Opportunity Valuation and Investment Decisions - A Tale of Narratives and Numbers*

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Abstract

How often have we heard the phrases “he is a number cruncher”, “there is nothing he could not sell”, conceded these stereotypes sound like profiling, but they are also rooted in two fundamentally different ways people are educated, often starting as early as grade school and leading to the STEM vs Liberal Arts higher education system. The fact is that we all have a preference when analyzing, presenting or making decisions based on data and information, investors and executives are no exception. The oil and gas upstream business is characterized by large uncertainties both in terms of variety and magnitude, leading to high investments risks and often elusive upsides, making sound investment decisions is a balancing act between narratives, a good storyline, and numbers, a sound valuation and pricing. Obviously complicating matters are biases both from individuals providing narrative, who does not want an optimistic and slightly biased explorer, as well as data where sampling biases are often a matter of facts. This article will explore these issues with recent real-world examples, as well as suggest solutions on how to best integrate narratives and numbers, enabling executives and investors to beat the odds through better investment decisions.
Investment Decisions
A tale of narratives and numbers

AAPG ACE 2019 San Antonio, TX
An industry riddled with uncertainties

- We fail more often than we succeed
- We are not very good at predicting
- It is a commodity business driven by supply and demand
Our formative years

Creativity

12 - 19 Age

Science

Science

Arts

Arts

Poets

Quants

Geologists

Geophysicists

Engineers

Finance
The Investment Triptych

The exploration team makes an investment proposals, based on a valuation

The executive makes a decisions regarding the proposal

The investors finances the investment
Resource Assessment and Opportunity Valuation

Accumulation(s) chance of success and associated PIIP resource distributions

Probabilistic Resource Addition

Prospect(s) chance of success and associated PIIP resource distributions

Field Development Planning

Prospect(s) recoverable resources distributions

Prospect(s) economic chance of success and associated recoverable resources distributions

Minimum Economic Fields Size

Prospect(s) economic chance of success and associated recoverable resources distributions

EMV

NPV, IRR

Geologist/Geophysicist

Development Engineer/Economist

Decision Maker/Investor

Judgment under Uncertainty

Biases
- Availability
- Optimism
- Representativeness
- Confirmation
- Conformity
- Authority

Outside View
- Narratives
- Numbers

People
- Independent judgment
  - Assurance Reviews
  - Wisdom of the Crowd
  - Prediction Markets

Base Rates
- Bayesian Statistics
- Machine Learning

Hubris & Ego
Multiple prospects in shallow water offshore Gabon, with stacked pay in a rift basin setting, equivalent to the onshore Rabi Kounga field. The objective reservoirs are pre-salt Early Cretaceous sandstone deposits.

The Gamba is an excellent quality reservoir rock deposited regionally in a single sheet across the license area. The Gamba seal is provided by overlying salt.

The Dentale is very good quality reservoir rock deposited as a series of stacked channels with intraformational shales forming seals. Structures are syn-rift anticlines caused by the opening of the Atlantic.

How about the Gamba and Dentale dependencies?
About the Narratives

- The appeal of a story is measured by how well it is told, not necessarily how good it is.
- A story draws on emotions and biases, which can be manipulated.
- Fear, uncertainty, and doubt ... a bit extreme no?
- Numbers become an afterthought sometimes downplayed or even ridiculed.
- A picture is worth a thousand words, an interactive “picture” is even better.
And then came the Numbers (the really short version)

<table>
<thead>
<tr>
<th>Before Commercial cut-off</th>
<th>MEFS (MMbbl)</th>
<th>POS</th>
<th>P90 (MMbbl)</th>
<th>P50 (MMbbl)</th>
<th>P10 (MMbbl)</th>
<th>Mean (MMbbl)</th>
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<th>NPV ($MM)</th>
<th>IRR (%)</th>
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<td>Base</td>
<td>55</td>
<td>370</td>
<td>46</td>
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<tr>
<td>Low</td>
<td>-8</td>
<td>121</td>
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About the Numbers

- Numbers provide a sense of comfort that due diligence was exercised
- Numbers feel precise, and the more the better
- Numbers give the impression that biases have been removed, as numbers represent “reality”
Narrative and Numbers

‣ Which one is more natural in an environment with many uncertainties?
‣ Which one is easier to remember?

‣ Importance of the Outside View for both
  ‣ Support and challenge through external reviews (formal or informal)
  ‣ Calibration through appropriate base rates
Base rates are just that ... base rates

Shell’s charge calibration in the 80’s

Commercial cut-off

Worldwide geological experience as a systematic basis for prospect appraisal
AAPG Memoir 35

NPV @10% ($MM)

Initial Reserves (MMbbl)

NPV=0
Balanced Valuations improve Investment Decisions

- Numbers and narratives are equally important and need to be fully integrated
- Think in Ink - Writing is the most appropriate and easiest way to integrate both worlds
- Role of a valuation intermediary, a master in numbers and narratives
- Analogues need to be connected to base rates
- Going interactive
  - Ability to interactively test impact of key uncertainties at the prospect level
  - Ability to interactively test investment options at the portfolio level
Impact of dependencies on valuations

After commercial Cutoff

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<td>Gamba</td>
<td>30%</td>
<td>15</td>
<td>25</td>
<td>38</td>
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<tr>
<td>Dentale</td>
<td>17%</td>
<td>3</td>
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Gamba/Dentale Independent

Gamba/Dentale Dependent
Strategic Investment Decisions

- What is your growth challenge?
- Where do we want to play?
- How are we going to win?
- What capabilities do we need?
We are not quants nor poets...

...we just have a preference
To all the people I had the opportunity to meet over the years, and the ones I have yet to meet.

Dr. Daniel Zweidler
International Oil and Gas Industry Consultant