

# **Globelics and the BRICS project**

**José E. Cassiolato**

RedeSist, Institute of Economics, Federal University of Rio de Janeiro, Brazil

Globelics Academy  
Rio,  
23 - august - 2012

# The setting up of Globelics

- A network of scholars who use the IS framework as an analytical tool to understand processes of development
- The need to create knowledge through interaction
- Appreciative theory & the importance of history versus models, benchmarking, etc
- Innovation as a social, localized, systemic process
- IS framework as a focusing device

# América

501 Años Cabeza Araya



Este el mapa nuevo, dependiente a geografía del mundo se en mapa que se hizo  
 por el mundo del cual se, que tal como se muestra mundo que sea. En el planisferio  
 se hallaron, el que se usó en las escuelas y en todos países, el Ecuador se está en el centro del  
 norte según de 1800 y el sur, una América Latina ahora se el importante como antes que  
 Europa y mucho más que la zona de Ecuador, México y Florida, según se ve en el

América Latina se ha sido más grande que Europa y América mayor que América  
 (México y Florida) el mapa que se usaba, también todo lo demás. Siempre estaba  
 erróneo, porque, ahora, después de la caída de América, Ocean  
 América, también por parte de todos, ahora mismo, para ahora, también mismo, que antes  
 de ahora.

Edición: 1950

## **National Systems of innovation and development:**

- The Micro-Macro dichotomy
  - Macro instability deeply affects microeconomic behaviour.
- Heterogeneity and indigenous knowledge
  - Income Distribution and higher degree of heterogeneity (intra and inter industry).
- Inequalities and Innovation Systems and Innovation Systems and Inequality
  - Disparities (in income distribution, patterns of consumption, capabilities, regional, etc).

# Studying IS in Developing Countries

- Diversity and the role of local knowledge
- The local and the Global
- The Search for Indicators
  - Do you really think that patents and citations are proxies for innovation in general? and in development conditions????
- Linking the micro to the meso and to macro
- Different strategies – different outcomes
  - China, India, Korea VERSUS Latin America, Africa, “Transition Economies”, etc – the role of policies and the government!!!
- Globelics and the BRICS project

## Brics-countries

- Extremely uneven regional development income
  - gap between the most and the least developed regions enormous and still growing.
- Open and hidden unemployment among unskilled workers is extremely high while there may be shortages of skilled labour.
- The FDI (scale and type very different).
- Role of Diasporah as source of both capital and skilled labour. (China and India) and Brain Drain in others

# Annual average growth rates of total real GDP (%)

	1980-89	1990-00	2001-04
Brazil	3,1	2,9	1,8
Mexico	0,8	3,1	1,7
Rep. of Korea	8,5	5,8	4,6
China	10,6	10,4	8,8
India	5,7	6,0	6,1
Russia	-	-4,7	6,1
South Africa	1,4	2,1	3,2

Source: UNCTAD Handbook of Statistics, 2005.

# Industrial performance and growth

- China: spectacular GDP growth is certainly related to the high competitiveness of its manufacturing system
- Brazil, Russia, South Africa: manufacturing has lost relative importance and weight; international competitiveness has faltered...
- India: manufacturing has grown, on average, at the same pace of GDP

Question: is an improvement of manufacturing's competitiveness an important factor for long term growth?



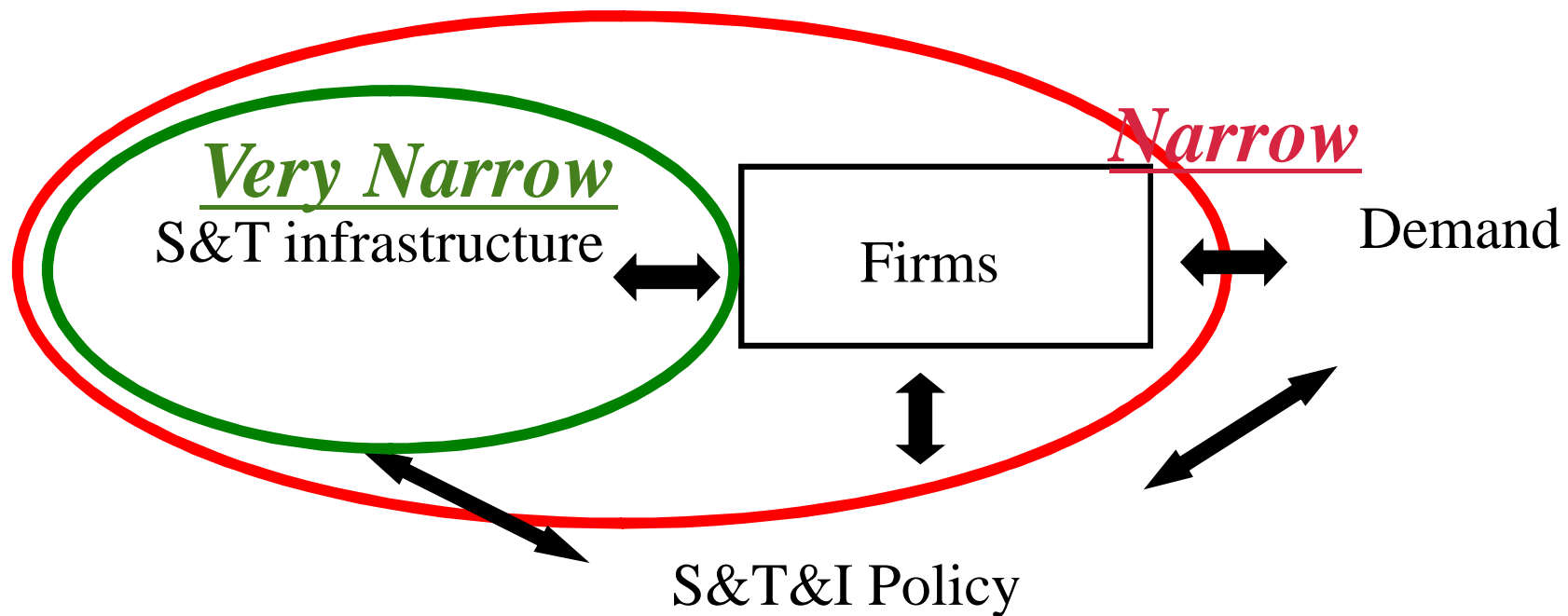
# Towards a research design for BRICS

- ‘explain’ in a comparative perspective the specialisation, competitiveness and growth performance, **BUT TAKING INTO ACCOUNT THE LOCAL DIMENSION AND SPECIFICITIES OF THE DUAL ECONOMY**
  - select productive activities that play important roles in the national innovation system and take the regional/local dimension into account.
  - analyse for each of of local systems
    - what takes place inside firms in terms of innovation, learning and competence building.
    - the interaction among firms and other actors including co-operation and networking.
  - how specificities (for example in national education) and different implicit and explicit policies affect firm behaviour, strategies and innovation capabilities.

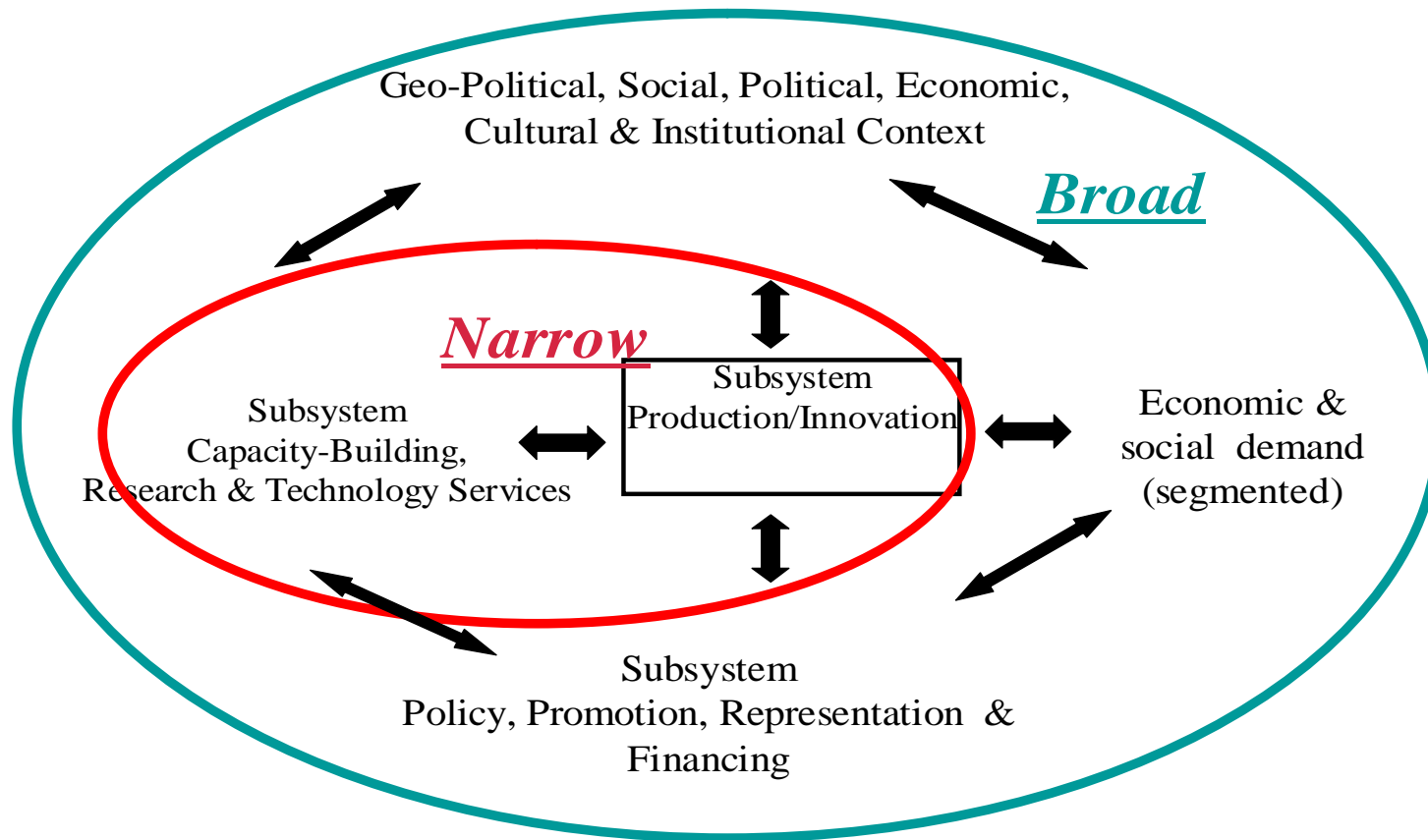
## Towards a research design for BRICS

- **The concepts (NSI, learning, etc): need to be redefined from a “Southern” perspective**
  - **Power (geo politics, MNCs, etc)**
  - **Financial globalization**
  - **Privatization, deregulation,**
  - **Diversity and institutions**
  - **The local (regional) dimension**
  - **The second economy, informal sector, etc..**

# NSI: The Narrow Version



# The Broad NSI

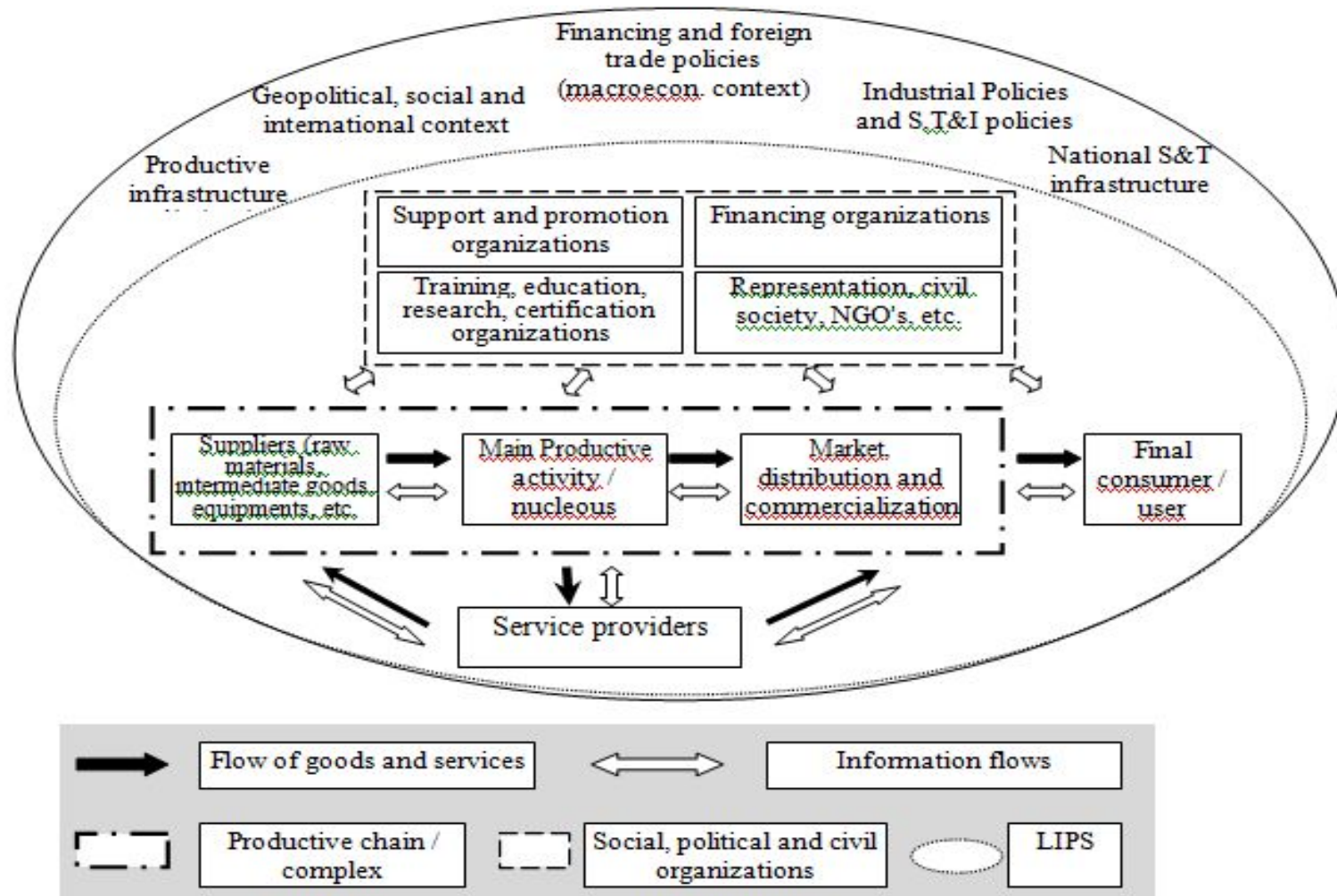


# Different delimitations of innovation systems

- The narrow version:
  - Extended R&D-systems – linking knowledge institutions to production.
- The broad version:
  - Extended production and innovation systems – focus on learning and interaction in the economic and social system (Freeman and Aalborg).
  - Institutions that affect innovation

# Analysing the System of Innovation

## Territory and activity



# Innovation systems and knowledge bases

Smith, K. (2000) What is the 'knowledge economy'? Knowledge-intensive industries and distributed knowledge bases.

Figure 4. Activities, technology/knowledge areas and knowledge network in the Norwegian food processing industry

Activity	Technology/Knowledge-area	Knowledge suppliers
Selection and preparation of raw materials	Filtering-, centrifugal-, washing technology; steaming (thermic treatment); sensorics; molecular biology and micro biology; chemistry and biochemistry	Matforsk, Norconserv, NLH, NVH
Processing	Process lines (engineering); IT and informatics; logistics; heating and refrigerating technology; sensorics; molecular biology, micro-biology, bacteriology; chemistry, biochemistry; analytical chemistry; gastronomical skills	Norconserv, Matforsk., NLH, NVH, NTNU (kk); SINTEF, Norske Meierier, Potetindustriens Laboratorium
Preservation and storing	Cooling/freezing technology; vacuum; hermetics and modified atmosphere packing; sterilisation; pasteurisation and homogenisation; biological preservation (f.ex. fermentation); bio-technology; bio-chemistry; bacteriology and micro-biology; analytical chemistry	NLH, NVH (ins. fmn), Matforsk (avd. pros.), Norconserv, SINTEF (knt), NTNU (kkt), Norsk Kjøtt, NTH (ins. k)
Packing/wrapping and coating	Disposal technology and environmental issues; materials technology; process lines (engineering, informatics); design; consumer preferences and marketing; micro-biology and bacteriology; bio-chemistry and analytical chemistry; cooling/freezing technology; vacuum; hermetics and modified atmosphere packing	NVH (ins. fmn; ins. bfe), Norske Meierier, Matforsk (avd. kval.), Norconserv, NLH
Hygiene and safety	Micro-biology; bacteriology; bio-chemistry; analytical chemistry	Norsk Kjøtt, Norske Meierier, Potetindustriens Laboratorium, NVH (ins. fmn), Matforsk (avd. kval.), NLH, SSF
Quality and nutrition	Chemistry; micro-biology; additives; texture; sensoric analysis and evaluation	Matforsk, Norconserv, NLH, UIO, NVH (ins. fmn; ins. bfe), Norsk Kjøtt, Norske Meierier, Fisk.dir., Ernær.inst.
Quality control and quality documentation	Testing/measurement technology; spectroscopy; sensorics; micro-biology and bacteriology; bio-chemistry and analytical chemistry	Norske Meierier, Kontroll inst. f. meieriprodukter; Norconserv; NVH (ins. fmn; ins. bfe); NLH, Matforsk (avd. kval.)
Transport and distribution	Logistics; IT and informatics; general transport technology; cooling/freezing technology; micro-biology and bacteriology; bio-chemistry and analytical chemistry	SINTEF (knt), NTNU (kkt), NLH, Matforsk, NVH (ins. fmn), UIO (informatics and logistics)
Trading/marketing/sales	Sociology (consumer preferences and trends); economy (price elasticities etc.)	BI, NLH, SIFO

Source: Trine Bendix Knudsen, Arne Isaksen and Keith Smith, 'Innovation and Knowledge Bases in the Norwegian Food Processing Industry' in O.J. Borch (ed) **The Food Industry: between business and politics** (Oslo: Tano Aschehoug), p. 196 [in Norwegian]; Thor Egil Braadland and Johan Hauknes, **Innovation in the Norwegian Food Cluster**, STEP Group, Oslo, 2000.

# The BRICS Project:

## Main objectives

- stimulate interactions and the exchange of experiences between researchers and policy-makers interested in innovation in BRICS aiming at creating capabilities and finding joint workable solutions;
- characterize the structure of BRICS' national innovation systems, their recent evolution and perspectives;
- compare the five countries innovation systems, identifying differences and similarities, common bottlenecks and complementarities;
- develop and use concepts and information capable of representing the Innovation Systems of BRICS;
- discuss policy implications and put forward policy recommendations, extracting lessons that can be useful not only for these countries but also for other developing countries.



# Project coordinators

- Brazil
  - José Cassiolato and Maria Clara Soares (UFRJ)
- Russia
  - Leonid Gokhberg and Alexander Sokolov (MSE)
- India
  - KJ Joseph (CDS)
- China
  - Liu Xielin (CAS)
- South Africa
  - Rasigan Maharajh (TUT)

# Specific objectives

- increase the interaction of innovation researchers and government officers of BRICS through meetings and other forms of articulation (seminars, web page, etc).
- increase the knowledge about the NISs of BRICS through
  - the development of adequate concepts, indicators and methodologies;
  - the analysis of selected BRICS innovation systems - and horizontal themes that affect innovation in these countries;
- increase the capability both of researchers – in special graduate students - and government officers of BRICS through research on innovation systems, discussions, innovation panels and other forms of articulation;
- diffuse the knowledge generated through the publication of books.

# Results

- 1 book published by Anthem Press
  - Brics and Development Alternatives: Innovation Systems and Policies. Edited by José E Cassiolato and V. Vitorino, 2010.
- 5 books published to be published by Routledge
- Second phase – Comparative research – social innovation (health)

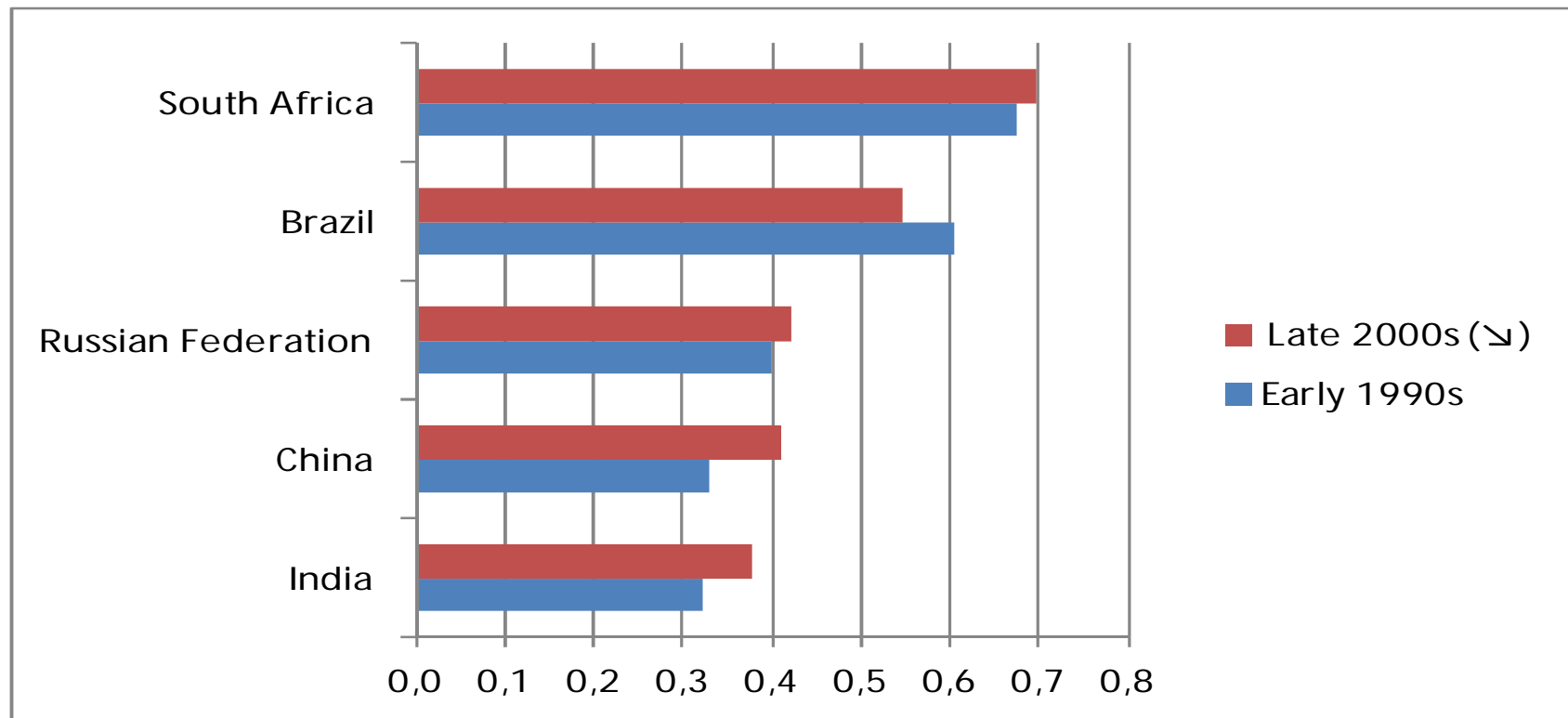
- **The State and the National System of Innovation: a Comparative Analysis of the BRICS Economies**
  - Edited by Mario Scerri (IERI-TUT, South Africa) and Helena M. M. Lastres – (BNDES, Brazil), Routledge, 2012.
- **Development Challenges in BRICS: Inequality and National Innovation Systems**
  - Edited by Maria Clara Couto Soares (UFRJ, Brazil), Mario Scerri (TUT, South Africa) and Rasigan Maharajh (TUT, South Africa), Routledge, 2012.
- **BRICS National Innovation Systems: The Promise of Small and Medium Enterprise,**
  - Edited by Ana Arroio (Firjan, Brazil) and Mario Scerri (TUT, South Africa), Routledge, 2013.
- **The Role of TNCs in the National Systems of Innovation of BRICS**
  - Edited by José E. Cassiolato (UFRJ, Brazil), Graziela Zucoloto (IPEA, Brazil), Dinesh Abrol (NISTED, India) and Liu Xielin (CAS, China), Routledge, 2013.
- **The Financing of Innovation in the BRICS Countries,**
  - Edited by Michael Kahn (TUT, South Africa) and Luiz Martins de Melo (UFRJ, Brazil), Routledge, 2013.

# **BRICS PROJECT**

## **Inequality and National Innovation Systems**

- The analysis of the co-evolution between innovation system and inequality tried to identify how (and whether) the diverse elements of the BRICS NSIs and inequality mutually reinforce each other.
- Co-evolution perspective:
  - high degrees of endemic inequality shaping the evolution of national systems of innovation.
  - innovation systems reinforcing/undermining inequalities.

# Change in Inequality Levels in BRICS early 1990s versus late 2000s (Gini Coefficient of Household Income)



Source: OECD-EU Database on Emerging Economies and World Bank Development Indicators Database (2011)



## Co-evolution: Inequality ► NSI

- The origins of the current patterns and rates of inequality differs across BRICS systems:
  - South Africa: apartheid; India: discrimination on the basis of caste, religion, ethnicity or gender; Brazil: concentration of land and of political power; Russia: URSS collapse and extreme *laissez faire* variety of capitalism, dismantling soviet welfare system; China: accelerated evolution of a distinctly variety of capitalism widening gaps between rural and urban populations.
- Despite these differences, the study showed that *inequality is a peculiar trait of BRICS countries comprising a key factor for understanding both the configuration and the dynamic of their national innovation systems.*



## Co-evolution: Inequality ► NSI

- Significant enduring inequalities severely restrict NSI development and compromise its long term dynamic limiting the broad based human capital & human capabilities (supply side), domestic systems of consumption (demand side), etc.
- The structural nature of inequality in BRICS countries establishes it as an informal institution within the web which makes up their NSI.

## Co-Evolution: NSI ► Inequality

- The nature of the co-evolution of the NSI and inequality is obviously different for the five BRICS economies given their specificities.
- It was seen that innovation systems can affect inequalities in different ways and through distinct paths, which are influenced by national conditions and shaped by public policy.
- Despite the specificities, the common conclusion is that *in the absence of appropriate policy measures, the evolution of NSIs in the BRICS - especially within the post-eighties context of market liberalisation - tended to reproduce, reinforce and even intensify structural inequalities.*

# Some policy findings

- Distinct strategies for technological change may lead to different outcomes in distributive terms, thus either aggravating or mitigating inequality.
- Mutual self-reinforcing mechanisms between innovation system and inequality (especially given long historical reinforcement) in BRICS forms the basis for a path dependent vicious circle of innovation.
- This path dependency almost inevitably require State intervention to break vicious cycle.
- Advancing the understanding of the inter-relations between innovation and inequality may be helpful to find ways to shape the evolution of NSIs so that they reduce rather than increase inequalities.
- Inequalities need to be taken explicitly into account in the development & innovation strategies of BRICS countries.

# **BRICS PROJECT**

## **Policies and the role of the State**

# BRICS – The different policy models

- Brasil and South Africa
  - – The OECD model
- Rússia
  - – The OECD model till Putin... After ...
- India
  - Explicit and implicit policy (but hardly innovation policy)
- China
  - Explicit and implicit policy and much more – The indigenous innovation policy
- Source: Cassiolato e Vitorino (2009) Brics and Development Alternatives: Innovation Systems and Policies, Londrfes, Anthem Press

**Poverty of S&T (and innovation!!!) policy & its close subordination to finance: OECD recommendations (Policy section of *Science Technology & Industry Scoreboard 2007*):**

- **The European Paradox and the Linear Policies**
  - **Give firms tax subsidies (write-off of current R&D spending, tax relief, allowances on taxable income) = now a “major” policy tool)**
  - **Encourage public research organisations to commercialise their inventions**
  - **Improve conditions for venture capital**

# STI Policies in BRICS (and elsewhere) in the 2000s

- Some similarities but big differences (eg. role of TNCs)
- China and India
- versus
- Brazil, South Africa (and Russia???)
- The limitations of the Lisbon Strategy and its frustrated use in LA (and also elsewhere...)
  - The trap of the new policies becoming “only in a new icing on an old cake”  
*‘by integrating some Schumpeterian variable to mainstream economics, we may not arrive at the root causes of development  
we risk applying a thin Schumpeterian icing on what is essentially a profoundly neo-classical way of thinking.’*  
(Reinert & Reinert, Globelics, 2003)
- But..... the reality of local experiences (LIPS)
- and the tale of the man who lost his keys (Sutz)

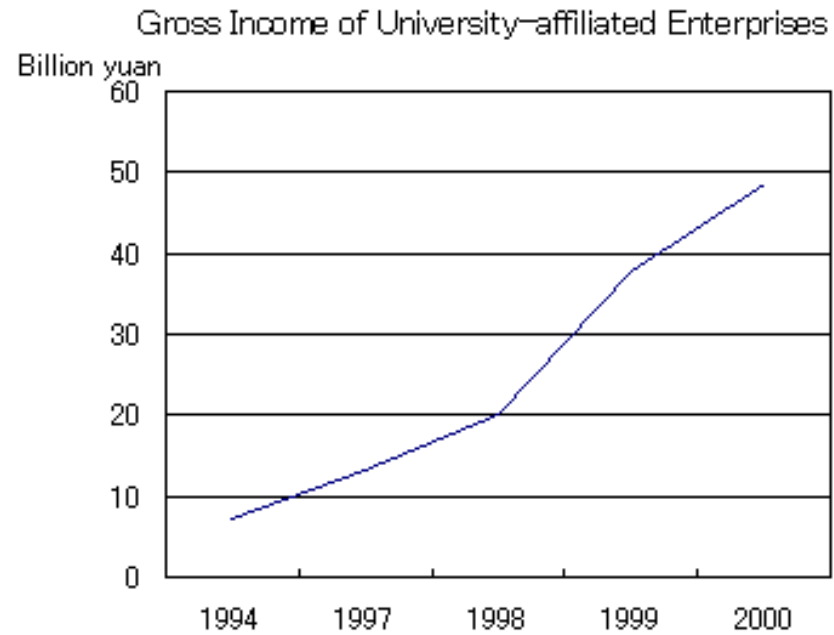
# University – Industry Linkages



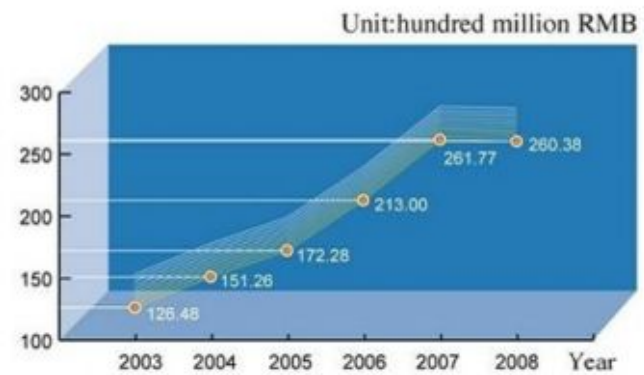
## China - University's spin-off

	Number of spin-off	revenue (billion RMB)	Profit (billion RMB)	净利润 (亿元)	上缴税金 (亿元)	对学校的回报(亿元)
1999	2137	26.7	2.2	18.04	10.96	13.92
2000	2097	36.8	3.5	28.03	18.79	8.46
2001	1993	44.8	3.1	23.98	20.09	7.78
2002	2216	53.9	2.5	18.63	25.92	7.61
2003	2447	66.8	2.8	14.73	29.40	7.74
2004	2355	80.7	4.1	23.86	38.48	8.25

# China – Universities hi-tech firms



2003-2008 Total revenue of Tsinghua Holdings Co.,Ltd



# China - Venture Capital

- 4 categories:
  - Controled by local government
  - Controled by Universities
  - Controled by large corporations
  - Controled by foreign capital
- VC Sources of Funds – 2004:
  - Chinese corporations 35 %
  - SOEs 22 %
  - Government 17 %
  - Foreign firms 17 %
  - Financial sector 6 %
  - Others– 3%
  - Fonte: Gao *et al.*, 2006.

## Incentives to innovation are incentives to R&D?

- ... firms should be barely receptive to subsidies directed at R&D alone, any more than people buying cars would respond to a reasonable subsidy on the tyres
- Comments by an Australian entrepreneur quoted in:
- Australia - Productivity Commission (2007b) Public Support for Science and Innovation, Research Report, Productivity Commission, Canberra. p. 35).

## China – Wind Energy Sector Local Firms X TNC Subsidiaries

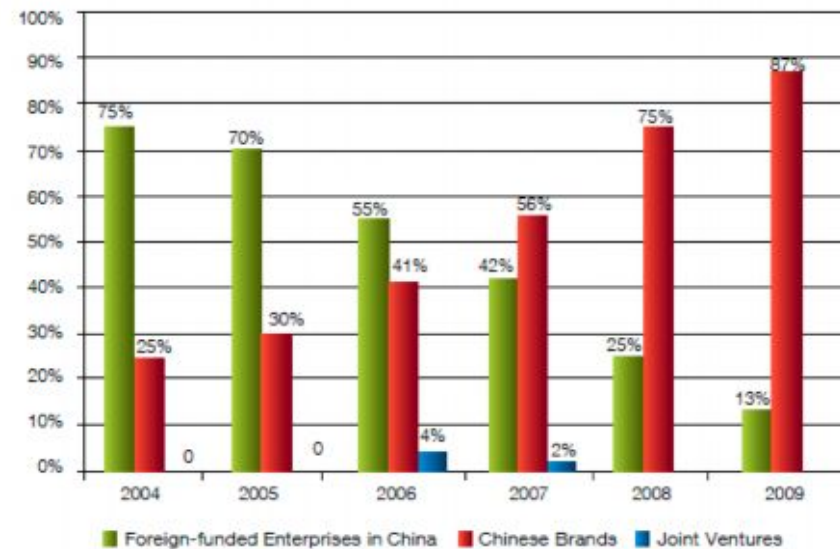


Figure 16 Comparison of Newly Installed Capacity Market Share between Domestic and Foreign Companies in the Chinese Wind Power Market

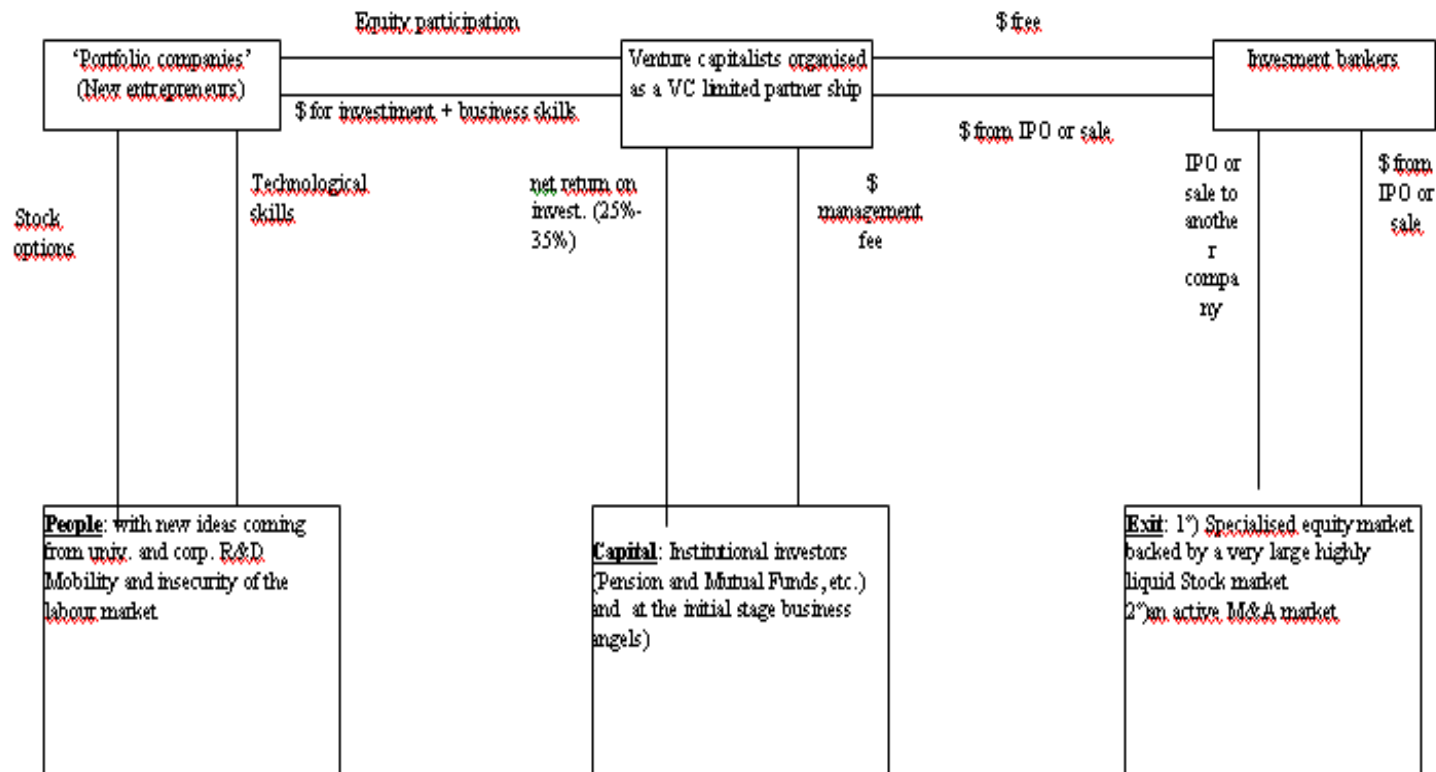
# TNCs R&D in China

- *Productive technology spillovers*
  - There are positive productivity spillovers from foreign firms to their local suppliers in upstream sectors in China (e.g. Buck, Liu, Wei, & Liu, 2007; Buckley, Clegg, & Wang, 2002; Kueh, 1992; Li, Lam, Karakowsky, & Qian, 2003; Wu, 1999; Zheng, Siler, & Giorgioni, 2004; Zhu & Tan, 2000).
  - But Local firms have improved and expanded production capabilities rather than innovation capabilities.
- *Negative effects*
  - Technology spillover is unsatisfactory
  - Cooperation between TNCs and other parts of NIS is limited
  - Technical linkages between TNCs and local suppliers are limited

# One example of inappropriateness

Source: Chesnais (2003)

Figure 3.3: USA - [The socio-economic and institutional conditions for an efficient venture capital market



# The specificities of the US venture K market (a US institution)

- For a venture capital industry to emerge
  - strong and regular flow of talented and mobile individuals leaving their positions within an established organisation to set up their own company in the expectation of future large financial rewards (combination between genuine risk-taking and the particularities of the US high skill labour market).
  - exit conditions provided the US financial and corporate system. Since venture capitalists are not long term investors at any given moment in their relationship with the entrepreneurs in their ‘portfolio’, they need to be able to hand the firms over easily to other investors in the stock market or large corporations. This requires an active stock market and also an active M&As market with large companies interested in acquiring venture-backed firms in order to implement the new technologies the latter have developed.
  - relationships that the financial firms specialised in the ‘venture industry’ develop with the investors that entrust them with funds, the entrepreneurs they finance and the investment bankers who organise the termination of the venture capital operation.



# **BRICS PROJECT**

## **Systemic Indicators**

# The Problem of Indicators

“It will always be essential to use STI statistics in full awareness of the “footnote” problems which arise in the differences across countries in definition, classification and measurement of most STI indicators. Otherwise, STI indicators may easily be abused. And whereas in the world of economic statistics abuse often meets its ghost – admittedly often only years later – in the world of STI statistics the possibilities for abuse given the often endogenous impact of such statistics on public S&T spending itself, are more numerous and much more oblivious. This holds not only for STI performance assessment at the level of individuals or organisations, but also at the level of countries. One might e.g. remember how the comparisons made in the 70’s and 80’s between the so-called socialist economies and the OECD countries ignored many of the substantial differences in definitions between R&D in the West and in the East. **Today, it could be argued that there are similar major problems in making comparisons between the developed, emerging and other developing countries in comparing STI indicators.**”

FREEMAM, C.; SOETE, L. “Developing science, technology and innovation indicators: what we can learn from the past”. Working Paper Series/UNU-Merit – January 2007.

## *Input & output indicators*

- Indicators used to capture the output dimension: publications and patents of inventions;
- Publications → bibliometric indicators: counting scientific work published in academic magazines or in other means, registering data on each publication;
- Patents → systematic information on applications or granted patents.

## Criticism to input and output indicators

- They assume the linear model of innovation;
- Technology considered more or less as a commodity;
- S&T policy implications
  - belief that the results of efforts centered in research institutions and in human resources formation would be almost enough to generate technological progresses.

## Criticism to the input and output indicators

- R&D expenditures:
  - What is really R&D???
  - Results of the activity are not evaluated;
  - Other important domains of R&D activities are left out – adoption or adaptation of new equipments and the informal learning activities;
  - The very concept : R&D today is different from R&D in the time of Frascati Manual
- Indicators based on bibliographic production → self-selection problems, predominance of anglo-saxon journals in the existing databases;
- Indicators of Patents:
  - They express only the existence of an invention; pronounced inter-sectoral variance of the propensity to patent;
  - Difficulty for obtaining a patent varies a lot from country to country;
  - Patent requests have little to do with the protection of the innovation.

## What is so great about R&D expenditures as an indicator of innovation input ?????

- The main theoretical criterion for the Frascati scheme of separation of the R&D function from related scientific activities was the distinction between **novelty** and **routine**.
- What became distinctive about modern, industrial R&D and justified the focus in the Frascati Manual on this concept was its scale, its scientific content and the extent of its professional specialisation.
- A much greater part of technological progress appeared attributable to research and development work performed in specialised laboratories or pilot plants by full-time qualified staff. (Freeman and Soete Developing science, technology and innovation indicators: what we can learn from the past, Working Paper Series, 2007-001, UNU - Maastricht ESRTCIT 2007).

## What is so great about R&D expenditures as an indicator of innovation input ???

- Innovation capability became now seen less in terms of the ability to discover new technological principles, but more in terms of the ability to exploit systematically the effects produced by new combinations and use of pieces in the existing stock of knowledge (**David, P. and D. Foray** 1995) “Accessing and Expanding the Science and Technology Knowledge Base”, *STI Review*, no.16, pp. 16-38).
- Not surprisingly the new model appears closely associated with the emergence of various new sorts of knowledge “service” activities, implying to some extent, and in contrast to the Frascati R&D focus, much more **routine** use of a technological base allowing for innovation without the need for particular leaps in science and technology, something which has also been referred to as “innovation without research” (Freeman and Soete 2007)

## Innovation indicators

- Derive from the criticism of the linear model of innovation;
- Chain link model (Kline e Rosemberg, 1986) → emphasizes the concept that the innovation results from an interactive process;
- The company is not a simple technology buyer;
- The innovation is not a sequential process;
- The innovation doesn't depend on the invention process and such processes tend to be accomplished for the solution of problems during the innovation process, instead of being its starting point



## Innovation indicators

- The approaches focus on the object (the innovations properly said) and / or on the subject (the company and other actors);
- The object approach seeks to identify important types of innovations;
- In relation to the subject approach emphasis is given to the “Manual of OSLO” and to the European surveys (in Latin America the Manual of Bogota);

## *Criticism to the Indicators of Innovation*

- Object approach → it doesn't allow to differentiate the economical relevance of different innovations; tends to focus on product innovations in detriment of process innovations;
- Subject approach → complexity of the research;
- Because of the innovation concept adopted by the “OSLO Manual” results of innovation surveys need to be analyzed carefully;
- Some problems of Innovation surveys:
  - Different methodologies, different concepts used in different countries;
  - Time delay;
  - Use of sample and not panel data.

## **Brics Project: Systems of innovation indicators**

- Derive from the consolidation of the National Systems of Innovation approach;
- Processes of the production, diffusion and use of ST&I should consider the simultaneous influence of organizational, institutional, economic, cultural and local specific factors;
- Stress the fact that firms do not innovate separately;
- The indicators of ST&I seek to identify the characteristics of operation of each National Systems of Innovation;

## Systems of innovation indicators

- Need of indicators centered on the measurement of :
  - Flows of information and knowledge (codified or tacit);
  - Flows of human resources;
  - Institutional landscape of the national systems of innovation;
  - Innovative behavior of the companies;
  - Integration of indicators of ST&I with economic indicators.

**Most of these indicators – concepts, collection methodologies and applications – are still in a very immature stage (for ex. Blue Sky, Nesta).**

## **Evidences in the use of systemic indicators: the experience of *RedeSist* and *BRICS Project***

- Learning-by-interaction is fundamental for RedeSist's definition of LIPS and for the proposal of learning and innovation indicators;
- Innovation, production and value generation activities require several forms of interaction among economic agents, who in turn interact with institutions;
- The proposal of indicators detailed below are an attempt to go beyond the conventional input indicators (R&D expenditures, financial resources and workforce engaged in S&T activity) and output indicators (bibliometric indicators and patents) normally used as proxies for innovation;
- The suggested indicators could be grouped into three categories: learning indicators, cooperative practices; indicators of technological effort and innovation indicators.

## Evidences in the use of the indicators in Brazil: the experience of *RedeSist*

<b>1 - Learning activities</b>
In-hose learning (APRINT)
Learning from productive links(APRAGPR)
Learning from S&T links (APRC&T)
Learning from other agents(APRDMAG)
<b>2 - Innovative efforts</b>
Internal training efforts (ESFTRE)
Efforts to contract qualified people externally (ESFABS)
Constancy of innovative activities(COATIN)
Constancy of R&D efforts(CONP&D)
Constancy of the acquisition of new technologies (CONOUTC)
Constancy of marketing efforts(COFORCOM)
<b>3 - Cooperative Practices</b>
Vertical cooperation(COPVER)
Horizontal cooperation (COPHOR)
Cooperation with services suppliers (COPSRESP)
Cooperation with other agents (COPDMAG)
<b>4 - Innovative performance</b>
Radical Innovations in products (INPD1)
Radical Innovations in processes (INPC1)
Incremental Innovations in products(INPD2)
Incremental Innovations in processes (INPC2)
Organizational innovations (INORG)

# Crisis, innovation system and BRICS

# What crisis?

- What we know about the global financial crisis is that we don't know that much
  - Paul Samuelson, 2009
- Risk asset prices have risen too much, too soon and too fast compared with the improvement in economic fundamentals
  - Nouriel Roubini, FT 03/11/2009



# Financial crisis or Model crisis?

- **Present economic crisis**
  - **expression in a specific historical context of the internally created limits (“internal barriers”) that capital runs up against**
  - **these barriers manifest themselves in an interconnected manner**
    - **by the fall in the rate of profit and**
    - **in periodic crises of massive overproduction**
      - **Great disagreement on the measurement of the rate of profit**
      - **The rate of investment (nearest approximation to the accumulation of physical capital) provides an expression of capitalists’ propensity to accumulate in real capital and so gives an indication of the way they view the profitability of such investment**
      - **Capital devises ways to offset the fall in the rate of profit and also to defer the moment commodities (goods) become impossible to sell and overproduction is manifest**

- **Main mechanisms used by “advanced economies” for offsetting fall in profit and deferring overproduction :**
  - **High foreign investment in “emerging economies”, notably China**
  - **Strong increase in the rate of exploitation from the 1980s onwards**
    - **extension of the working year (in the USA in manufacturing nearly two weeks more in 2002 than in 1982).**
    - **Containment and fall of real wages**
  - **Massive accumulation in financial services**
  - **Massive recourse to debt**

# Innovation Systems and the Challenges of a new global framework

- **Transformations in the global production (and innovation) system**
  - The casino has limits !!! And the world will not be the same ...
  - Changes on the main axis of the global economy
  - The relative exhaustion of markets in advanced countries and the importance of markets in the developing world (the Chinese strategy of innovations for local markets and sustainability)
  - The unemployment problem ....
  - The State is back and the importance of policies

## Crisis - Fiscal Stimulus Programmes (% of GDP)



Source: ILO, "The Financial and Economic Crisis"

# “Green” Component of stimulus packages

Country	Fund US\$ bil	Period years	Gren comp USSD bil	% green comp.
<b>Ásia</b>				
Austrália	26.7	2009-12	2.5	9.3%
China	586.1	2009-10	221.3	37.8%
Índia	13.7	2009	0.0	0.0%
Japan	485.9	From 2009	12.4	2.6%
Korea	38.1	2009-12	30.7	80.5%
Thailand	3.3	2009	0.0	0.0%.
<i>Sub-total</i>	<i>1.153.8</i>		<i>286.9</i>	<i>23.1%</i>
<i>Ásia</i>				
<b>Europa</b>				
EU	38.8	2009-10	22.8	58.7%
Germany	104.8	2009-10	13.8	13.2%
France	33.7	2009-10	7.1	21.2%
Italy	103.5		1.3	1.3%
Spain	14.2	2099	0.8	5.8%
UK	30.4	2009-12	2.1	6.9%
Others EU	308.7	2009	6.2.	2.0%
<i>Sub-total</i>	<i>325.5</i>		<i>54.2</i>	<i>16.7%</i>
<i>Europa</i>				
<b>Américas</b>				
Canada	31.8	2009-13	2.6	8.3%
Chile	4.0	2009	0.0	0.0%
USA	185.0	10 Years	18.2	9.8%
	787.0	10 Years	94.1	12.0%
<i>Sub-total</i>	<i>1.007.8</i>		<i>114.9</i>	<i>11.4%</i>
<i>Américas</i>				
<b>Total</b>	<b>2.796</b>		<b>436</b>	<b>15.6%</b>

Source: HSBC report on Climate Change (2009)

# Thank you

