.

6. Appendices

6.1 References

1. Company Annual Reports(2009-2017), AGM minutes(2015,2017)

2. Super Brand India Survey(1st, 2nd, 3rd,2015,2016)
3. Crisil Lube Market Outlook 2016
4. Infosys viewpoint of lubricant business 2016
5. Internal data of the organization, in the form of corporate presentations etc.
6. Primary data from SAP ERP system and SSMS system of the organization.

6.2 Others (DEA, MW Test, Customer Survey Responses)

- Annexure - I : Expert Interview Questions
- Annexure - II : Expert Interview Responses
- Annexure - A : DEA INPUT, DEA OUTPUT SUMMARY, DEA OUTPUT DETAILS
- Annexure - B : MW Test
- Annexure- III : Customer Survey
- Annexure -IV: Customer survey response