



Measuring innovation in China ~ some thoughts

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Introduction

- UNESCO strategy
- Comments on NIS
- Naïve observations on place of statistics in Chinese NIS (as an outside observer – not well informed!)

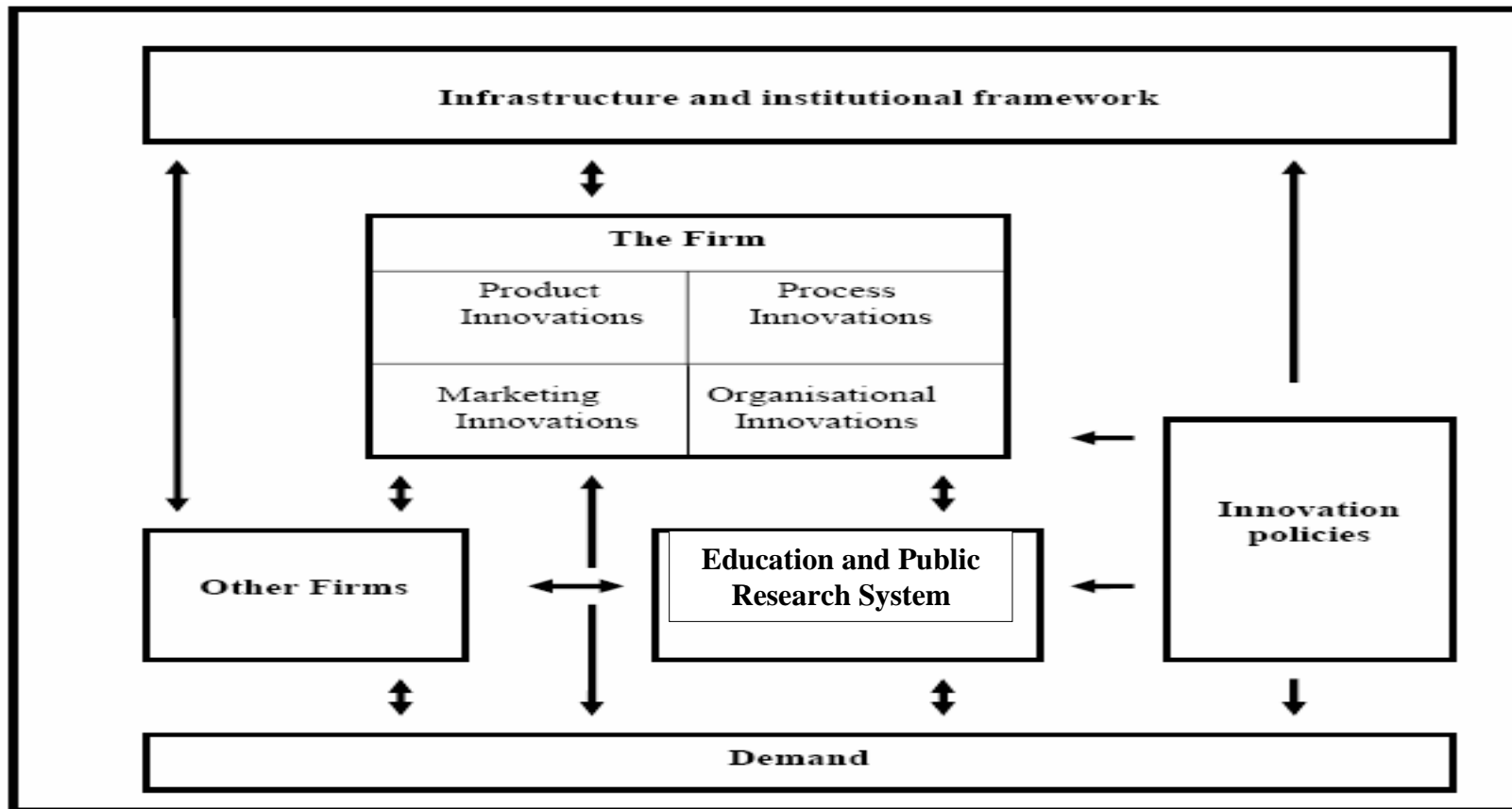
UNESCO strategy

1. R&D; where are the researchers?
2. Innovation; who is coming up with new ideas?
3. What is their impact?

Implementation

- Currently collect global R&D data
 - Surveys in 2004 and 2006
 - Work on adaptation of Frascati standard planned for 2007
- Considering work on innovation
 - Contributed annex to Oslo manual 2005
- Regional workshops programme

The innovation measurement framework of Oslo manual



Types of innovations

- **Product innovation:** introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics.
- **Process innovation:** implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software.
- **Marketing innovation:** implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing.
- **Organisational innovation:** implementation of a new organisational method in the firm's business practices, workplace organisation or external relations.

Degree of novelty

- **New to the market:**
 - the firm is the first to introduce the innovation onto its market.
 - The market is defined as the firm and its competitors.
 - The geographical scope is subject to the firm's own view of its operating market and thus can include both domestic and international firms.
- **New to the world:**
 - the firm is the first to introduce the innovation for all markets and industries, domestic and international.
 - implies a qualitatively greater degree of novelty than new to the market.
- **Disruptive innovations:**
 - an innovation that has a significant impact on a market and on the economic activity of firms in that market.
 - focuses on the impact of innovations as opposed to their novelty.
 - These impacts can, for example, change the structure of the market, create new markets, or render existing products obsolete. However, it might not be apparent whether an innovation is disruptive until long after the innovation has been introduced.

Sources for transfers of knowledge and technology	Open information sources	Sources for purchases of knowledge & technology	Co-operation partners
Internal sources within the enterprise: R&D Production Marketing Distribution	* * * * *		
Other enterprises within the enterprise group	*	*	*
External market and commercial sources: Competitors Other enterprises in the industry Clients or customers Consultants/consultancy firms Suppliers Commercial laboratories	* * * * *	* * * * *	* * * * *
Public sector sources: Universities and other higher education institutions Government/public research institutes	* * *	* * *	* * *

Human resources

- UNESCO approach, underplayed in Oslo manual
- Identifying creative/innovative individuals > link to education, especially higher education
- UNESCO/OECD/EU model survey on careers of doctorate holders
 - Being piloted in China

Key human resource questions for NIS

- Who are the most highly skilled, creatives and innovators?
- Where are they working?
- What are they working on?
- With what resources?

HE in China

- Rapid growth but at GER of 19% still behind leading Asian countries

A fast expanding NIS

- Rapid progress, especially east coast
- How to manage rapid expansion?
 - increasing demands on ministry and centre
 - fast growing private sector
- greater demand on statistics to
 - Monitor overall levels of expansion
 - Monitor private sector

A two track system?

- Divisions?
 - East v west
 - Urban v rural
- Increasing need for 'filter down'
- High level innovation and low level innovation
- Fostering growth and new ideas throughout the country

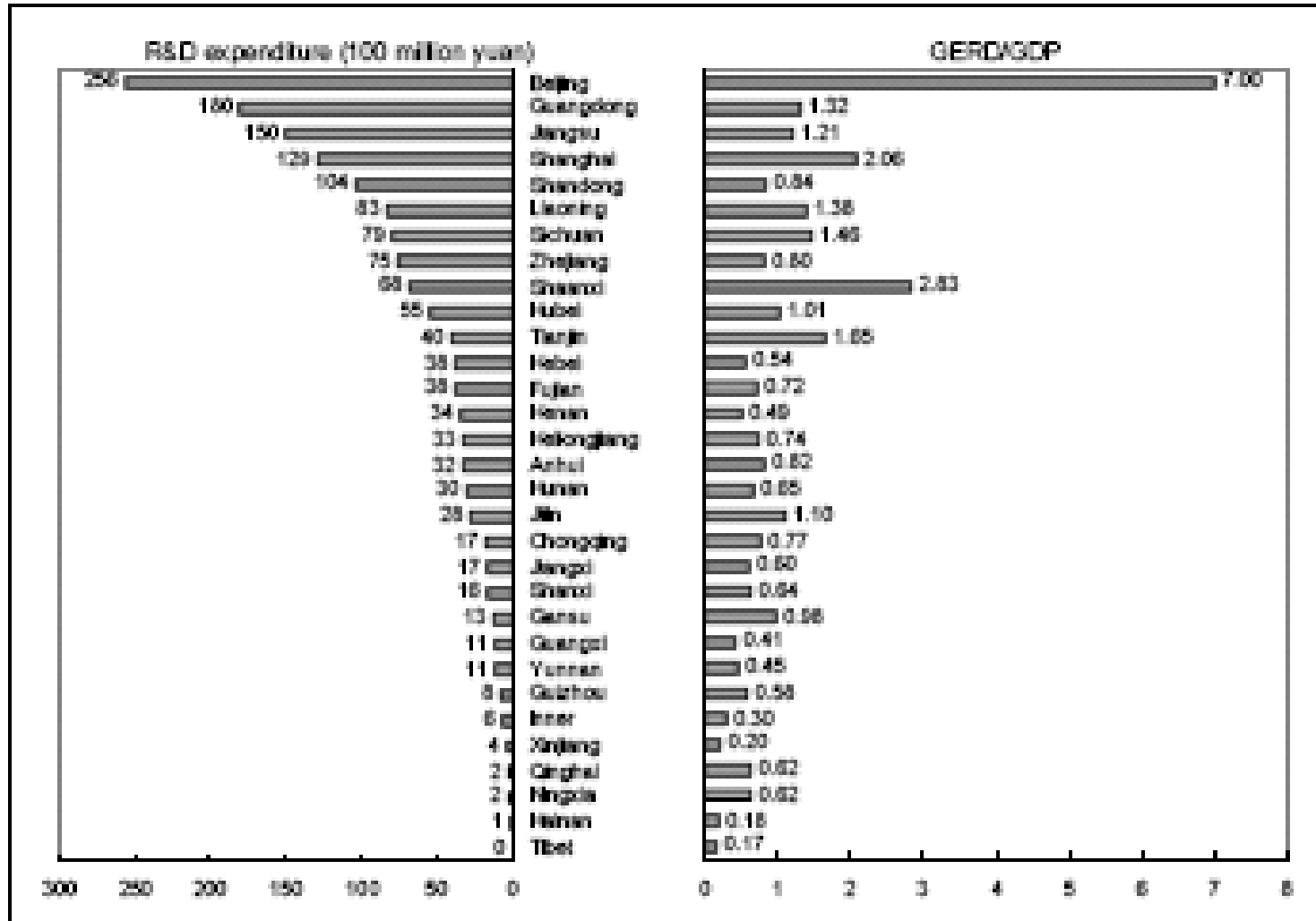
Move from replication to innovation

- national level; progress measured
- provincial level; need for
 - 'new' ideas/products
 - Replication/dissemination of national progress
- Greater demand on statistics at provincial level

Provincial innovation indicators

- High tech 'national' in east coast urban centres
- In rural and 'provincial' settings
 - Low tech
 - Organisational; distribution, marketing
 - Replication; using national 'discoveries' to improve provincial systems
 - Role of 'informal' sector

Provincial R&D statistics for China



Innovation surveys

- Organised to reflect sub-national differences within innovation system
 - Different frequency?
 - Different questions/topics?
 - Emphasise different kinds of innovation?
 - Infrastructure/innovation support system availability in rural areas?

UIS proposed adaptations for Oslo standard

- **'potentially innovative firm'**
- **ICTs in innovation surveys**
 - strategic use of new technologies ("Front office" vs "Back office")
- **Linkages**
 - linkage agents and types of linkage
 - geographical location of linkages
- **Innovation Activities**
 - "Hardware purchase", and "Software purchase"
 - "Industrial design", and "Engineering activities"
 - "Lease or rental of machinery, equipment and other capital goods"
 - "In-house software system development"
 - "Reverse engineering"
- **Human resources + training**
- **Quality and environmental management**

Conclusion

- China IS a global economic power
- Chinese innovation has 'arrived' at national and international level
- Rapid expansion requires strengthening of statistical system
- Need for statistics to measure
 - Extent/different forms of innovation in more 'remote' areas
 - Increasing role of private sector
 - Role of education & 'innovators/creatives'