Assessing the Feasibility of Project Appraisal Methods in the Oil and Natural Gas Industry: A Case Study of ONGC's ABC Project

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Abstract: Project appraisal plays a crucial role in the decision-making process of organizations, particularly in the oil and natural gas industry where resources are limited and have alternative uses. The aim of this study is to evaluate the project appraisal methods used in the industry, with a specific focus on ONGC's ABC project. Through an analysis of the technical and financial feasibility of the project, this study aims to determine whether the project is viable and to identify any potential areas for improvement in ONGC's project appraisal processes. The findings of this study have implications for the oil and natural gas industry as a whole, highlighting the importance of effective project appraisal in ensuring the optimal allocation of resources.

Keywords: project appraisal, feasibility analysis, oil and natural gas industry, ONGC, ABC project.

Introduction

About Oil and Gas

Oil and natural gas are significant pieces of the worldwide energy market and assume an important part of the worldwide economy. The cycles and frameworks engaged with the creation and appropriation of oil and gas are complicated, capital-escalated, and require best-in-class innovation. By and large, gaseous petrol has been related to oil, fundamentally in view of the creation cycle or procedure on the upstream side. For the majority of the historical backdrop of the business, flammable gas was viewed as an irritation, and even today it is roasted in enormous amounts in some areas of the planet, including the US. Natural Gas has taken on a more noticeable job in the worldwide energy supply because of the improvement of shale gas in the US, as referenced above, and its lower ozone-depleting substance discharges when copied contrasted with oil and coal.

About ONGC

ONGC, India's largest crude oil and natural gas producer, accounts for 71% of the country's domestic output. Its crude oil is utilised by downstream businesses like as IOC, BPCL, HPCL, and MRPL to manufacture petrol, diesel, kerosene, naphtha, and propane.

The capacity of ONGC to manage all aspects of oil and gas exploration, production, and related services in-house distinguishes it. The organisation performs in demanding conditions with a devoted workforce of over 27,000 qualified experts and has been recognised with the Best Boss award.

Review of Literature

The evaluation of oil and gas assets is a crucial step in the investment decision-making process. Typically, investment evaluation focuses on assessing both the risks and benefits associated with these assets, with occasional consideration given to factors such as corporate strategy and environmental preservation.

Existing academic literature on investment assessments in the oil and gas industry primarily focuses on risk variables associated with exploration and exploitation. These include exploration risk, geological risk, reserve

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risk, technical risk, project risk, and contract risk, among others, as identified by scholars such as Ghandi and Lawell (2017), Xie (2011), Yin (2011) and Zhan (2008). While some scholars adopt a broader perspective and consider macro-environmental issues such as economic and political variables, international oil price fluctuations and sovereign credit risk, they often miss the account for the long-term consequences of these risky factors. There is a lack of comprehensive analysis and summarization of all risks related to offshore oil and gas exploration and development investments in previous studies. Furthermore, many studies only evaluate the impact of a single risk factor on oil and gas production when quantifying risk factors. Some studies, such as Dong (2010) and Li (2017a), employ weighted risk factors to prioritize the development of oil and gas resources, but they do not thoroughly assess the intrinsic risk-benefit relationship.

The use of the discounted cash flow method for evaluating benefits through the net present value (NPV) calculation is widely accepted by both academia and industry. Some scholars have introduced the real choices approach, which utilizes NPVs to assess the importance of selecting the best investment and the ideal timing for investing (Abadie and Chamorro 2017; Huang et al. 2018; Zhou and Yan 2013). However, this approach does not represent a significant departure from the discounted cash flow methodology. Other researchers have utilized NPVs to invert economic limit parameters, such as well spacing, well density, recovery rate, also steam injection rate (Gurgel. 2017; Liu and He 2008a, b; Zekri and Jerbi 2002). Asset pricing models, including the APT Model, CAPM Model, and WACC, have been summarized by Grandits and Thonhauser (2011), Lin and Yao (2012), Reinschmidt (2002), and Rowse (2008), who also studied the risk discount rates of stocks and securities. Due to the lack of a well-developed trading market and regular trading behavior, a limited sample size of oil and gas resource trading cases is inadequate for evaluating the risk discount rate for overseas oil and gas block investments. Thus, the fundamental Factor Accumulation Technique is more applicable and advantageous. However, the comprehensive analysis and quantification of all accumulating factors have emerged as a new urgent concern.

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Academics have proposed various approaches to investment decision-making that consider both risk assessment and reward evaluation. In the field of mathematics and operations research, decision-making problems are often solved through objective conversion or method enhancement, where multiple decision-making goals are combined into a single goal (Deng 2010; Zhu. 2013). For example, one algorithm performs weighting for both risk and reward to establish a comprehensive objective for decision-making.

Multi-objective ranking algorithms have also been used to improve decision-making processes (Fazlollahtabar and Saidi-Mehrabad 2015; Sorensen and Springael 2014; 2012). One such algorithm involves selecting the topmost 30 percent of plans graded by benefit, and then selecting the top 30% of those plans classified by risk, continuing the process until the best plan is identified. In the oil and gas sector, decision-makers are more likely to consider the process integration approach.

The main objective of this study is to test the following research hypothesis. Using Guo's resource-related risk compensation method as a basis, this paper comprehensively examines all economic technical, and core risks associated with overseas oil and gas investments. It identifies different risk impact modes and considers various static risks that are involved in oil and gas exploration and development costs. The study proposes a dynamic discount rate that factors in changes in dynamic risks by dividing the accumulation factors. This approach addresses the issue of dynamic changes in specific risk components and avoids subjectivity in decision-making and risk recalculations during benefit evaluations with dual objectives.

Objective

- To find the Beta of the ONGC Ltd. & the BPCL Ltd.

- To Study the Comparative Analysis of the Beta of ONGC Ltd. With the BPCL Ltd.

Research Methodology

Project Appraisal and assessment are frequently alluded to together as venture evaluation. Project evaluation is worried about surveying, ahead of time, whether a task is advantageous and hence on the off chance that it ought to be continued with. The course of task assessment is worried about surveying, from a review perspective, the exhibition of a venture after it has been carried out and finished. Such a course of strategy evaluation possesses a focal spot in open arrangement and the board.

What is Project?

A task is an exceptional, transient undertaking, embraced to accomplish arranged targets, which could be characterized with regard to results, results, or advantages. A task is normally considered to be a triumph in the event that it accomplishes the targets as per its acknowledgment rules, inside a concurred timescale and spending plan.

The Project Cycle

The examination and assessment of activities, projects, and approaches are assailing with regard to the task cycle. The project cycle at ONGC Ltd. involves:

1. Project Formulation
2. Appraisal and Evaluation
3. Approval of Feasibility Report.

The Venture definition, examination, and endorsement system followed by ONGC at various places of time might change, contingent on the mandates given occasionally by the Government of India (GOI) regarding different PSUs.

Project Formulation

The most vital phase in planning an undertaking is to characterize the expansive results that are supposed to be finished when the venture closes. These results ought to be optimistic yet additionally reasonable. It would be ideal for them to likewise be clear and succinct. The report ought to incorporate an unmistakable portrayal of how the task will be carried out, including the board game plans, expenses, procedure, and required inputs. The undertaking ought to make arrangements for yearly work designs that characterize the exercises that will take on a yearly premise to propel the accomplishment of the general results.

Factors affecting Project Formulation

Selection of appropriate technology: The primary issue looked by ONGC is the determination of proper innovation for a particular undertaking. Current innovation created i.e., in exceptionally industrialized nations may not be reasonable for reception in emerging nations like India as the circumstances predominant vary from one country to another.

Influence of External Economies: The second problem relates to the absence or non-availability of external economies. The project has to depend on other industries for the supply of raw materials, power, tools, spare

parts, etc., or on ancillary enterprises which can provide technical, finance social, and managerial service from the network work of communication.

Resource mobilization: The third problem is resource mobilization. In the context of present-day development of the magnitude and size of the project, it is important to provide the entire development capita that a project may need.

Knowledge about Government Regulations: Besides these problems the company has to comprehend several Government directives, import, and export policies, price controls, etc. It also has information regarding the present status of capacities and possibilities of future development in various industrial fields like metallurgical industries, electronics equipment industries, transportation industries, and the like.

Project Appraisal at ONGC

The designations of abilities to Navratnas are dependent upon the accompanying circumstances and rules:
"Every one of the recommendations, where they relate to Capital use, speculation, or different issues including significant monetary or administrative responsibilities or where they affect the design and working of the PSE ought to be

i. Prepared by or with the help of experts and specialists.
ii. Should be evaluated, in reasonable cases, by Monetary Foundations or presumed proficient associations with aptitude in the areas.
iii. The monetary examination ought to likewise ideally be upheld by the inclusion of the assessing establishments through advances and value interest.

Beta (Market Risk factor – Introduction)

CAPM Beta is a proportion of the unpredictability, or efficient gamble, of a security or a portfolio in contrast with the market in general.
It helps in assessing the dependence of the security concerning the changes in the market.

Understanding Beta

1. Betas are typically used to compare the return-to-risk ratios of stocks and mutual funds because the stock market and stock-based mutual funds have a wider range of volatility than other asset classes.
2. If a particular stock has greater volatility due to systematic risk than the market as a whole, it would be prudent for an investor to demand a higher return from that stock than the market return, which is the return of the market as a whole, such as the stock market, or a subclass of a market, such as the NASDAQ or the S&P 500 stock index.

Inference of Beta

If Beta = 1:
In the event that the Beta of the stock is one, it has a similar degree of hazard as the financial exchange. Subsequently, if the securities exchange (BSE, NSE, and so forth) ascends by 1%, the stock cost will likewise climb by 1%. Assuming the securities exchange drops somewhere near 1%, the stock cost will likewise drop somewhere near 1%.

Essentially, every stock is exposed to two types of risks: -

Non-Systematic Risks incorporate dangers that are well defined for an organization or industry. This sort of chance can be wiped out through enhancement across areas and organizations. The impact of expansion is that the diversifiable dangers of different values can balance one another.

Systematic Risks are those dangers that influence the general financial exchanges. Deliberate dangers can't be relieved through enhancement however can be surely known by means of a significant gamble measure called **"BETA"**.

If Beta > 1 :
In the event that the Beta of the stock is more prominent than one, it suggests a more significant level of hazard and unpredictability when contrasted with the financial exchange. However, the course of the stock value change will be something similar, notwithstanding, the stock value developments will be somewhat limits. For instance, expect the Beta of the ABC stock is two, and afterward assuming that the financial exchange climbs by 1%, the stock cost of ABC will climb by two percent (better yields in the rising business sector). Notwithstanding, assuming that the securities exchange drops somewhere near 1%, the stock cost of ABC will drop somewhere near two percent (accordingly meaning higher disadvantage and chance)

If Beta >0 and Beta<1:

On the off chance that the Beta of the stock is short of what one and more prominent than nothing, it infers the stock costs will move with the general market, notwithstanding, the stock costs will stay safer and unpredictable. For instance, in the event that the beta of the stock XYZ is 0.5, it implies assuming the general market goes up or somewhere around 1%, XYZ stock cost will show an increment or reduction of just 0.5% (less unpredictable)

Key Determinants of Beta

Nature of Business: The beta incentive for a firm relies upon the sort of items and administrations offered and its relationship with the generally speaking macroeconomic climate. Note that Recurrent organizations have higher betas than non-repeating firms. Likewise, optional item firms will have higher betas than firms that sell less optional items.

Operating leverage: The more noteworthy the extent of fixed costs in the expense design of the business, the higher the beta

Financial leverage: The more obligation a firm takes on, the higher the beta will be of the value in that business. Obligation makes a decent expense, premium costs, that builds openness to showcase chances.

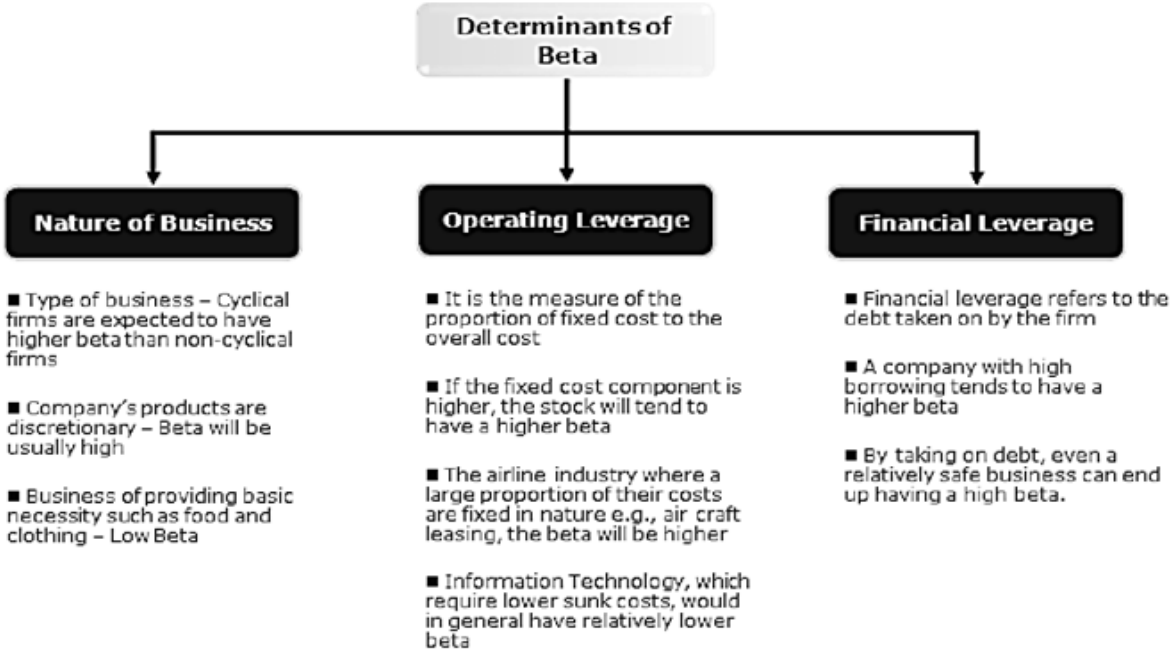

Figure 1: Determinant of Beta

Data Analysis

Beta Calculation:

Beta can be calculated by three methods,

i) Regression
ii) Slope
iii) Covariance

ONGC – BPCL (Beta Analysis)

ONGC beta with Market for 1 year (Fiscal Year)

Regression Analysis: (done on Excel)

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.261391015
R Square	0.068325263
Adjusted R Square	0.064506924
Standard Error	0.021328711
Observations	246

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.008140218	0.008140218	17.89397464	3.30624E-05
Residual	244	0.110998993	0.000454914		
Total	245	0.119139211			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.001660333	0.001362848	1.218281838	0.224293561	-0.001024115	0.004344781	-0.001024115	0.004344781
X Variable 1	0.575206031	0.13597843	4.230127024	3.30624E-05	0.307364695	0.843047367	0.307364695	0.843047367

Using Data Analysis tool and selecting regression there and putting the (y) range w.r.t (x) range.

2) Slope: (done on Excel)

Using Formula- = slope (y range, x range)

Slope: 0.575206031

3) Covariance: (done on Excel)

Using Formula- =covariance.p (y range, x range)/variance.p(x range)

Covariance: 0.575206031

BPCL beta with Market for 1 year (Fiscal Year)

Regression Analysis: (done on Excel)

Using Data Analysis tool and selecting regression there and putting the (y) range w.r.t (x) range.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.54643261
R Square	0.298588597
Adjusted R Square	0.29571396
Standard Error	0.013581954
Observations	246

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0.01916085	0.01916085	103.8700217	1.49587E-20
Residual	244	0.045010555	0.000184469		
Total	245	0.064171405			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	-0.000972415	0.000867851	-1.120486644	0.263608078	-0.002681851	0.00073702	-0.002681851	0.00073702
X Variable 1	0.882496104	0.086589989	10.19166432	1.49587E-20	0.711936859	1.053055349	0.711936859	1.053055349

Slope: (done on Excel)

Using Formula- =slope (y range, x range)

Slope: 0.882496104

Covariance: (done on Excel)

Using Formula- =covariance.p (y range, x range)/variance.p(x range)

Covariance: 0.882496104

Findings

Beta of the **ONGC Ltd.** is **0.575206031 & BPCL Ltd** is **0.882496104**

The Risk associated with both the organization is low and less unstable with the market and both are steady, Yet the venture embraced by the BPCL Ltd will be steadier with less Gamble while ONGC Ltd. will be giving less Return with less Risk

Conclusion

The merger with ONGC will lead to a timely control of the situation. The mutual pool of resources and assets of both the companies will definitely result in an oil superpower within and country and around the world.

Thus, from this beta investigation we can comprehend that it infers what is happening were,

Beta>0 and Beta<1,

From this we can say that the stock costs will move with the general market, notwithstanding, the stock costs will stay safer and unpredictable

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