

Descriptive analysis of Oil and Gas Industries

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Abstract - The Aim of this Survey paper is to show the processes and decisions related to Oil and Gas Exploration development and production which is carried out through the descriptive analysis. In today's world the resources like oil and gas are gaining more importance which leads to the high level profit of those organizations extracting those resources. This survey will explicitly demonstrate the exploration, development and production done by each organization over years and helps to develop a decision support system for future production. This also helps in automating business decision which results in high profit in nearing future.

Key Words: OPEC, ONGC, ROA, ROE, EPS, VAIC, ERD

1. INTRODUCTION

Oil and Gas Industries are considered to be the biggest sector in the world in terms of dollar value and also plays a major role in increasing the globe's economy. However, the fluctuations in their production level challenges the country's high demands and also results in rise and fall in revenue. The oil and gas industries also known as "Global Powerhouse" employs hundreds of thousands of workers worldwide and serves as a path of major employability providers. The descriptive analysis of these industries on all three key areas like Upstream, Midstream and Downstream bound to exhibit their progress in past years by analysing historical data and provides us with a statistical report which will be helpful for those industries in nearing future to overcome their limitations.

1.1 Types of Analysis

1.1.1 Prescriptive Analysis

In the area of analytics there is an analysis named prescriptive analytics gives us a laser-like focus to answer specific questions. For example, in the health care industry this analysis helps us to calculate the population of the patient and determines where to focus treatment by adding filters for their diseases. This model can be applied in any industry target group or problem.

1.2 Predictive Analysis

Predictive analysis is used to recognize past patterns to predict the future. For example, some leading companies use predictive analytics for making their score high in the market. Some companies have gone one step further by implementing predictive analysis to analyze the source

score, number and type of communications to support marketing sales and other types of complex forecasts.

1.3 Diagnostic Analysis

This analysis is used to explore or to examine why something happened. For example, for a social media marketing campaign, we can use the descriptive analysis to locate the number of posts, followers, mentions, reviews, etc. These can be used to analyze which one worked and which didn't.

1.4 Descriptive Analysis

Descriptive Analysis is a process that develop a summary of historical data which will be useful to provide the information that resides about what happened. For example, we can able to see, the increase in followers for a particular tweet in Twitter. This analysis provides about what happened after a particular tweet post

1.2 Study on Process of Extracting Oil and Gas

1.2.1 Exploration and Well Development

Petroleum geologists and geophysicists in order to search hydrocarbons (oil and gas) under the earth surface uses the method called Exploration. This method helps in locating oil and gas reserves using seismic surveys and drilling wells. It is a costlier and riskier because the amount is spent in dollars (\$) to build wells in which two out of three contains no traces of hydrocarbons. Therefore, the companies required to drill as many wells in one area before they find the resource as it may take decades. Certain explorer finds no resources at all.

1.2.2 Production

This process involves extraction of hydrocarbons and separation of the extract into liquid hydrocarbon, water, gas, and solids, by removing the items that are non-saleable. Production sites often handles crude oil from various well. The liquid hydrocarbon (Oil) will be processed at a refinery; similarly, natural gas may be processed in the field or at natural gas refinery in order to remove the impurities. This is depicted in figure (Fig -1).

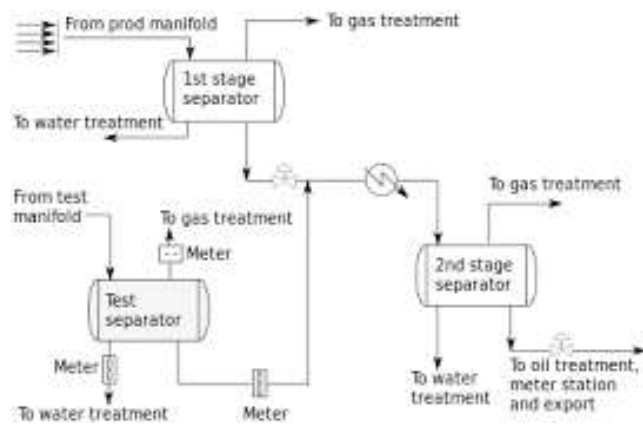


Fig -1: Extraction and Separation Process

1.2.2 Site Abandonment

Final process in the oil and gas extraction is Site Abandonment, which involves restoring the site by plugging the well(s). This is done when a recently-drilled well lacks the capability to produce profitable quantities of oil or gas, or when the well is no longer profitably viable.

2. PREPROCESSING

2.1 Historical Data Assortment

Historical Data Assortment includes the process of collecting data generated in the past along with current data. This include sequential process finding resources producing sites, construction of the plant, mining techniques installed, amount produced, demand encountered and satisfied, transactions made. These entire data serves as the foundation for analyzing the growth and helps in increasing the overall revenue of the nation.

2.2 Building Data warehouse

Data warehouse includes large storage of data that constellate a far-flung range of data for a particular organization used for decision managements. Data warehouse building includes extracting the transactional data from the organization over years, cleansing and transforming the transactional and load it into dimensional database.

2.2.1 Cleansing Noises

Historical data collected may contain some noises in it. In order to build warehouse, the data from various sources should be cleaned and made into identical format to combine them into a single table. The cleansing of data known as Transforming in ETL process. Extracted data is treated as per the need and combined into a single source by removing all the impurities.

2.2.1 Loading Data into Data warehouse

After the completion of data cleansing data is transformed into the structure which is appropriate for the data warehouse. Once the transformation is completed then the data is populated into the data warehouse in the form of tables.

2.3 Designing E-R Model

Entity relationship diagrams will help us to view the l starting point for design the design of the database that is used to determine the information system requirements of oil and gas organization. It represents the relational structure of the organization and illustrates specific data points and its relation with attributes. It also enhances one to many, one to one and many to many relationships among data.

The dimensional data figured in Fig.2

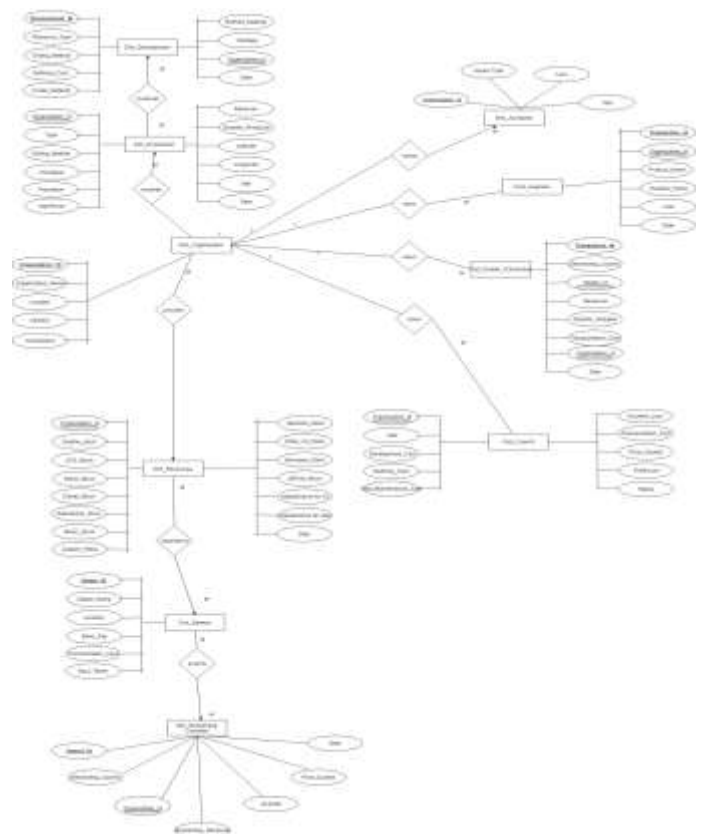


Fig -2: E-R Model

3. DESCRIPTIVE ANALYSIS

Descriptive analysis part involves analyzing the oil and gas industries deeply and producing reports to have a clear view. The reports are generated based on the data that has been collected over a period of time and stored in a data

warehouse as a single source. Analysis is made by various analysts like data analysts, business analysts, supply chain analysts, security analysts etc. The reports are generated as per their need to have an elaborated vision of the details. This elaborated view helps them with making decisions but understanding what went wrong in the past and what should be implemented in order to overcome all those impediments in the nearing future.

The analysis process began by generating a descriptive statistic on the price of the Oil and Gas. The table describes the Minimum, Maximum and Standard Deviation of those hydrocarbons based on the ROA (Return on Assets), ROE (Return On Equity), Sales growth, EPS (Earnings per share), VAIC (Value Added Intellectual Co-Efficient), Etc.

Table -1: Descriptive Statistics (Oil and Gas Sector)

	Min	Max	S.D
ROA	-1.976	.5657	.180
ROE	-1.6553	.9994	.460
Sales Growth	-.5050	2.4965	.350
EPS	-108.86	159.45	44.5
VAIC	-9.12	33.19	9.15

Reports on the Economy of the Organizations is used to analyze the company's growth or contribution over a decade. This analysis will help them in improving future contribution amount by doing certain plans. The following figure (Fig -3) demonstrates this.

Yearly turn over of an Organisation

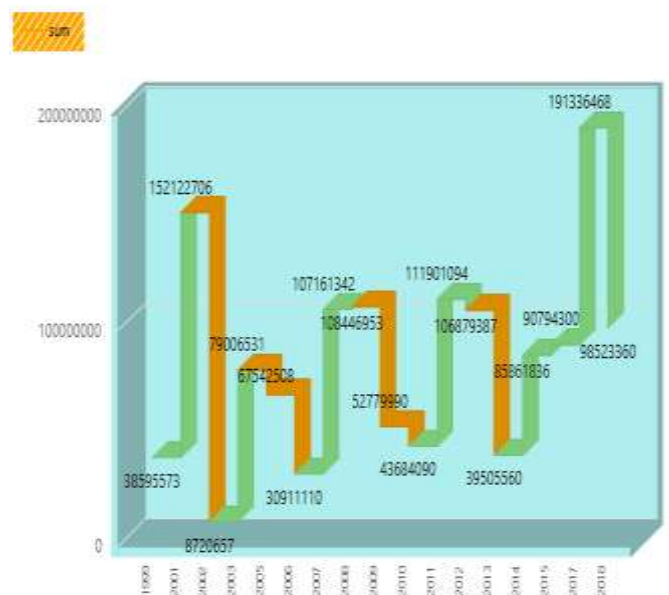


Fig -3: Turnover of an Organization (\$)

Another analysis based on the report for the amount of hydrocarbons produced by implementing certain extraction/drilling methods will enable the analyst to provide suggestions to the organization on the profitable mode of extraction tool. This is demonstrated by the figure (Fig -4).

Quantity of Refined Material by each Extraction Methods

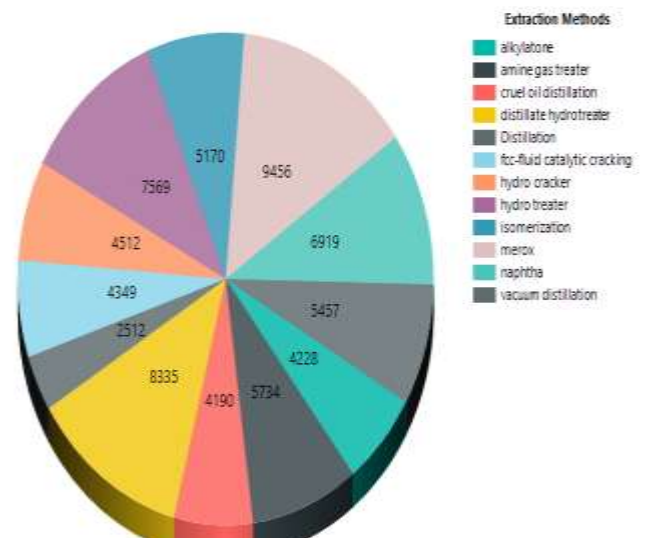


Fig -4: Quantity produced by each extraction methods

Analysis on price increase over years is also analyzed which is also used to detect the future rise or fall on price of oil and gas and also helps to view the economy level contribution of oil and gas effectively

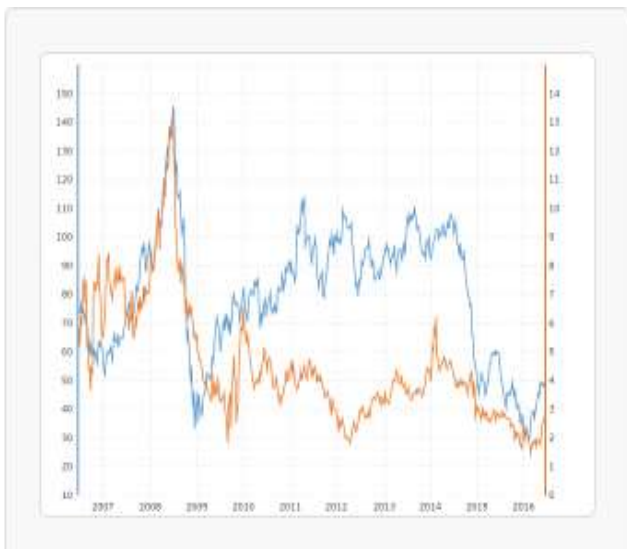


Fig -4: Oil Vs Natural Gas Price (\$)

4. CONCLUSION

The continuing trend among countries to mine resources in their quest to become developed powers led us create this paperwork. The jest of our work depicts the overall analysis of the various process in Oil and Gas Industry. Several simulations lead to the formation of the datasets which was analyzed descriptively. The Upstream and Downstream processes were analyzed for crafting a better Decision Support System that forecasts the effective ways to be more productive and profitable.

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