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Managing an Exploration Portfolio in a Global Business: from Theory to Practice

The competition for attractive upstream investment opportunities has increased during the last few years. The three main reasons for this are: 1) more companies have entered the international playing field, 2) all players are generally cash-rich as a result of the recent high oil and gas prices, and 3) the number of new investment opportunities has been limited. With this change in landscape, the importance of portfolio management as a potential competitive differentiator has increased.

Portfolio management should ensure the financial and human resources of a company are directed to the most attractive investment opportunities. This role consists of two parts. The first is tactical, and includes maximizing returns given an existing collection of investment opportunities and boundary conditions. The second one is strategic, and involves setting the direction for portfolio change through the creation of an aspired portfolio.

This paper explains these roles in more detail and describes the fundamentals that are necessary to unleash the full potential of portfolio management. Examples from Shell Global Exploration are used to provide guidance how some of the portfolio management theories can become everyday practice.

The roles of Portfolio Management

Portfolio management is traditionally seen as the process for arriving at a business plan that maximizes return whilst minimizing risk within a given set of boundary conditions. In so doing so, performance targets are set and performance metrics defined. A related common role is describing the business plan in terms of robustness by providing ranges of possible outcomes around the headline numbers. These tactical tasks are indeed essential, but portfolio management has much more to offer.

A key strategic responsibility of portfolio management includes painting the picture of how the portfolio should look like, instead of just maximizing an existing one. Painting the aspired portfolio is accomplished by testing the outcome of strategic options under different, but possible future states of the external environment. This scenario modeling allows management to see where the current portfolio is under-performing and/or where the company could be exposed in case external circumstances change.

Describing the gap between the current and the aspired portfolio determines the types of investment opportunities that need to be added or removed from the existing one. This should be followed by concrete actions to adjust the existing portfolio to one that performs best under the chosen strategy, and under a variety of external scenarios.

To have an even greater business impact, it is imperative that portfolio optimization is not done on the traditional, annual business cycle, but that it is a continuous process. For example, new drilling results or geo-political changes give additional insights that should lead to the dynamic adjustment of the portfolio.

What does successful portfolio management require?

In order for portfolio management to fulfill the above roles, and for it to become a potential competitive differentiator, certain basic requirements need to be put in place.

1. Pro-active performance analysis

Detailed historic performance analysis is far more than a book keeping exercise. It is about testing hypotheses on the causes for under- (or over-) performance. It involves putting historic performance into context and diving deeply into potential root causes. Key here is differentiating between good 'results' and good 'decisions'. For example, the decision to farm-out a well might be considered a failure if the well subsequently comes in as a discovery, but if the risks and rewards were correctly assessed upfront (i.e. recognizing this chance of success), the actual farm-down decision might still have been right. Portfolio management is about recognizing good decisions, not rewarding serendipitous results.

2. Integrated database

To enable pro-active performance analysis, a system is required that allows the roll-up of historic performance data and that provides an instantaneous assessment of the portfolio health at any moment in time. This information should be available not only for the whole globe but also according to numerous different segments and themes. Having one, fully interlinked system for the whole organization is a must; otherwise databases will be incompatible, user specific and thus easily outdated.

3. A systematic and consistent approach to opportunity evaluation

Although not directly in the realm of portfolio management, there is a fundamental need for a consistent analysis and characterization of the investment opportunities at all levels of maturity within a portfolio, in particular with regards to their risk, volume and value. Applying any portfolio management technique without ensuring internal consistency upfront is a waste of time and money.

4. Portfolio management team: organizational position and skills

The portfolio management team needs to be fully linked into the company's strategy formulation, commercial activities, technology development and downstream value-chain to allow a constructive two-way information flow. The portfolio management team needs to have a non-emotional approach and only provide factual arguments that allow senior management to make the tactical and strategic decisions.

Portfolio management enabled improved performance for Shell Global Exploration

Shell Global Exploration experienced a series of disappointing exploration results worldwide in the late nineties. Portfolio management facilitated an in-depth analysis of the root causes, and as a consequence Shell managed to improve its exploration performance noticeable. Since 2000, Shell Exploration discovered some 40 % more scope for recovery than during the previous 4 years, and had a unit finding cost that is about 45 % lower. Portfolio management helped in highlighting the need for changes in the following three areas:

- ***Organizational change***
Shell decided in 2000 to move away from optimizing its exploration portfolios at a local level, to doing so at a global level. This change allowed a better allocation of the scarce financial and human resources to the most attractive investment opportunities. This drive was further strengthened by the implementation of a new operating model for the whole Shell Exploration and Production business in 2002 with unambiguous single point accountability for performance, portfolio and resources.
- ***Strategy shift***
The in-depth portfolio analysis done in 2000 indicated the need for shifting the strategy into one that focused more on material volume exploration and portfolio rejuvenation. As part of the analysis, an aspired exploration portfolio was drawn up and based on this, screening criteria for new opportunities were set. The shift in exploration strategy is clearly getting traction as demonstrated by the yearly increase in the number of wells drilled that target material volume prospects.
- ***Increased Focus***
By specifying the areas that fit the global portfolio and those that don't, the number of commercial deals could be stepped-up radically. As a result, Shell has significantly reduced the number of countries in which it is active. Shell can now better leverage its human and capital resources.

Ongoing improvements in Shell Exploration Portfolio Management

A virtual team with a lean base at head office and linked to small teams in the five operating regions manages the global exploration portfolio. This virtual community performs both the tactical task of dynamically optimizing the activity program, and the strategic role of setting the direction for portfolio change through scenario testing and forward modeling.

Currently ongoing is the implementation of a Global Exploration Management System (GEMS). This system has been developed in-house by combining the individual strengths of the tools that were previously used in the various local operating units. It is the database for all prospect and license block related information and offers functionality that is useful at a local, regional and global level.

Examples of practicalities that were overcome

The following describes two issues commonly encountered when implementing portfolio management theory, together with the approaches and solutions developed within Shell Global Exploration.

1. Managing the effects of “over-promising” and “under-delivery”

Simply summing the contributions of individual projects is generally not a good basis for planning the delivery of the total organization. Whereas each project on its own may seem a fair 50/50 reflection, the aggregate plan does not cater for unforeseen delays due to non-forthcoming government approvals, drilling “train-wrecks”, etc. In addition, when the allocation of funding to projects is dependent on its economic merits, there is a tendency for project owners to (subconsciously) inflate their projects through favorable estimates of uncertainties.

Shell solutions:

In an effort to reduce over-promise, the actual business performance is linked via scorecards to the promises made at the time of project funding. Secondly, through the sharing of look-back studies that highlight over-promises, their root causes and consequences, the awareness is raised. Discussions are held that aim to shift the culture, particularly addressing the tendency for project owners to show protective behavior.

Finally, consistency in interpretation and evaluation is ensured within Shell Global Exploration through a 5-step review process for all exploration projects. This is further supported by standardized work-processes, risking templates and volumetric & economic tools. The intent is that the process not only ensures consistency but also enables creativity, swifter decision-making and optimal use of valuable staff time.

2. Balancing the role of science and experience-based judgment

Portfolio management in the oil and gas industry continues to struggle with implementing mathematically advanced techniques, mainly because these formulas are often considered too much of a “black box”, and don’t allow senior decision-makers to cross-check outcomes with their gut-feel. This attitude in turn results in limited budgets and under investment in these advanced techniques.

Shell solutions:

Decision trees, together with Monte Carlo analysis are the backbone for decision-making within Shell Global Exploration. Assessments of how the more advanced portfolio management techniques can contribute to an enhanced business performance are, however, continuously ongoing. Valuations based on the real option theory are not done regularly, but the underlying thinking has nevertheless shifted attitudes from one focused on risk elimination to one concentrating on the creation of options. In the past, Shell used to make significant investments to eliminate as many uncertainties as possible before starting activities, now more attention is given to creating flexibility and exit clauses that maximize value.