

Annex 3 – A model for management in oil and gas

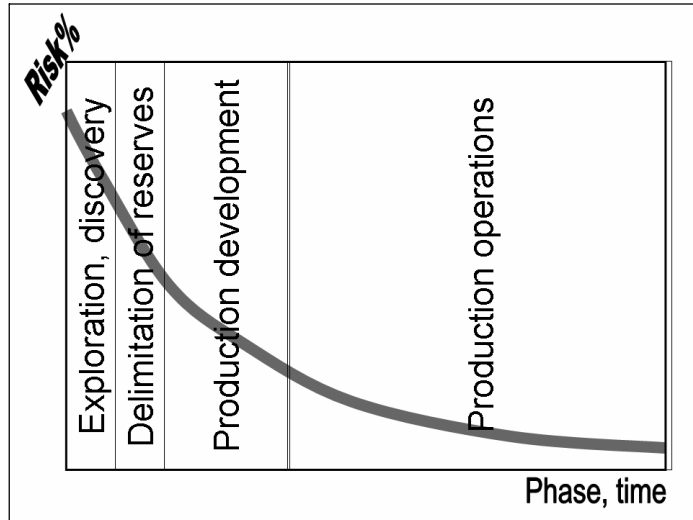
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'It is interesting to promote a reflection on the differences that characterize E&P in relation to other business areas of the oil business, getting in touch with the conceptual bases of the decision process. What is available are gigantic forces to "mathematicize" the decisions in E&P, with the claim to find universal deterministic laws that describe natural phenomena, of which we only know the current geometric form.'

Guilherme de Oliveira Estrella, Director of E&P, PETROBRAS, December 2003

This is an essay and, as the name itself proposes, deals with speculation of ideas for debates and understanding about management in productive oil and gas chains. The knowledge limitations of the author permit, by being confessed beforehand, that errors and superficialities be corrected by people who are better informed, thus allowing a continuous mechanism of knowledge improvement on the theme.

Activities in oil and gas may be considered related to the grouping of intensive assets for the following reasons:



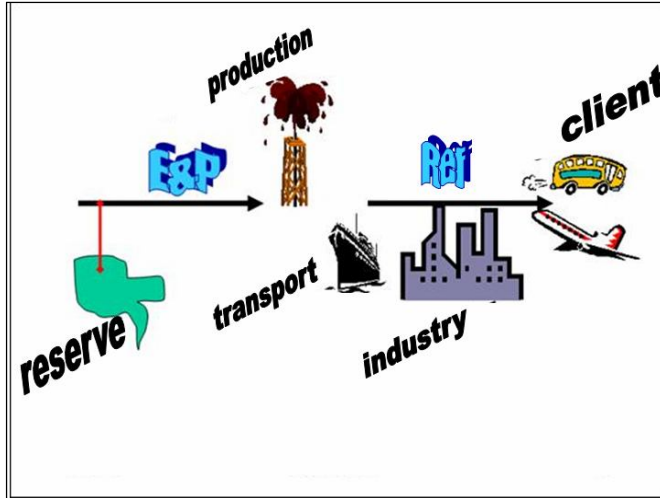
- Significant anticipated spending, in value and in time, still without income
- High importance of the incorporated assets, if compared to the total value of the business

Such factors lead to the thought that, in such activities connected to intensive assets, risk is present in a more significant way, because hits and misses may cause business defeats or

successes of greater intensity, and also, for the reason of the risk being present, the conditioned values fit into levels of greater magnitude, when compared to the values of other economic activities where risk is not a differential factor.

Risk, in this context, refers to the probability of success or failure of an event, as for example, the chance of discovery of an accumulation of hydrocarbon in the exploratory activity of oil and gas.

To represent the two main business in oil and gas, figure 1 is shown, where two distinct areas may be observed: Exploration and Production, on one side, and Transport and Refining on the other. The subsequent activities, or those coming afterwards the two previously cited, like distribution of derivatives, petrochemicals, among others, may be understood, for the scope of this work, as characteristics similar to Transport and Refining, referring to risk.

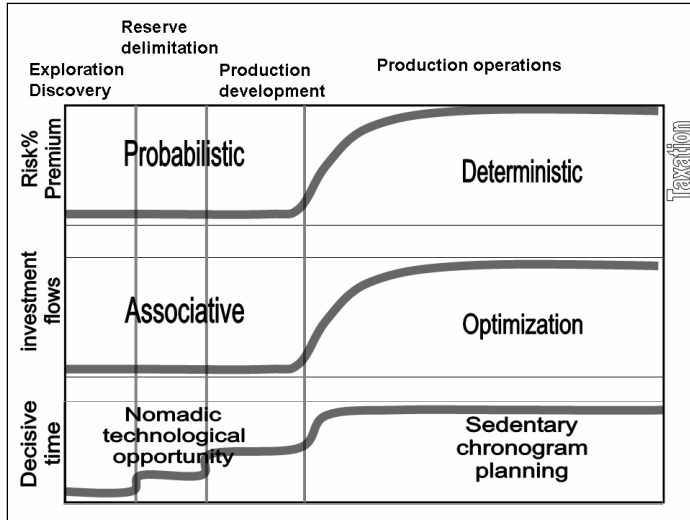


Just focusing on the first part, that is, the grouping of E&P's activities, therefore, those ones located upstream the productive process (known worldwide just as 'upstream') which have distinct characteristics from the second part, in function of their profit center, of their value generation modalities, of their added values, and also, of their required mental capability and model.

These activities are intrinsically associated to risk, to investments with

varied and significant probabilities of return. The prizes are normally relevant, but the chance of success or getting nothing is present and influential.

As such, in exploratory basins, mainly in activities in little known or less understood sedimentary basins, business entrepreneurship and daring characterize a different approach from the other subsequent stages of the oil and gas chain. Figure 2.



The concept of expected value has to do with such an environment, known as probabilistic, stochastic. Expected value may be conceptualized as the product between the sought asset and the probability of its occurrence. The more deterministic (less vulnerable to risk) are activities, like those more downstream from the oil and gas process; the greater the probability of success in the investments, tending to the value 100% or 1, that is, the

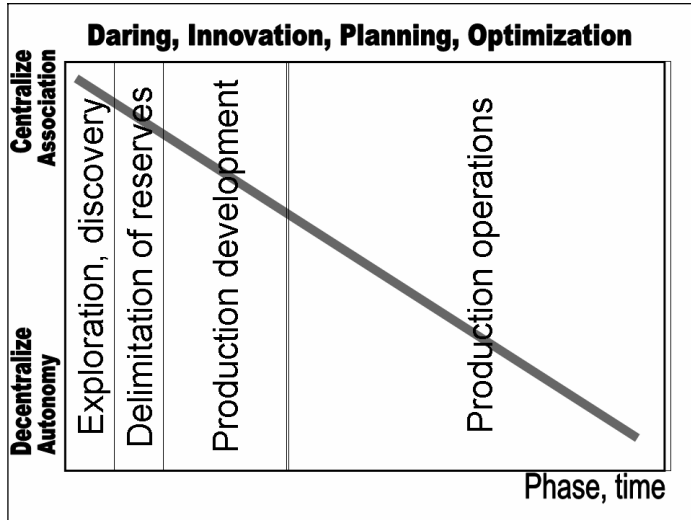
expected value gives place to a defined value. Figure 3.

In this field are found differences related to work, organization, and management. If the approach modalities between the two parts are not made distinct, or else, if they are treated linearly, such may not provide the expected best results from the system, or, additionally, it points in the direction of a reduction in the success continuity, it may lead to mistakes, for treating, in a misguided way, what is probabilistic in a deterministic way.

Following the tendency of the risk curve, the management of these activities should be dealt with as presented in figure 4, that is, in a sloping mode with relation to concentration, autonomy, and association capacity. The characteristics of the professionals of the two areas are also distinct, since the upstream group is characterized by the continuous accumulation of novelties and creativity, frequently not bound to a fixed object and physical goals, having important scientific induction. On the other hand, the second group, the downstream one, has characteristics of deepening in already existing themes, optimizing processes and systematic controls, even if they have, in their content, a significant technological participation.

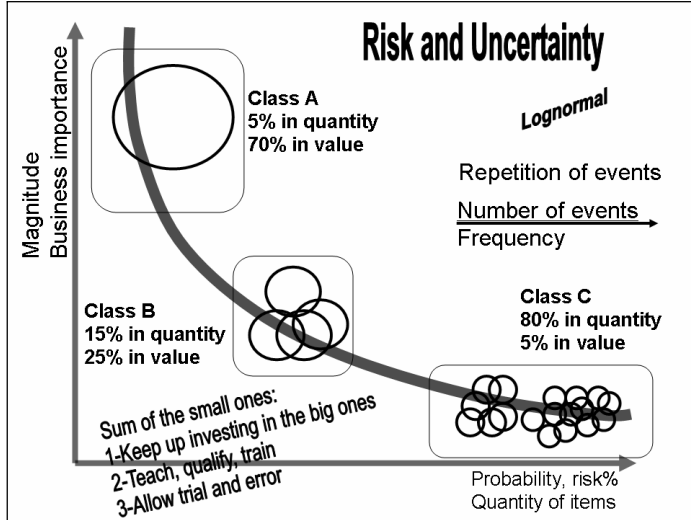
A good solution for the harmonic and productive relationship of a company with the complete oil and gas chain may be to respect the characteristics of each productive chain phase, using

differential management, making each environment adequate to produce what it was outlined to promote. Simultaneously placing projects of the upstream chain phase with projects of



another phase, using every available sophisticated model of comparison, may become a simplistic attitude which no doubt may bring losses as a consequence, even greater to a management cycle, with little chance of recovery, or only allowed in the long term.

As a complement to the above stated concept, it is convenient to mention that the result of a complete knowledge approach about the productive E&P chain requires a synergic relationship



with multiple dimensions, as shown in Figure 5, considering blocks, attractiveness, and concepts of distinct nature and difficulty, that is, on one side, significant magnitudes and high risks, and, on the other, small dimensions and low risks.

In nature, large magnitude events occur to a lesser extent, while smaller events are more frequent. Grouping small events, and comparing them with great and less frequent ones, reinforces larger results, compared to a simple algebraic sum of objective monetary values, because, in probability environments, synergy occurs and

makes a difference between surviving and succumbing. It is worth reassuring that the more

upstream phase of the oil and gas productive process, like exploration, fits into the set of natural sciences, and of mineral resource discoveries, quite different from the other phases, that have to do with the industrial realm.

Concluding, there is no superior or inferior phase in the productive E&P chain, or in the complete oil and gas chain, they simply have different natures.