

3.1. Inovação em Saúde

Carlos Morel e Claudia Chamas

Centro de Desenvolvimento Tecnológico em Saúde (CDTS)

*Instituto Nacional de Ciência e Tecnologia em
Inovação em Doenças Negligenciadas (INCT-IDN)*

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Ministério da Saúde

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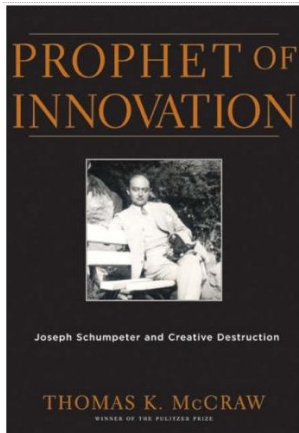
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instituto nacional de
ciência e tecnologia
de inovação em
doenças negligenciadas

Tópicos abordados nesta apresentação

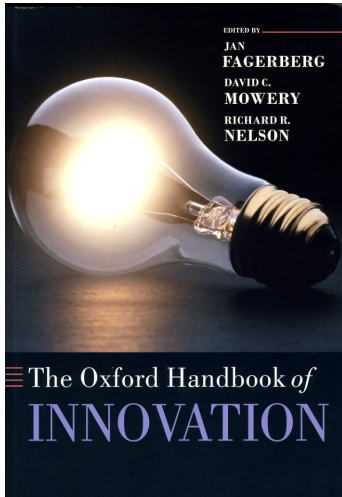
- 1 Inovação e inovação em saúde: Conceitos básicos
- 2 Países em desenvolvimento Inovadores
- 3 Sistemas Nacionais de Inovação

Formas de inovação, segundo Schumpeter



- Novos produtos
- Novos métodos ou processos de produção
- Novas fontes de suprimento
- Novos mercados
- Nova formas de organizações de negócios

Do 'modelo linear' à inovação e ao empreendedorismo



Do 'modelo linear' à inovação e ao empreendedorismo

Inovação: Algumas definições

- *Introdução de novidade ou aperfeiçoamento no ambiente produtivo ou social que resulte em novos produtos, processos ou serviços*
(Lei de Inovação Tecnológica nº10.973/04, art. 2º, IV)
- *Introdução no setor produtivo de um produto (bem ou serviço) novo ou substancialmente primorado ou pela introdução na empresa de um processo novo ou substancialmente aprimorado*
(Manual para Pesquisa - PINTEC, IBGE, 2008)

Do 'modelo linear' à inovação e ao empreendedorismo

Inovação: Conceitos básicos

- Algo novo, que gere ou agregue valor social ou riqueza
 - Novo produto
 - Novas tecnologias
 - Novos processos operacionais
 - Novas práticas mercadológicas
 - Pequenas mudanças, adaptações, novidades
- Três pilares da inovação
 - Conhecimento (científico, tecnológico, empírico)
 - Informação
 - Criatividade
- Bases da inovação
 - Empreendedorismo
 - Empresas (públicas e privadas)

Do 'modelo linear' à inovação e ao empreendedorismo

Empresas e organizações públicas de pesquisa brasileiras

- Empresas
 - IPEA 2005: só 1,7% são inovadoras (1.199/72.000)
- Organizações públicas de pesquisa brasileiras
 - *Path finders*
 - *Path founders*
 - *Path losers*

Salles-Filho S, Machado Bonacelli MB (2010) Trends in the organization of public research organizations: lessons from the Brazilian case. *Science and Public Policy* 37(3):193-204

Inovação em saúde

Inovação em saúde: exemplos

- Inovação de *produto*
 - Novos medicamentos, vacinas, kits diagnósticos
- Inovação de *processo/método*
 - Nova maneira de sintetizar um medicamento
- Inovação de *políticas de saúde*
 - Dias nacionais de vacinação
- Inovação de *estratégia*
 - Convenção da OMS de luta contra o tabaco

Inovação em saúde

Inovações que possibilitaram a erradicação da varíola

- Inovação de *produto*
 - Vacina liofilizada, evitando cadeia de frio
- Inovação de *processo/método*
 - Agulha bifurcada
- Inovação de *políticas de saúde*
 - Engajamento de comunidades e seus líderes em campanhas de vacinação
- Inovação de *estratégia*
 - Vacinação em círculos, em vez de vacinação em massa



Technological And Social Innovation: A Unifying New Paradigm For Global Health

Developing countries need R&D partnerships and implementation research networks to play a more prominent role in global health.

by Charles A. Gardner, Tara Acharya, and Derek Yach

ABSTRACT: This paper highlights the growing capacity for innovation in some developing countries. To maximize the potential of this phenomenon for global health, countries and donors need to link two disparate schools of thought: (1) a search for technological solutions exemplified by global public-private product development partnerships, and (2) a focus on systemic solutions exemplified by health policy and systems research. A strong capacity for both technological and social innovation in developing countries represents the only truly sustainable means of improving the effectiveness of health systems. Local public-private research and development partnerships, implementation research, and individual leadership are needed to achieve this goal. [*Health Affairs* 26, no. 4 (2007): 1052–1061; 10.1377/hlthaff.26.4.1052]

Países em desenvolvimento Inovadores

InnovationStrategyToday

Health Innovation in Developing Countries to Address Diseases of the Poor

Carlos Morel¹, Denis Broun², Ajit Dangi³, Christopher Elias⁴, Charles Gardner⁵, RK Gupta⁶, Jane Haycock⁷, Tony Heher⁸, Peter Hotez⁹, Hannah Kettler¹⁰, Gerald Keusch¹¹, Anatole Krattiger¹², Fernando Kreutz¹³, Keun Lee¹⁴, Richard Mahoney¹⁵, R.A. Mashelkar¹⁶, Hong-ki Min¹⁷, Stephen Matlin¹⁸, Mandi Mzimba¹⁹, Joachim Oehler²⁰, Robert Ridley²¹, Pramilla Senanayake²², Halla Thorsteinsdóttir²³, Peter A. Singer²⁴, Mikyung Yun²⁵

The concepts presented here were crystallized at a meeting convened by the Rockefeller Foundation at the Bellagio Study and Conference Center, 10–13 May 2004. Twenty-three participants attended from Brazil, Canada, France, India, Korea, South Africa, the United Kingdom and the USA. Following the meeting, a number of other individuals made significant intellectual contributions, and they are included as authors of this paper. The authors are grateful to all who contributed to this paper and to the Rockefeller Foundation for financial support. The views expressed are nevertheless those of the authors in their individual capacities and do not necessarily reflect those of their respective institutions, nor of the publishers, editors and supporters of *Innovation Strategy Today*.

<http://www.biodevelopments.org/innovation/ist1.pdf>



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Nation Building through Science & Technology:
A Developing World Perspective
—10th Zuckerman Lecture, Royal Society, London
R.A. Mashelkar

US drug, vaccine, or pharmaceutical patents by inventors from China, Korea and India



eJournal
An eJournal Sharing Creative and Innovative Ideas and Experiences about Global Issues in Agriculture, Health, and the Environment Facing Developing Countries

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Table 2: US patents, GDP per capita, and US patents per GDP/capita (2003)

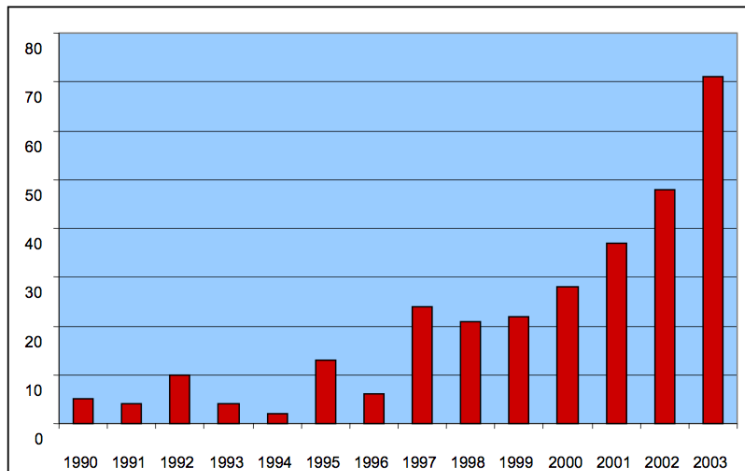
Country	US Patents	GDP per capita	US patents per GDP per capita
1 USA	99,386	36,006	2.760
2 Japan	37,779	31,407	1.203
3 India	444	487	0.912
4 China	724	989	0.732
5 Germany	13,110	24,051	0.545
6 Korea, Rep.	4,246	10,006	0.424
7 France	4,682	24,061	0.195
8 Canada	4,410	22,777	0.194
9 UK	4,803	26,445	0.182
10 Italy	2,206	20,528	0.107
11 Israel	1,392	15,792	0.088
12 Brazil	209	2,593	0.081
13 Sweden	1,771	26,929	0.066
14 South Africa	142	2,299	0.062
15 Australia	1,174	20,822	0.056
16 Switzerland	1,845	36,687	0.050
17 Belgium	998	23,749	0.042
18 Finland	1,009	25,295	0.040
19 Austria	753	19,749	0.038
20 Thailand	64	2,060	0.031
21 Argentina	76	2,797	0.027
22 Singapore	564	20,886	0.027
23 Malaysia	95	3,905	0.024
24 Mexico	129	6,320	0.020
25 Indonesia	16	817	0.020

Source: US Patents: www.uspto.gov

GDP per capita: www.worldbank.org

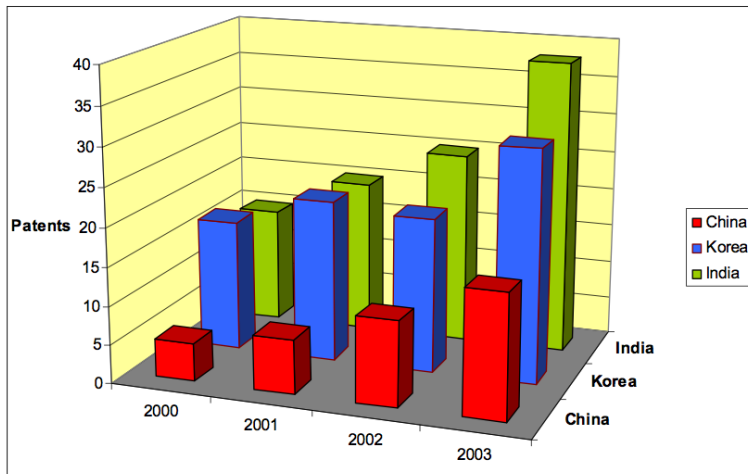
Países em desenvolvimento Inovadores

*Figure 1: US patents from selected countries. Patents are for drugs, or vaccines or pharmaceuticals
(Countries included are Argentina, Brazil, China, India, Malaysia, Mexico, South Africa, and Thailand)*

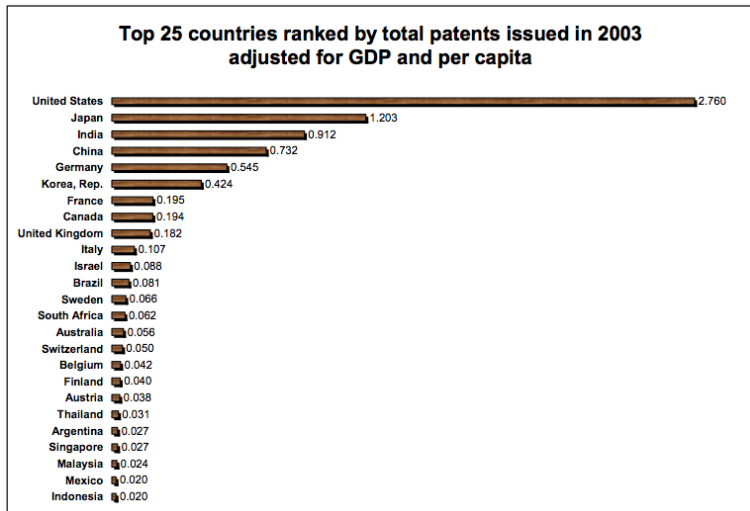


Países em desenvolvimento Inovadores

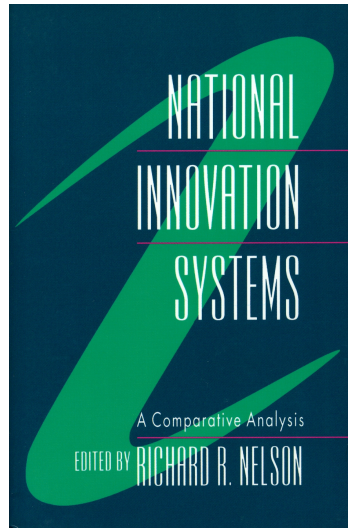
Figure 2: US drug, vaccine, or pharmaceutical patents by inventors from China, Korea and India



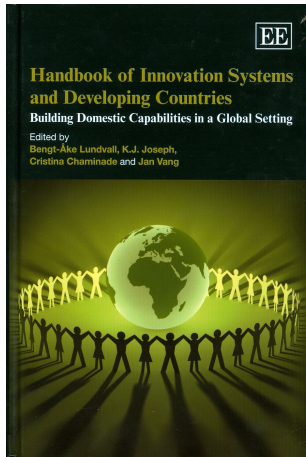
Países em desenvolvimento Inovadores



Sistemas de Inovação



Sistemas de inovação: visões limitada e ampla



- *Limitada*: inovação = C&T
- *Ampla*: inclui aprendizado, inovação e construção de competências em diferentes níveis de agregação
 - *“The national innovation system is an open, evolving and complex system that encompasses relationships within and between organizations, institutions and socio-economic structures which determine the rate and direction of innovation and competence-building emanating from processes of science-based and experience-learning”*

Componentes de Sistemas de Inovação em Saúde

(Morel et al - <http://www.biodevelopments.org/innovation/ist1.pdf>)

- *Manufatura*: Capacidade produtiva de acordo com normas internacionais
- *Mercados domésticos*: Criação de mercados com presença governamental nos sistemas e serviços de saúde
- *Mercados de exportação*: Capacidade de comércio internacional incluindo por exemplo vendas via UNICEF
- *P&D*: Apoio dos setores público e privado
- *Propriedade intelectual*: Sistemas adequados para lidar com propriedade intelectual
- *Regulação*: Sistemas apropriados garantidores de produtos seguros e eficazes

Table 4: Stages of health innovation capabilities in developing countries by six determinants
(Capabilities in developed countries are shown for comparison)

	Manufacture	Domestic Market	Export Market	R&D	IP System	Drug Regulatory System
Stage 1	Assembly of imported components	Small market	Very little except as toll manufacturer	Very little	Very limited understanding of IP; no IP protection	Very limited
Stage 2	Production on license or by copy with significant cost-advantages over Northern products	Growing domestic market of increasing interest to foreign companies; some import substitution; significant share of imports come from other developing countries	Growing trade; companies learning how to establish export markets; significant share of exports go to other developing countries	Local government and foreign donor-funded R&D to understand technology either to produce on license or to copy	Patents allowed for local inventors, but foreign inventors and investors still not interested because of lack of markets and IP protection; few local public-private partnerships (PPPs)	Limited services without enforcement capabilities
Stage 3	Manufacture of domestically developed high technology products with significant cost-advantages over Northern products; growing source of outsourcing	Rapidly growing domestic market of interest to foreign companies	Increasing exports make significant contribution to GNP; significant share of exports go to other developing countries	Scientifically advanced; funded predominantly by local government, and carried out predominantly by local public research institutions; capable of innovation	Advanced IP system, but poorly enforced; moderate experience with technology management in local PPPs	Advanced capabilities but not at highest level because of need to strengthen capabilities as appropriate
Developed countries	Most developed capabilities to produce high technology drugs, vaccines, and devices	Highly profitable market in both the public and private sectors generating profits to support, in part, advanced research	Global companies	Generous support for health research from basic to applied. Large research investment by private companies including large pharmaceutical manufacturers and biotechnology companies	Established system of IP protection, and management of technology in local PPPs (e.g., university-industry R&D agreements)	A dedicated agency overseeing regulatory approvals of drugs/vaccines. In addition, the government oversees clinical trials & production facilities and enforces rules and regulations.



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Intellectual property rights and innovation in developing countries

Yongmin Chen ^{a,*}, Thitima Puttitanun ^{a,b}

^a*Department of Economics, University of Colorado at Boulder, Boulder, CO 80309, United States*

^b*Department of Economics, San Diego State University, United States*

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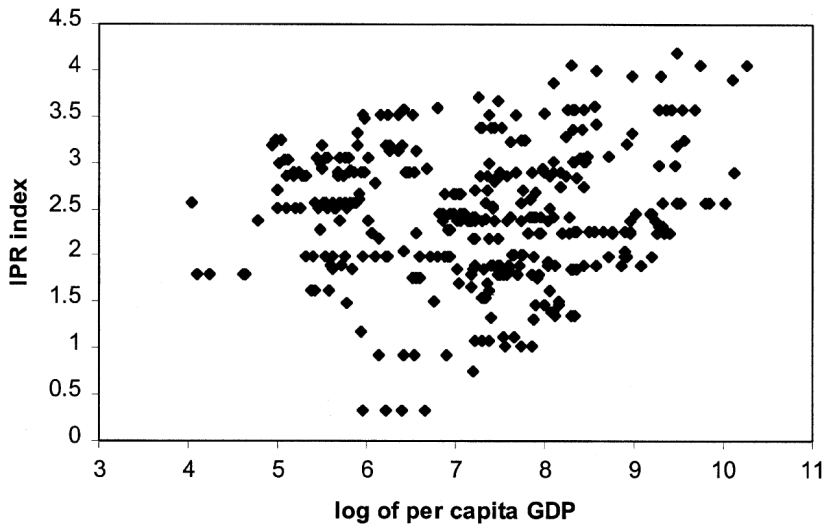


Fig. 2. A scatter plot of the relationship between IPRs and per capita GDP.

Y. Chen, T. Puttitanun / *Journal of Development Economics* 78 (2005) 474–493

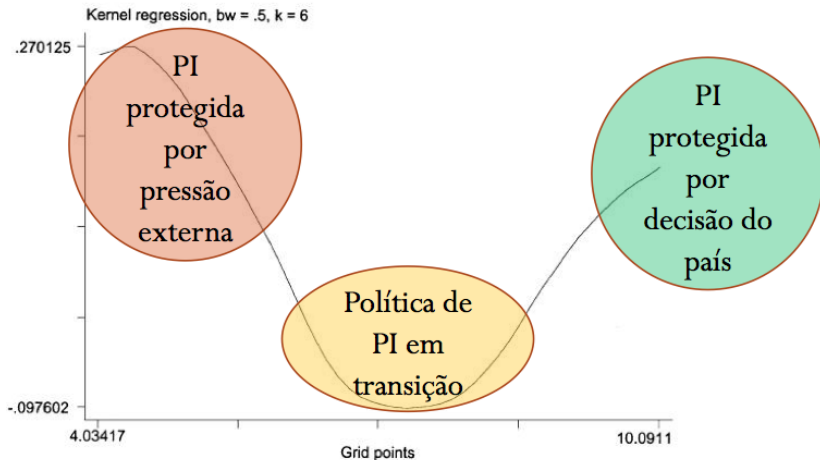
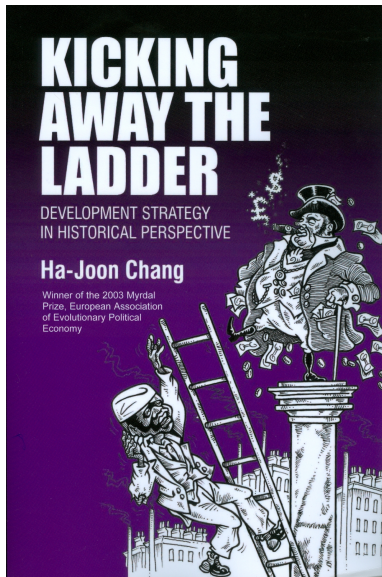
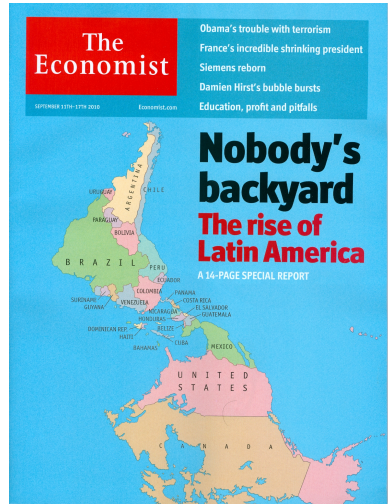


Fig. 3. Semiparametric estimates of the effect of GDP per capita on IPRs.





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Desenvolvimento: Apesar disso, país está abaixo de vários emergentes

Brasil é líder em pesquisa e inovação na AL, diz BID

Sergio Leo | De Brasília
14/09/2010

Texto: A- A+

Compartilha   

O Brasil é, de longe, o país com melhor desempenho em inovação, pesquisa e desenvolvimento entre as nações da América Latina, mas, como elas, está bem abaixo dos outros emergentes, como China, Índia e Coreia do Sul, segundo estudo recém-divulgado pelo Banco Interamericano de Desenvolvimento (BID). Um dos maiores desafios brasileiros é capacitar empresas e governos estaduais a aproveitar os programas de apoio criados pelo governo federal, disse a chefe da divisão de ciência e tecnologia do banco, Flora Montealegre Painter. Ela abre hoje, em Brasília, seminário com representantes estaduais sobre inovação.

"O Brasil tem muitíssimos instrumentos de apoio à pesquisa e tecnologia para inovação, em nível federal", saudou a executiva. "O que se necessita realmente é apoiar o fortalecimento das instituições regionais e estaduais." O BID estuda oferecer linhas de crédito para fortalecer programas de inovação e desenvolvimento tecnológico em diferentes Estados. Projetos-pilotos vêm sendo desenvolvido pelo banco com os governos de Alagoas, Paraíba, Minas Gerais e Santa Catarina.



Ruy Baron

Flora Painter: "O Brasil tem muitíssimos instrumentos de apoio à pesquisa e tecnologia para inovação, em nível federal"

Health Innovation Networks to Help Developing Countries Address Neglected Diseases

Carlos M. Morel,^{1*} Tara Acharya,² Denis Broun,³ Ajit Dangi,⁴ Christopher Elias,⁵ N. K. Ganguly,⁶ Charles A. Gardner,⁷ R. K. Gupta,⁸ Jane Haycock,⁹ Anthony D. Heher,¹⁰ Peter J. Hotez,¹¹ Hannah E. Kettler,¹² Gerald T. Keusch,¹³ Anatole F. Krattiger,¹⁴ Fernando T. Kreutz,¹⁵ Sanjaya Lall,¹⁶ Keun Lee,¹⁷ Richard Mahoney,¹⁴ Adolfo Martinez-Palomo,¹⁸ R. A. Mashelkar,¹⁹ Stephen A. Matlin,²⁰ Mandi Mzimba,²¹ Joachim Oehler,²² Robert G. Ridley,²³ Pramilla Senanayake,²⁴ Peter Singer,²⁵ Mikyung Yun²⁶

Gross inequities in disease burden between developed and developing countries are now the subject of intense global attention. Public and private donors have marshaled resources and created organizational structures to accelerate the development of new health products and to procure and distribute drugs and vaccines for the poor. Despite these encouraging efforts directed primarily from and funded by industrialized countries, sufficiency and sustainability remain enormous challenges because of the sheer magnitude of the problem. Here we highlight a complementary and increasingly important means to improve health equity: the growing ability of some developing countries to undertake health innovation.

Morel CM et al (2005) *Science* 309(15 July):401-404

Sistemas de inovação em saúde

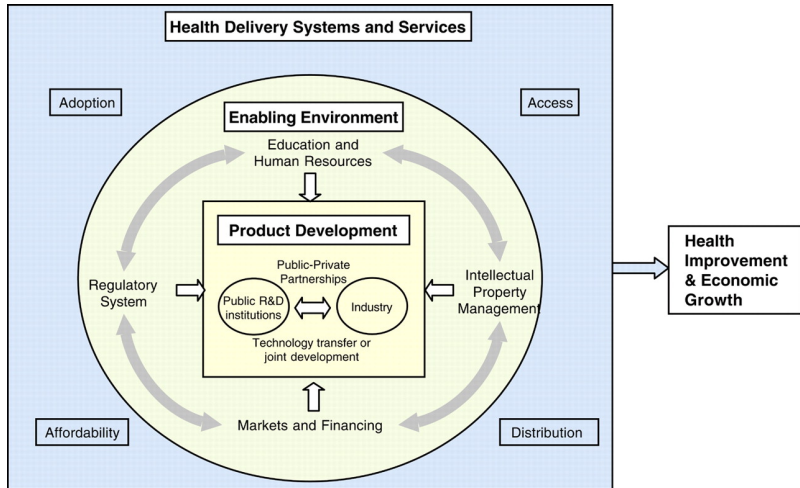
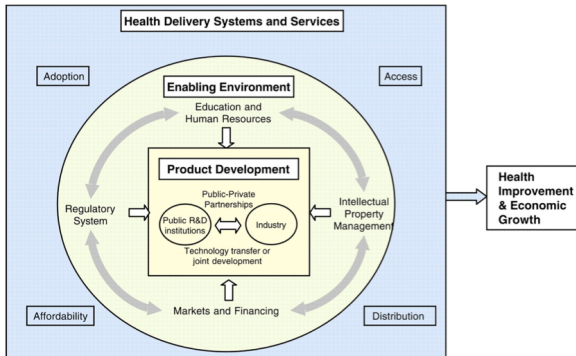


Fig. 1. Health innovation systems have multiple components, operating in both the public and private sectors, including the following: education, research, financing, manufacturing, technology management practices, intellectual property rules, regulatory rules, and domestic and export markets (including public procurement)



C. M. Morel et al., Science 309, 401-404 (2005)



Fig. 2. Group photograph of the participants of the FIOCRUZ-TDR Parasite Genome Network Planning Meeting, held in Rio de Janeiro, Brazil, on 14 and 15 April 1994. This international meeting, attended by 40 scientists and 5 representatives from WHO, selected the three parasite strains whose genome sequences are published in this issue of *Science* by the Tritryp project.

Lembrete: Links para documentos do Curso

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<http://iep851-2011.blogspot.com/>

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<http://www.cdts.fiocruz.br/ufrj2011>