

FEASIBILITY STUDIES - INSTRUMENT FOR DETERMINING THE EFFICIENCY OF AN INVESTMENT

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Abstract: A feasibility study is an analysis of how successfully a project can be completed, accounting for factors that affect it such as economic, technological, legal and scheduling factors. As the name indicated, the feasibility study is an analysis of the viability of an idea. All activities are directed towards obtaining survey response to the question "can we invest in this business idea". Feasibility studies can be used for many types of business, but especially for businesses that involve some risk. Determining the weaknesses or the impossibility of doing business for a specific location or time will save time, money and saves you trouble later. This paper presents the theoretical aspects relating to the development of feasibility studies. Practice applying a feasibility study is submitted studies for investment in the oil industry case.

Keywords: feasibility study, efficiency, investment, cash flow

Introduction and definition of feasibility study terms

As the name indicated, the feasibility study is an analysis of the viability of an idea. All activities are directed towards obtaining survey response to the question "can we invest in this business idea".

Feasibility studies can be used for many types of business, but especially for businesses that involve some risk. Determining the weaknesses or the impossibility of doing business for a specific location or time, will save time, money and saves you trouble later.

The purpose of a feasibility study is to give a first overview of the main aspects of the business that is to start. Usefulness is to identify issues that could hinder business success in the market.

The modern method used worldwide is known under the name Discount Cash Flow (DCF), and aims to accurately reflect all movements or into and out of economic-financial system, so the difference between them to put version evidence gain or loss.

A feasibility study is related to an investment opportunity as required by decisions about investment.

Assessing the feasibility of an investment project is using an indicator system in which correlation can conclude both in terms of quantifiable and on qualitative aspects.

DCF method is as essential feature version staggering time investment expenditure and revenue and the use updating.

Company overview

Oil companies are entities in which investments have a high priority. Large companies producing oil and gas oil are experiencing the longest period of reduction in investment in recent decades, while the price of oil barrel is the lowest level in 11 years. Therefore carrying out feasibility studies for each investment is a priority.

The company on which the feasibility study is the following features:

- Type activities - society services;

- Business category - special operations on wells for their stimulation.
"OPERATIONS acidizing"

One of the most used methods of chemical treatment to correct environmental damage porous productive is the acidification of the party. Matrix acidizing is defined as the operation of injecting the acid solution in the deteriorated layer at a pressure less than the fracturing pressure of the rock collector. The role of the acidic solution is to dissolve the solids invasion or precipitates deposited in the pore system of the rock (solids from the drilling mud or cement slurry, and expand existing fractures or create new ones.

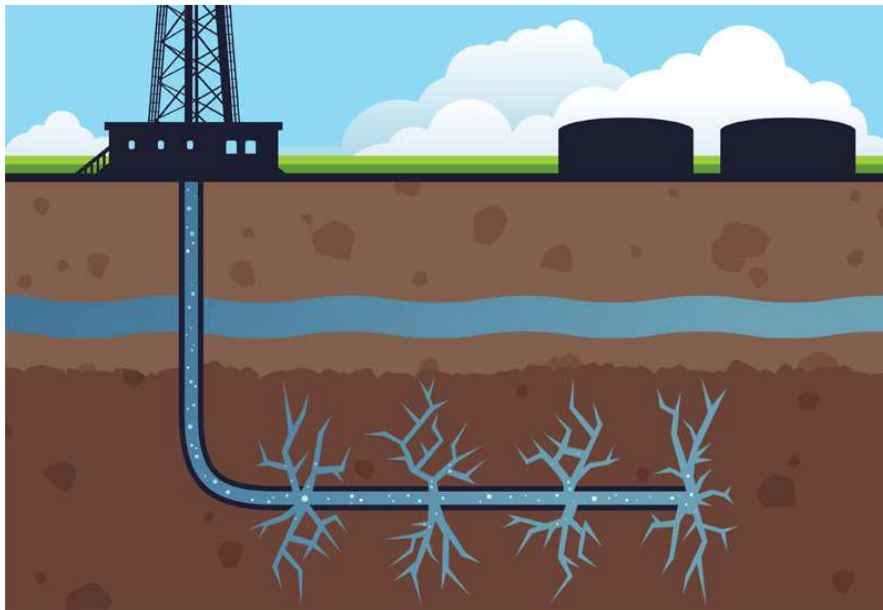


Figure 1: Reference picture shows how the fracking growing in the reservoir
Source: Macovei, N. (1996) *Drilling. Drilling equipment*, Publisher UPG Ploiești

Experts believe that the success of matrix acid treatment depends on the party's favourable response to the treatment fluid productive. The compatibility of the treating fluid with the rock and the fluids contained therein is an important factor in achieving an efficient stimulation treatment.

The sensitivity of the rock collector for an acid treatment fluid mainly includes all deleterious reactions can occur when the fluid comes into contact with it, which results in: deconsolidate the matrix, fine particles of rock and separation of their migration, the formation of precipitates.

This contamination can occur both in the permeability of the damaged layer, and the layer on the unaffected portion.

The sensitivity is determined by the chemical composition of the rock and petrographic its constitution.

Acidizing formations is practiced in the permeability of average values to high values (sandstones, carbonates containing more than 20% of the consolidated sand which cement is made up of calcium and magnesium carbonates, limestone and dolomite), by stimulating the parent rock is to improve the flow characteristics of the degraded area in the vicinity of the well wall.

An office location was in place. having an area of 7200 m², share in an office building consisting of 16 offices, and a 3 conference rooms; a hall that includes a covered garage for four auto-trucks and a forklift, warehouse for chemical, a magazine, changing rooms and a toilet; a booth for guards; a recreation park for smoking and 68 m² and parking for 14 cars.

In order to measure the number of operations that will be carried out per month or a year will consider:

- The location where it will work itself;
- Distance from headquarters to the location;
- Conducting acid stimulation program in terms of safety and security;
- Market demand for this product;
- This competition

During the month was estimated:

- least 8 transactions per month where 80% of the contracted probes at a distance greater than 300 km from headquarters;
- Maximum of 10 transactions per month if less than 20% of the contracted probes at a distance greater than 300 km from headquarters.;
- Maximum of 10 transactions per month if less than 20% of the contracted probes at a distance greater than 300 km from headquarters.

During the year it was estimated:

- least 72 operations a year where 80% of the contracted probes at a distance greater than 300 km from headquarters;
- Maximum 120 operations per year if less than 20% of the contracted probes at a distance greater than 300 km from headquarters.

Discount Cash Flow method algorithm

Investment efficiency requires consideration of an economic mechanism to reflect the peculiarities of the system to which they relate and respond to the demands of economic and financial methodologies reflecting efficiency of the system. The modern method used worldwide is known as the Discount Cash Flow (DCF), and aims to reflect the correct movements or inputs and outputs of economic-financial system, so the difference between them highlight gain or loss.

DCF method has the essential characteristic Timing of investment expenditure and revenue and the use updating.

Calculation of gross income, VB

$$VB = Q_t \cdot p_{vt} + Q_g \cdot p_{vg} + Q_{gasoline} \cdot p_{vgasoline}$$

Where:

Q_t, Q_g, Q_{gz} production of oil, gas, gasoline

p_{vt}, p_{vg}, p_{vgz} selling price for oil, gas, gasoline

Calculation of net income before tax, VN_{IT}

$$VN_{IT} = VB - Ch_{cash}$$

Where:

Ch_{cash} - cash expenses; taxes + expenses

Calculation of net taxable income, VNT

$$VN_T = VN_{IT} - DDA$$

Where:

DDA - depletion + depreciation = non-cash charges.

Non-cash expenses are expenses residual value, ie transmit the operating gradually over the years and are the two elements, depletion and amortization.

Depletion - It is a feature of the oil industry, about her appeared two concepts: the depletion rate and cost depletion. Both aim to create a financial supplies to eliminate the risk associated with discovery of new reserves. cost of finding new reserves can be calculated by applying a 15% gross income from the sale of production.

To establish the rate associated depletion is accepted that up to 50% of profit to be granted this quota.

Depreciation - It applies to the entire invested capital for the construction of wells, bottom and surface equipment, and construction-assembly.

The amounts will be distributed over a period of time wear and tear of equipment. For oil industry, the recommended method for calculating depreciation is SYD method.

Depreciation is crossing value of the investment over a period of time of the order, the production obtained with that investment. Invested capital depreciation of all, we apply for the construction of wells, plant bottom construction and assembly works.

The amounts will be distributed on a time enhanced by biological and physical wear and has moral equipment. Linear arrangement for this period cannot be determined, therefore, to determine the amortization period shall be taken into account:

- the rotational speed of capital;
- Updated by the discount rate.

Worldwide, the return on investment for 10 years is considered the linear arrangement. For equipment of the probe is 5 years, except pipelines, for which the payback time is 20 years.

In conclusion, we can say that the depletion and depreciation are self-financing sources, depletion being used for the discovery of new reserves and depreciation for equipment.

It is advisable to choose the method of calculation by which they will have a higher value, it means rapid replenishment of capital for smaller immobilization thereof, so a higher speed of rotation of capital and funding opportunities greater preferable bank loans.

Calculation of net income after tax, VN_{DT}

$$VN_{DT} = VN_{IT} - T_{ni}$$

Tax profit, T_{ni} is calculated as a percentage determined by the legislation, based on taxable income determined as the difference between revenues from the delivery of goods and services and expenditure incurred for their implementation, in a fiscal year, which lower taxable income and deductible expenses.

Calculating profit (net cash flow), NCF

$$NCF = VN_{DT} - I$$

Where:

I – investment

Update investments is to apply scale time discount factor on the profit obtained NCF . The method takes into account an essential element, namely that the investment is not only a quantitative dimension but also a temporal (timing of investments and revenue over time).

Profit calculation date (net discounted cash flow), $NCFA$

$$NCFA = NCF \cdot f_a$$

Under the conditions set above, calculate the discount factor, f_a :

$$f_a = \frac{1}{(1+i)^n}$$

Where:

f_a – discount factor

i – discount rate

Profit calculation at the end of the discount (net present value) NPV

$$NPV = \sum NCFA = NCFA_1 + NCFA_2 + \dots + NCFA_n$$

Efficiency investment. Case study – Oil Company

A specialized software is easy to use and Discount Cash Flow Analysis Calculator. This software allows the calculation speedy internal rate of return for a series of data.

The program is available on the Internet and allows use online and download format, a limited number of calculations.

After downloading to the computer it can be used for calculating the discounted profits $\Sigma NCFA = NPV$ and internal rate of return for different range of values, starting from an initial investment.

The program features a user-friendly interface and analysed.

As a result, the program provides assessment calculations as a complete yet simple to interpret.

The program supports changes to introduce fees and expenses specific to the activity for which the algorithm Discount Cash Flow method.

Company establishment and commencement of operations= total of 765750 euro for.

- Total monthly expenses with employees is 22,550 euros and the total annual expenditure on employees is 270 600 euro.

- Total monthly expenditure on fuel necessary machinery is 5850 euros and the total annual amount reaches 71,000 euros.

- total monthly expenses of raw materials is 22 380 euro and 268 560 euro monthly expenses reach

- $i = 20 \%$

- $T_{ni} = 16\%$

- Cash on balance reported = 14000 EURO

At the end of the time period considered, 10 years, it appears that, under the circumstances, obtain an updated amount of the net positive NPV = 890000 euro. This shows that the investment project is feasible in terms of this indicator, all future cash flows covering initial expense.

Analytical conclusions and observations

The company line management analysed and improved increased effectiveness. This can be achieved by establishing precise objectives and ensuring that processes and management structures in support of these objectives, while having them embedded in the concept of change.

The best way of managing financial performance implies focusing on the summary of relevant information and then analyses in detail the areas that require attention.

To choose the purchase was necessary to take into account a series of factors such as:

- Investment Fund Available;
- The Practice Of Equipment;
- Limit certain resources.

Getting the intended effects of correct knowledge is conditioned by all economic variables involved in determining the future of many factors conjuncture of economic, financial, social, political, cultural influencing investment.

Any investment is characterized by the fact that is an expense immediately, while the effects will appear in perspective.

Technical performance of the project lies in the world, providing better conditions for capitalizing on investment. Products will give thanks to modern production technology, good quality.

In the competitive market economy conditions, the company's business must be conducted profitably. In making investment decision, opting for that project which provides a maximum rate

of return. Investment efficiency is influenced by the difference between the profit rate and the interest rate.

From this point of view, the assessment of economic efficiency of the project is done by comparing the profitability of the project with the opportunity cost of capital.

Understand what the appropriate cost of capital is by considering the functions they perform:

- break even you have to overcome it allocated for capital investment
- Minimum rate of return on invested capital.

The investment value of EUR 765750 will be recovered in a short time, with the profits of operations.

Addition to managing absolute figures and elements, as much attention should be paid to relations between them to optimize performance of resource use.

The company has the opportunity broadened by other operations in the oil production commissioning and maintenance deposits.

In the main feasibility studies it is necessary to highlight the sensitivity Investment In the main feasibility studies it is necessary to highlight the sensitivity Investment this project What may change during operation target interventions. Data input in decision making, not listed with full knowledge known risk is an issue.

BIBLIOGRAPHY

1. Albu, M., *Technical and Economic Contributions in the Field Of Monitoring and Reducing the Impact of the Oil and Gas Industry on the Environmental Factors*, Advanced Engineering Forum Vol 13, 2015, Chapter 3, pp 233-240 © Trans Tech Publications, Switzerland, <http://www.scientific.net/AEF.13> ISSN: 2234-991X
2. Albu, M., *Integrarea componentei de mediu în strategia companiilor petroliere*, Editura Universității din Ploiești, 2013
3. Albu, M, Oțelea, M., *Illustrative Example of Applying the Feasibility Research in Underlying a Typical Investment in the Petroleum Industry*, Buletinul științific al Universității Petrol-Gaze din Ploiești, nr.1/2008, Seria Științe Economice, Volumul LX, pag. 79-84, ISSN 1224-6832 <http://www.upg-bulletin-se.ro/archive-1-2008.html>
4. Bișa, C. (coord.), *Elaborarea studiilor de fezabilitate si a planurilor de afaceri*, BMT Publishing House, Bucuresti, 2005
5. Kerzner, H., *Management de proiect*. Vol. I - Abordare sistemică a planificării, programării și controlului activității de proiect. Editura Codecs, 2010
6. Macovei, N., *Drilling. Drilling equipment*, Publisher UPG Ploiești, 1996
7. Păunescu, L., Albu, M., *Modeling and processing of experimental data stored in the decision making oil deposit exploitation*, The International Conference „Education and creativity for a knowledge society”, Universitatea Titu Maiorescu București, 29-30 oct 2010, Ed. A IV-a, p. 31-39, ISBN 978-606-8002-47-7
8. Russu, C., Albu, M., *Diagnosticul și strategia firmei*, Editura Tribuna Economică, București, 2005
9. Vasilescu, I., *Managementul proiectelor*, Ed. Eficon Press, București, 2005