Bussiness driven research in the oil industry?

Authors: Dr. Ing. Esteban Castellanos, Catholic University of Peru;
Dr. Roy Prokopuk, Canmet.

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Institution: Catholic University of Peru.

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In this paper a comparison between the Oil Industry R&D in Canada and in a latinoamerican country, Peru is developed according the general management theory.

1. Introduction.

The Research and Development expenditures, are as appears in Table 1. Canada occupies the sixth position of expenditures in relationship with the gross national product and therefore this article explores the possibility to conduct Research in the best way possible.

Generally speaking, small Companies are more productive innovators than large ones, so thatfor a large company would be better to scatter its research efforts among small groups[1].

According Wallin and Gilman, the optimum Research and Development expenses per sales for the Chemical Companies is 4,3 for small companies and 1,8 for large ones[2].

From economic studies the social rate of return from industrial innovations and R&D has been 40 percent or more, while about 10 percent of the new products and processes could not have been developed in the absence of academic research[3].

1.1 Factors for a good research.

There are many considerations for a good research, for instance good scientists quality, good management and competitive technology, but the first one is the most important. Unfortunately in Science there is not democracy and only a few persons are really scientists, therefore the interviews for hiring researchers are critical, but also good orientation, motivation, facilities and possibility to form good team works.

1.2 Project selection.

To select the technology development there are many considerations such as benefit/cost ratio, mathematical programming, innovation potential. An important consideration should be the Kondriatieff wave[4] (see fig.1) in order to planify the type of project to beginn. This theory explain that the economical behavior of the system includes 15 years recession period, 20 years of massive reinvestment, 10 years overbuilding and a 5-10 years period of economic turbulence as a prelude of the next recession.

Constraint analysis is also a good method to consider, that means a logic sequence of semiquantifiable questions, like estimation of the business, strategy for entry or growth, acquisition, joint venture, licensing, when to abandon , time vision, fitness, risks.

1.3 Economic impact and control.

In planning a project, the bussiness attractivenes is 10% sales or recovery in 5 years with 40% ROI before taxes, considering 10% growth per year. The measure of patent productivities is another indicator of a good development. The political, social and economical surprises are to be considered, as well as the geographical advantages and disadvantages, materials availability, marketing, capital, capability of the technology, management, legal, financial and other skills in order to put the greatest effort in a specific research. Taking into account that the live of a research project includes discontinuities[5], special considerations must be taken to avoid having these discontinuities as a loss of importance for the project (see fig.2).

To measure the productivity of engineers and scientists[6] in R&D on a week to week or month to month basis is not possible. A number of trials to evaluate knowledge workers has been developed. To quantify the ranking for outputs has experimented with an algorithm which includes four factors: potential annual benefit, probability of commercialization, competitive technical status and comprehensiveness of the R&D program.

In addition to the measurement of employees productivity, following keys are necessary to maintain a high level[7]: 1. Skilled, responsible management, 2. Outstanding leadership, 3. Organizational and operational simplicity, 4. Effective staffing, 5. Challenging assignments, 6. Objective planning and control.

2. Research Menagement in comparison.

The R&D Laboratory as a system for the oil Labs foccussed in this study, fits well with the model presented in Fig.3, based on the work of Brown and Svenson[8].

The Researcher is the factor number one for a good research in Canada. The selection of the person is done by advertisement in newspapers. Nowadays the Postdoctoral programs are intensified, as well as the interchange and secondments with the industry. In Peru there is a high level of researchers who change from job and the new researchers come from University talents and young students who made some practices in the state owned company.

The Phylosophy of having Government Research Laboratories comes from the oil crisis, defense strategy, the fact that in this field this kind of Labs are more productive than Universities and small companies and that the foreign companies don't invest easily in R&D. Besides that the "contract model" is a common trend in both countries, so that the research is market driven and competitive proyected.

In Peru, the R&D Managers come from operative units, mostly without academic degrees of MSc or PhD. In Canada the Managers are selected from the Researchers, because the Research Lab is not a part of the oil Industry.

Both countries don't have a technical ladder[9], so that they could be dealing with obsolescence problems. Another problem is the lack in application of project management and long term proyection.

Even when the management formation is similar in Canada and in Peru because of the opportunities for refreshment and learning, there are big differences in quality and quantity of people in Research, because whereas in Canada the Researchers have generally a PhD degree, in Peru not all have at least a Master title.

The research project comes in Canada from the Senior Research Scientists and fromn Industry needs and after that is analyzed by a Commitee from the same Lab. In Peru, the different operative units present suggestions for research. The very desirable work with different industries or even with universities is of course a problem in Peru, but also the patent production, due to obvious limitations in apparatus and education.

In the project selection for strategic, exploratory, incremental or mandated situations, the criteria of profitability, patentability, successlikilyhood and possibility of industry support are applied with different intensity, because in Peru successlikilyhood appears to be the principal law, whereas in Canada this factor is not the basis in comparison with the another three.

In relation to the socioeconomic impact and control, the government Lab in Canada tends to work in the break-even point (non profit) and in Peru, the idea of the possible future profitability would be the best option, for logical reasons. In measuring the control of R&D, Canada measures the patens, quality and quantity of writen output, fullfilment of projects, return on research indexes, measurement of innovation. In Peru the Chief influence is so big that sometimes the appreciation for these values is mixed with the emotional influences of this person and therefore very related with his background.

3. References.

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Table 1. Research and Development expenditures.

Countries.	Expenditures as % of GNP
US	2,6
UK	2,1
Germany	2,0
Japan	1,8
France	1,8
Canada	1,2
Italy	0,9

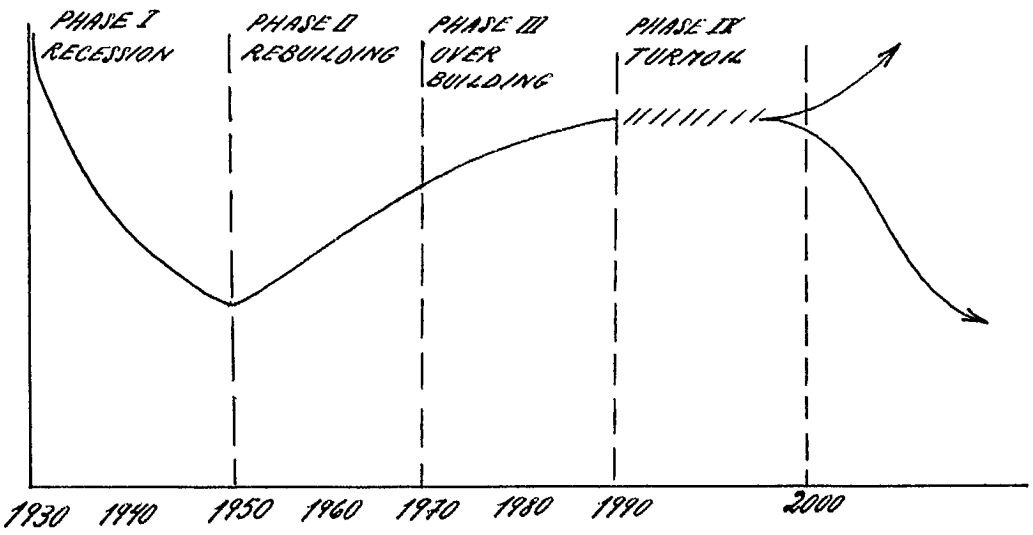

Fig. 1. Kondriatieff long wave[4].

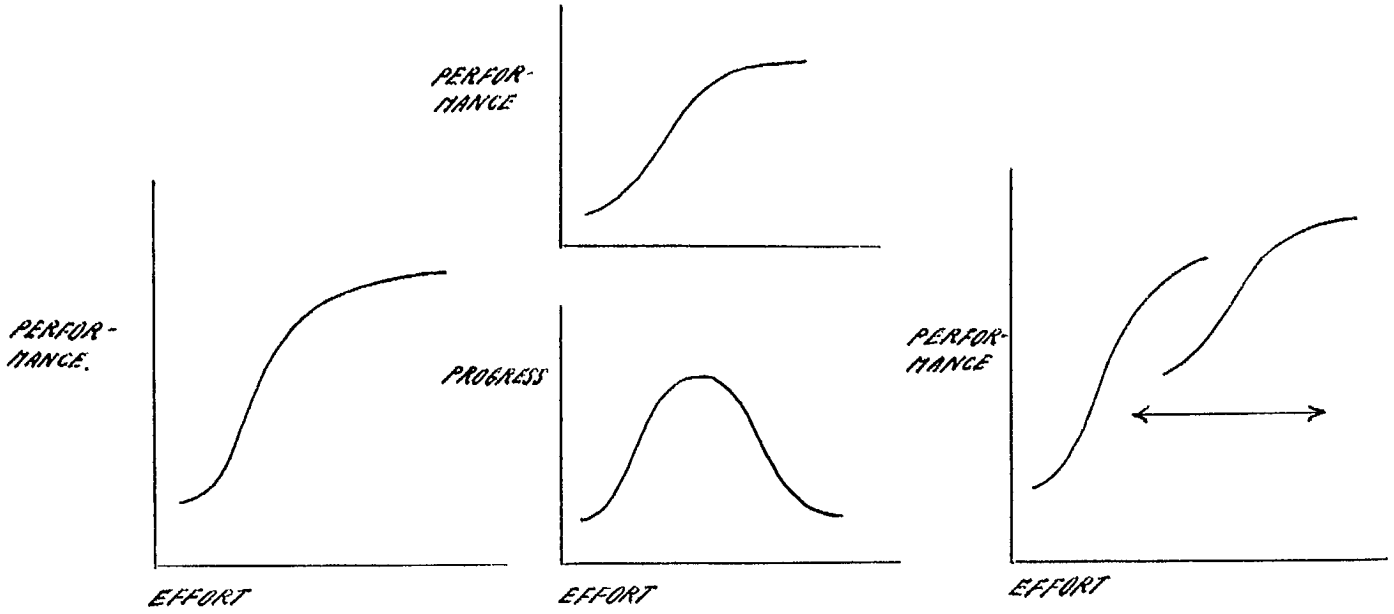

Fig.2. Live of a research project[7].

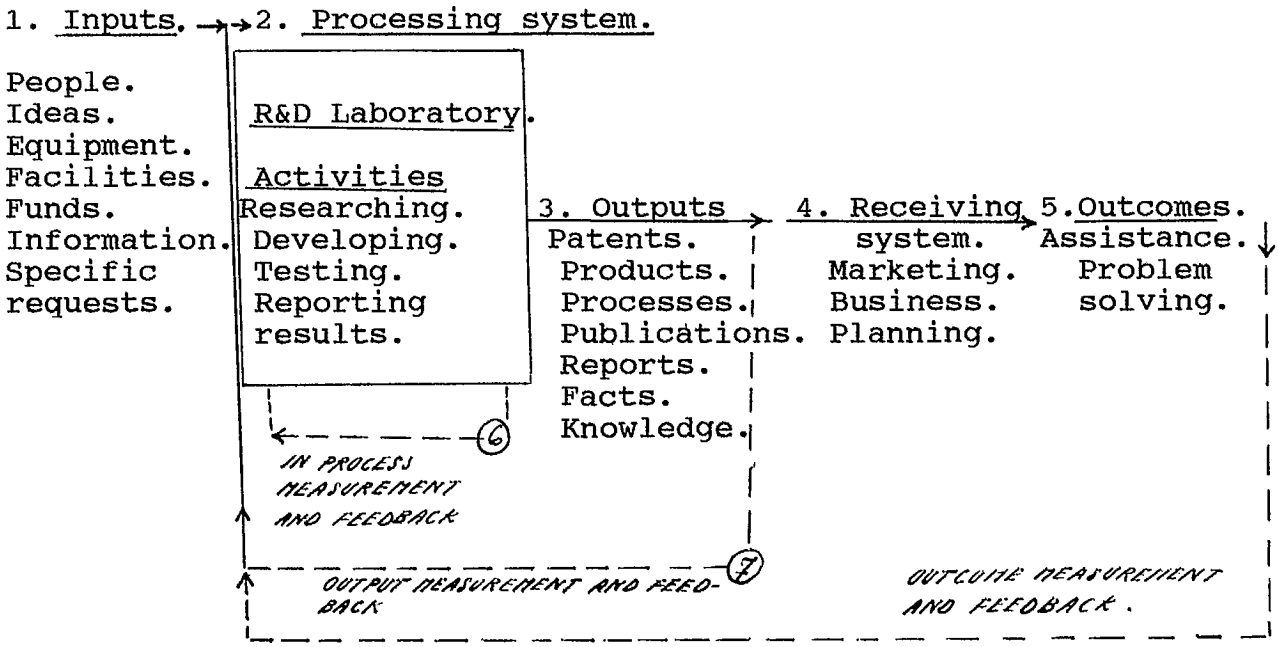

Fig.3. R&D Laboratoty as a system[8].