



A lógica da pesquisa nas empresas (*Research in industry*)



Preparatory Meeting for the World Science Forum 2013
August 29-31, 2012 - FAPESP - São Paulo

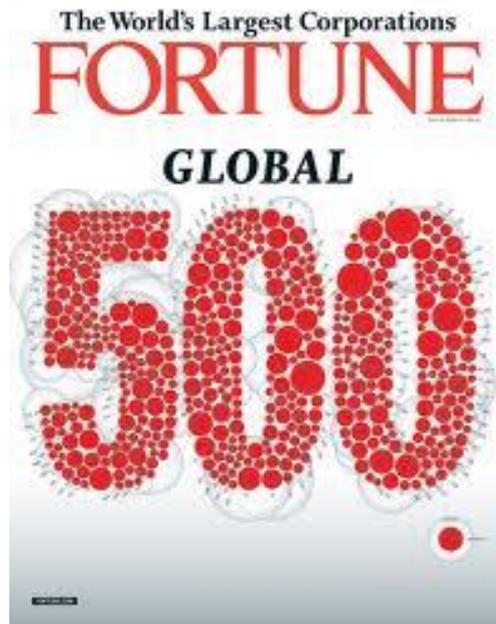
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Aug, 2012



2012 Posição	2011 Posição	Nome da Instituição
1ª	1ª	Universidade de São Paulo (USP)
3ª	3ª	Universidade Estadual de Campinas (Unicamp)
8ª	19ª	Universidade Federal do Rio de Janeiro (UFRJ)
13ª	10ª	Universidade Federal de Minas Gerais (UFMG)
14ª	14ª	Universidade Federal do Rio Grande do Sul (UFRGS)
15ª	31ª	Universidade Federal de São Paulo (Unifesp)
17ª	16ª	Universidade Estadual Paulista (Unesp)
18ª	15ª	Pontifícia Universidade Católica do Rio de Janeiro (PUC - Rio)
25ª	11ª	Universidade de Brasília (UnB)
28ª	37ª	Pontifícia Universidade Católica de São Paulo (PUC - SP)





MAIORES LUCROS DAS EMPRESAS DE CAPITAL ABERTO BRASILEIRAS

Posição	Nome	Setor	Lucro Líquido em bilhões R\$	Ano que aconteceu
1	Vale	Mineração	37,8	2011
2	Petrobras	Petróleo e Gas	35,1	2010
3	Petrobras	Petróleo e Gas	33,3	2011
4	Petrobras	Petróleo e Gas	32,9	2008
5	Vale	Mineração	30,0	2010
6	Petrobras	Petróleo e Gas	28,9	2009
7	Petrobras	Petróleo e Gas	25,9	2006
8	Petrobras	Petróleo e Gas	23,7	2005
9	Petrobras	Petróleo e Gas	21,5	2007
10	Vale	Mineração	21,2	2008
11	Vale	Mineração	20	2007
12	Petrobras	Petróleo e Gas	17,8	2004
13	Petrobras	Petróleo e Gas	17,7	2003
14	ItaúUnibanco	Bancos	14,6	2011
15	Vale	Mineração	13,4	2006
16	Brasil	Bancos	12,1	2011
17	ItaúUnibanco	Bancos	11,7	2010
18	Brasil	Bancos	11,2	2010
19	Bradesco	Bancos	11	2011
20	Vale	Mineração	10,4	2005

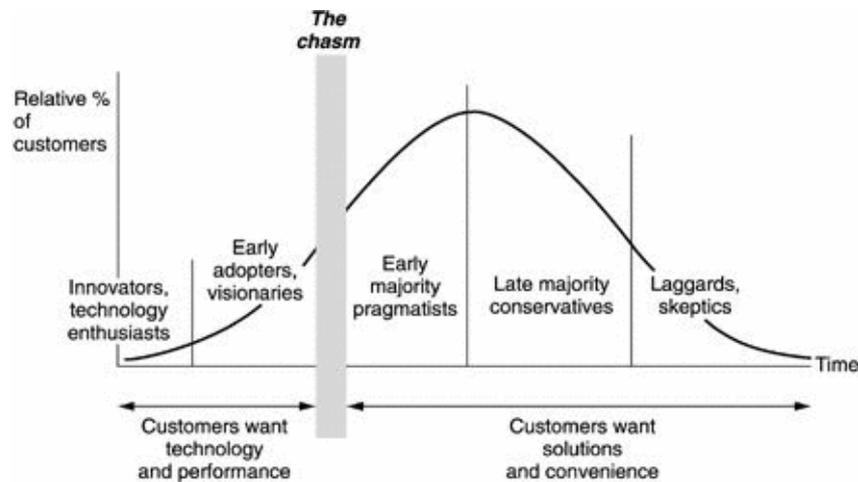
Fonte: Economatica



Why should companies innovate?

- To increase profits
- To decrease costs
- To gain markets
- To remain in business

Where does innovation begin?



Technology and Innovation at Vale

Investment in technological innovation

Limitations to conventional processes are primarily economic (low intrinsic value, high processing cost, etc) or technical (such as the presence of contaminants). Technological innovation is essential to the sustainability of mining.

Innovative technologies for copper:

Vale is studying alternative ways of developing copper resources in the Carajás region. **A demonstration plant is currently operating in the copper mine's industrial area to test a cutting-edge technology for treating copper concentrates.** This plant, which is capable of producing 10,000 tons of copper cathode per year, is testing the technical and economic feasibility of the hydrometallurgical process.



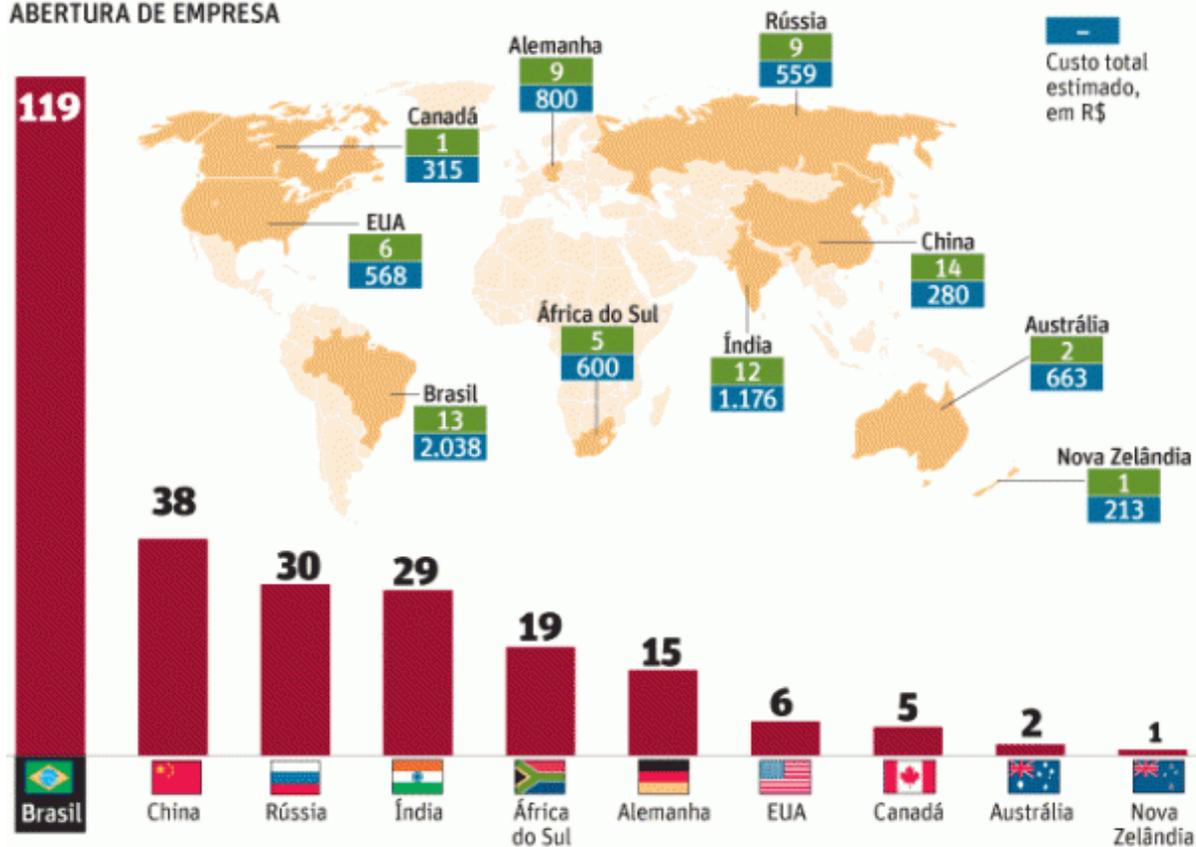
**“O Brasil está entre os países cujos sistemas de inovação não se completaram: construíram sistemas de ciência e tecnologia que não se transformaram em sistemas de inovação”
(Eduardo da Mota e Albuquerque, 1996)**



LONGA ESPERA

Brasil tem um dos maiores prazos para abertura de empresa*

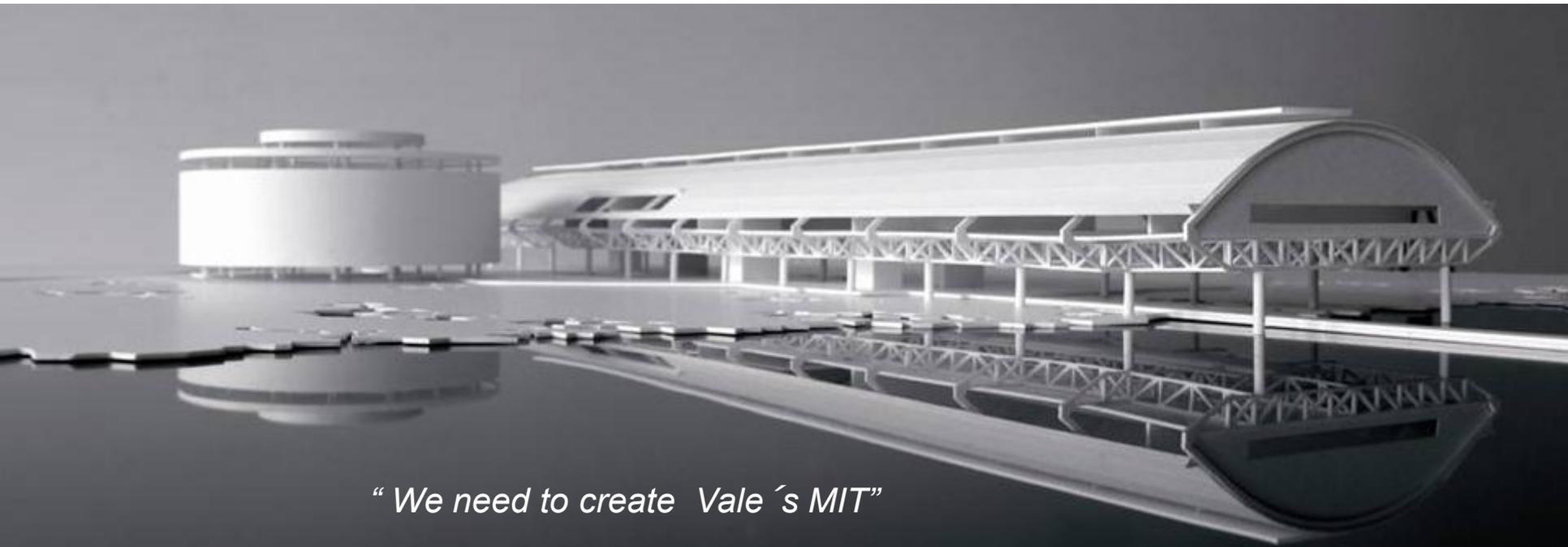
Nº DE DIAS PARA ABERTURA DE EMPRESA



*Comparação global em 2012 Fonte: Banco Mundial e Siqueira Castro Advogados

Vale Technology Institute

Aspiration



“ We need to create Vale ´s MIT”

Roger Agnelli, 2003

Architectural model
ITV Sustainable Development – Belém, Pará

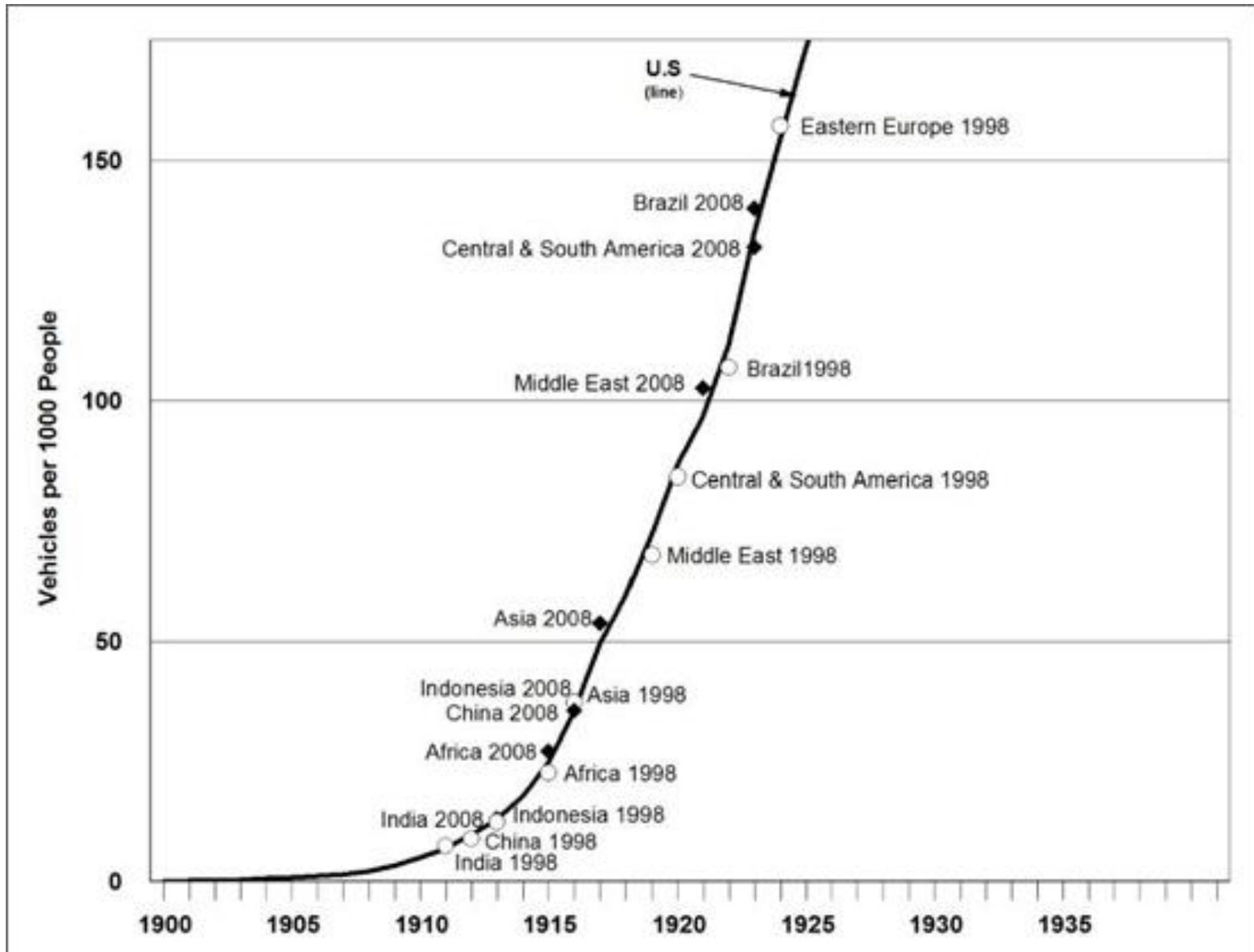
Operating Model

A collaborative network connecting not only ITV centers, but also domestic and international institutions





Frederic Lewis - 1º.jan.1930/Getty Images





1930/1970 USA x 2000/2010 Brazil

- Vehicles per 1000 people (1930)**
- Radio receiver per household (1940)**
- TV set per household (1970)**
- Life expectancy (1970)**

- GDP per capita (1930)**
- Illiteracy rate (1930)**

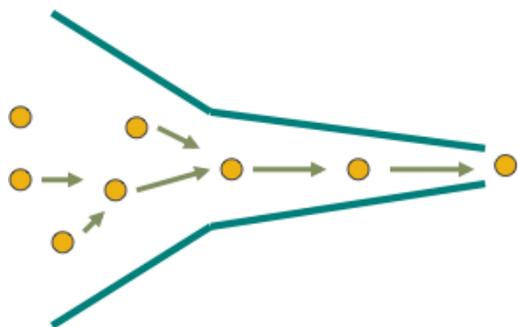
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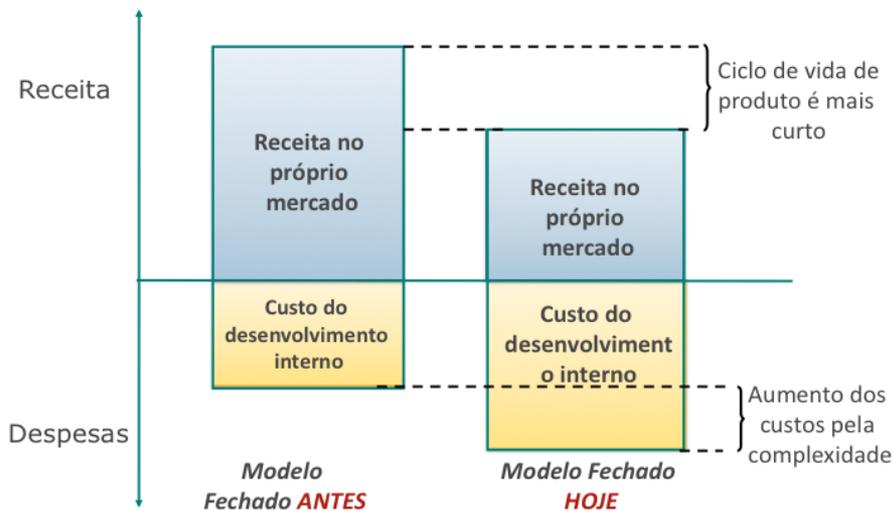
STRUCTURING CONCEPT

An open innovation concept was adopted in order to establish its current framework:

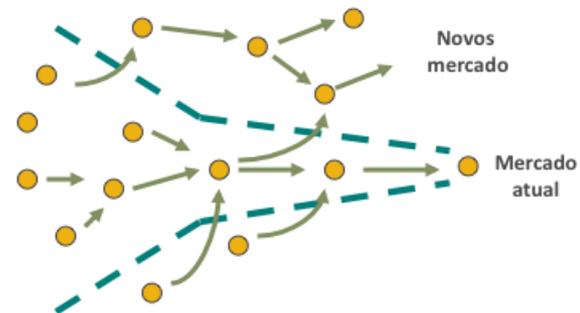
Closed Innovation



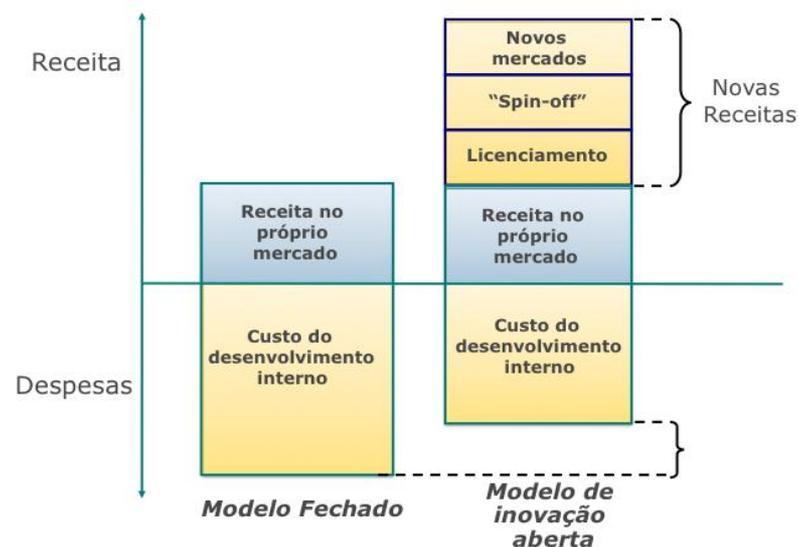
Impact of the model on P&L



Open Innovation



Impact of the model on P&L



Agreement between Vale and FAPs (Research Promotion Foundations)

Stimulate research projects in the macro-areas of Eco-efficiency and Biodiversity; Mining; Energy; and Ferrous Steelmaking Processes, with the main objective of producing high-quality science, technology and innovation in the regions involved.

R\$120 m

60 months

Start: 2009

Running costs
Capital
Scholarships
Building projects

R\$20 m

FAPESP

R\$72 m

VALE

FAPEMIG

FAPESPA
FUNDAÇÃO DE AMPARO À PESQUISA DO ESTADO DO PÁRA

R\$20 m

R\$8 m

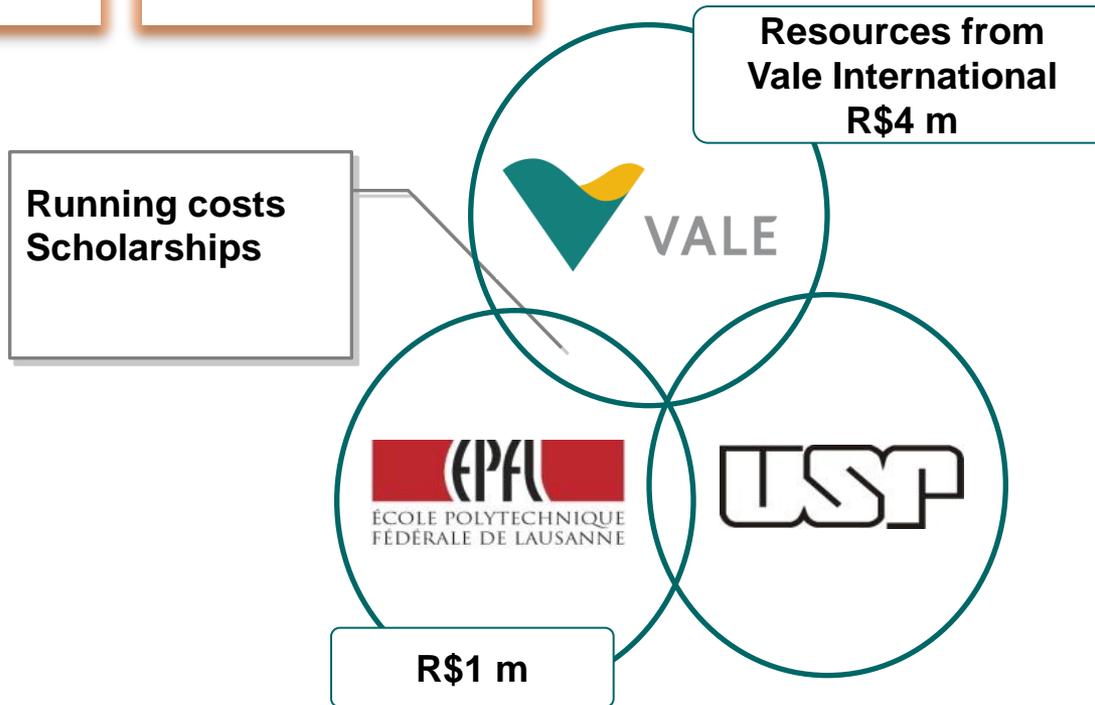
Vale Committee:
Vale technicians and specialists from different areas participate in judging, selecting and tracking research proposals.

Agreement between Vale, EPFL and USP (International)

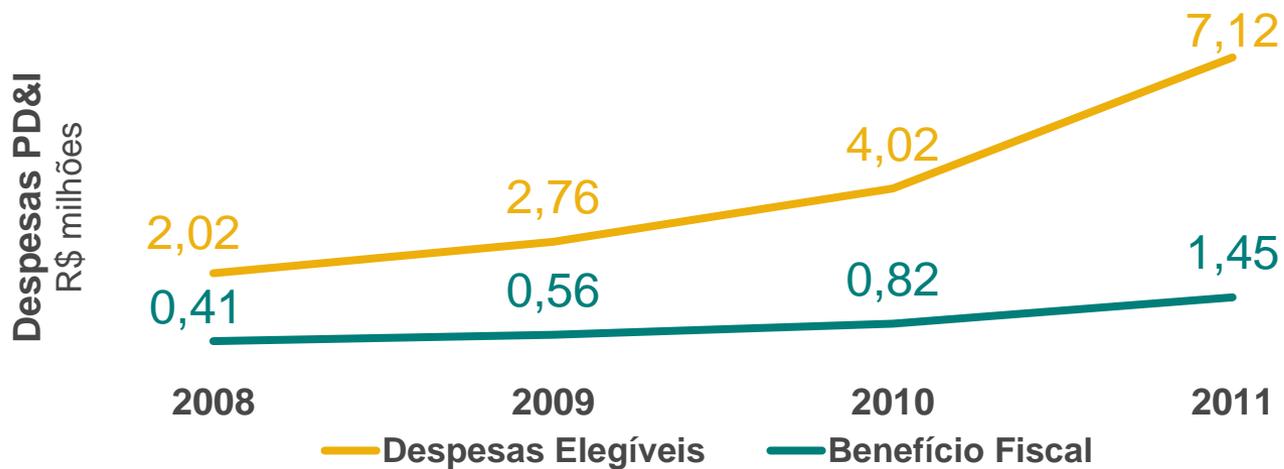
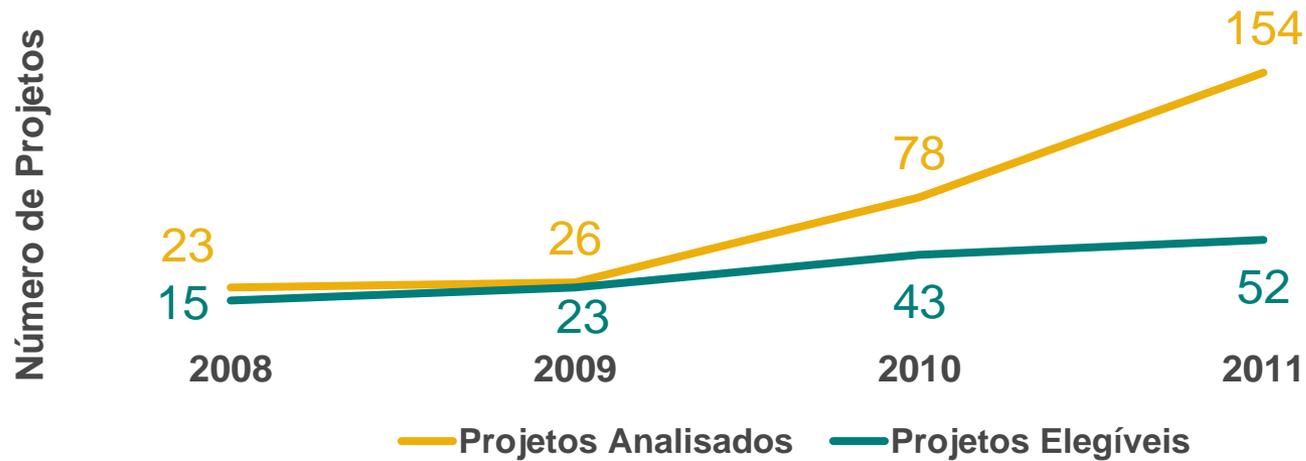
Provision of PhD scholarships at EPFL (École Polytechnique Fédérale) for USP researchers in the field of logistics to evaluate the structures of the EFVM's and EFC's bridges and tracks.

48 months

Start: 2010



VALE – Captura de Incentivos (Lei do Bem – 11.196/05)



Onde estamos presentes

Com sede no Brasil, a Vale emprega diretamente mais de 134 mil pessoas em todo o mundo e outras 50 mil em projetos.



* Informação válida em dezembro/2011

Cenário

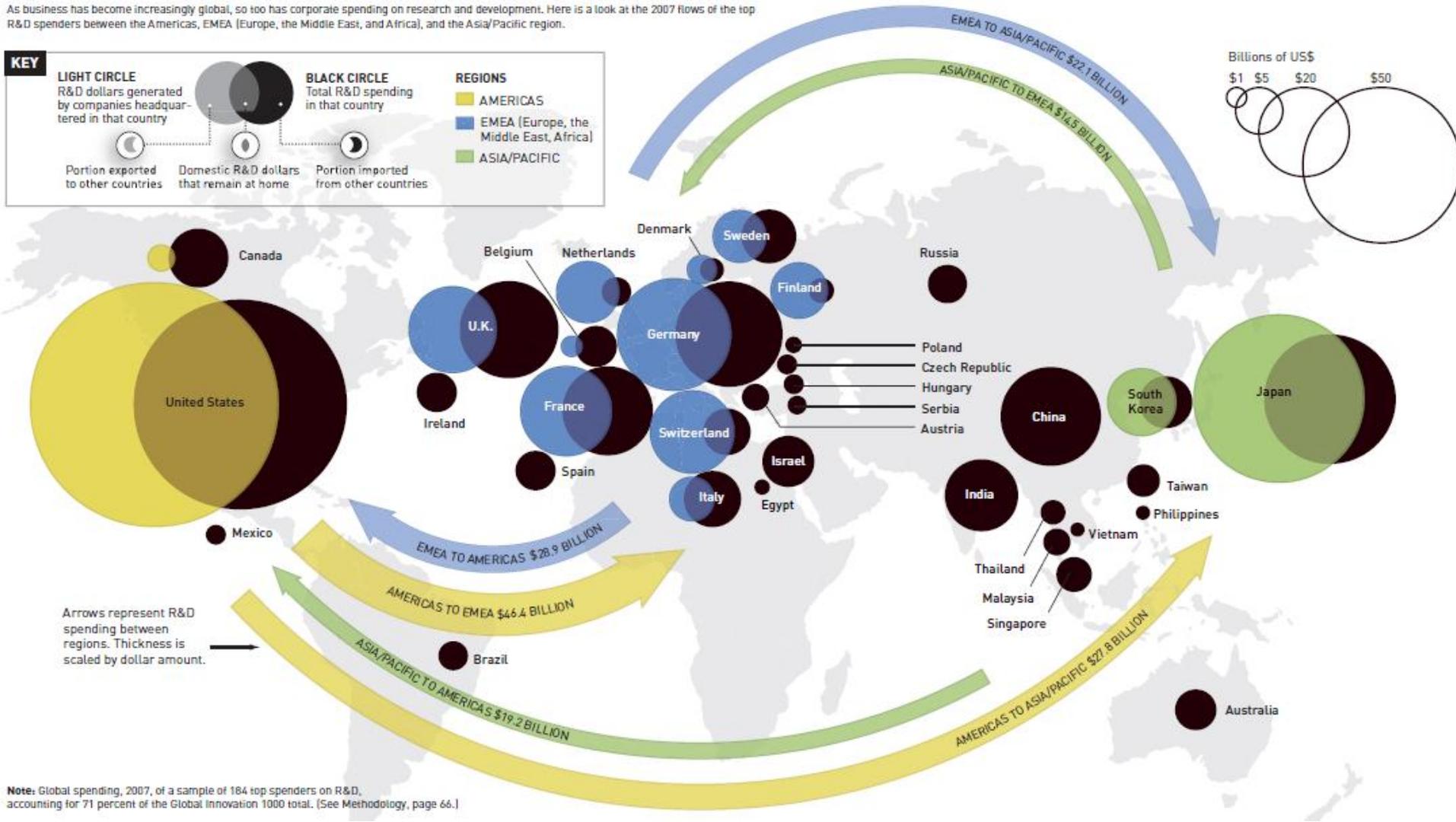
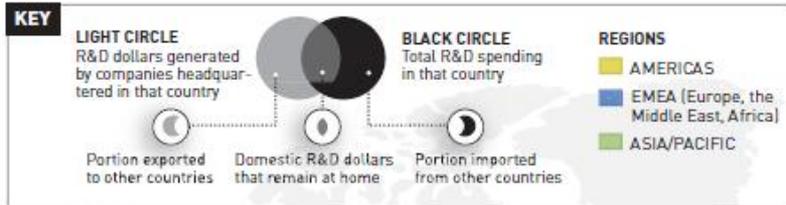
Top 1000 investidores em inovação 2008 (Booz Allen Hamilton)

O mundo do P&D Global – Balança internacional de P&D Global



Exhibit 1: The World of R&D

As business has become increasingly global, so too has corporate spending on research and development. Here is a look at the 2007 flows of the top R&D spenders between the Americas, EMEA (Europe, the Middle East, and Africa), and the Asia/Pacific region.



Note: Global spending, 2007, of a sample of 184 top spenders on R&D, accounting for 71 percent of the Global Innovation 1000 total. (See Methodology, page 66.)

Technology and Innovation at Vale

Vale's technology centers

Ferrous Metals Technology Center (CTF)



Opened in September 2008, following a R\$15 million investment.

It has first-class facilities for simulating the entire iron production process, including the processing stage and the behavior of ore in steelworks. The center's main objective is to evaluate iron ore's characteristics and its suitability for use in steelworks.

Located in Nova Lima in the metropolitan region of Belo Horizonte (Minas Gerais), the center's laboratories are equipped with modern scientific and technological resources and staffed by **30 researchers and 50 technical and administrative professionals.**

Technology and Innovation at Vale

Vale's technology centers

Brazilian know-how crossing frontiers



Since the 1960s, when the Mineral Development Center was established in Minas Gerais, Vale has been investing in technological development. Since Vale entered the global mining market in 2002, this center has been developing the technologies used in its greenfield projects.

- Bayovar Project in Peru: phosphates
- Moatize Project in Mozambique: coal
- Tres Valles Project in Chile: copper
- Evate Project in Mozambique: phosphates
- Neuquem Project in Argentina: potash
- Las Cuevas Project in Colombia: coal
- Antofalla Project in Argentina: potash

Technology and Innovation at Vale

Vale's technology centers

Vale Base Metals Technology Development (VBMTD, Canada)



When Vale acquired Canadian mining company Inco in 2006, it also gained an important technology center, now called the Vale Base Metals Technology Development center, in Mississauga in the Toronto region. Having operated for more than 100 years, the facility is a global center of reference in nickel technology and is staffed by **180 employees**.

The main aim of this technology center is to increase Vale's competitive advantages in the nickel business, supporting the company's growth strategies through the responsible, safe and environmentally friendly use of technology, particularly in the fields of nickel and copper processing, hydrometallurgy and pyrometallurgy.

Technology and Innovation at Vale

Leveraging value



Reduction in water consumption:

At Carajás Mine in Pará, where Vale currently produces around one third of its iron ore, **a new technology has enabled water savings equivalent to the amount consumed by a city of 430,000 inhabitants** (19.7 million m³ per year) and has also cut power consumption by over 18,000 megawatts per year, by eliminating the use of water to process ore.



Reduction in CO2 emissions:

In the “truckless” system developed by Vale, mining is carried out using mobile crushing units and conveyor belts to replace off-highway trucks. **This new approach cuts CO2 emissions by around 77%, reduces diesel consumption by 76% and lessens workers’ risk exposure.**



Reduction in dust emissions:

To prevent particulates in ore heaps from being dispersed by the wind, Vale used “wind fence” technology for the first time in Latin America, at Tubarão Port in Vitória. **The first wind fence installed cut dust emissions by approximately 77%.**



George Stephenson was born on June 9, 1781, in the coal mining village of Wylam, England. His father, Robert Stephenson, was a poor, hard working man, that supported his family entirely from wages of twelve shillings a week. Wagons loaded with coal passed through Wylam several times a day. These wagons were drawn by horses -- locomotives had not yet been invented. George Stephenson's first job was to watch over a few cows owned by a neighbor which were allowed to feed along the road;

Technological Innovation



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