The Importance of Science, Technology and Innovation Indicators for Policy

UNESCO Workshop on Surveys on Science, Technology and Innovation (STI) Policy Instruments, Governing Bodies, Policies and Indicators

Harare, Zimbabwe

7-8 November 2012

Martin Schaaper, UIS
Overview

Part 1
- Why STI?
- The need for policies
  - Evidence-based
  - Monitoring

Part 2
- What are we measuring?
- The role of the UIS
Science, Technology and Innovation?

The American view:

We need to build a future in which our factories and workers are busy manufacturing the high-tech products that will define the century... Doing that starts with continuing investment in the basic science and engineering research and technology development from which new products, new businesses, and even new industries are formed... Innovation is more important than ever. It is the key to good paying, private-sector jobs for the American people.

President Barack Obama, February 2012
The European view:

Our future standard of living depends on our ability to drive innovation in products, services, business and social processes as well as models. This is why innovation has been placed at the heart of the Europe 2020 strategy, with the Innovation Union as its flagship.

The Innovation Union is about turning ideas into jobs, green growth and social progress.
Science, Technology and Innovation?

OECD innovation strategy (2007-2010):

In 2007, Ministers acknowledged the need for a cross-government policy to harness innovation as a major driver of productivity that can strengthen economic growth and development.

Stronger innovation, combined with new international partnerships, can also help address pressing global issues such as climate change, health, food security and poverty.
Science, Technology and Innovation?
(4)

China’s view of innovation as contributing to the ‘green and harmonious’ development of a socialist society:

The 17th Party Congress of the CPC specified that Scientific Development, Harmonious Society, and promoting an Ecological Civilization should guide China’s social values and progress.
Science, Technology and Innovation? (5)

The African Ministerial Council on Science and Technology (AMCOST) stipulates in Africa’s Science and Technology Consolidated Plan of Action (CPA) that: The overall goals of the CPA are to enable Africa to harness and apply science, technology and related innovations to eradicate poverty and achieve sustainable development.
Science, Technology and Innovation policies

- STI now universally recognised as one of the main drivers of economic growth and societal well-being.
- ... and therefore of poverty reduction as well
- Governments should aim to harness the benefits of STI...
- ... and address market failure
Market failure

- Knowledge is discrete and requires large fixed costs (R&D) $\rightarrow$ price is higher than consumers are willing to pay
- Uncertainty (moral hazard): research often is unsuccessful
- Knowledge is a public good
  - Non-exclusive
  - Free riders
  - Positive externalities
- Result: firms are unable to capture all the benefits to society from their innovation.
National STI policy

- Integrated in the overall national strategic plan
- Coordinated between the various actors that have a stake (e.g. Ministry of Agriculture, Ministry of Health, Ministry of Higher Education, etc.)
“Innovation policy has developed as an amalgam of science and technology policy and industrial policy. It takes as a given that knowledge in all its forms plays a crucial role in economic progress, and that innovation is a complex and systemic phenomenon. Systems approaches to innovation shift the focus of policy towards an emphasis on the interplay of institutions and the interactive processes at work in the creation of knowledge and in its diffusion and application. The term “national innovation system” has been coined to represent this set of institutions and these knowledge flows.” (OECD)
Japan’s NIS

Fig. 1 Conceptual Diagram of National Innovation System

Source: Prepared by MEXT
Evidence-based policy

- Tests theory - why will the policy be effective and likely impacts if successful
- Incorporate some measurement of the impact
- Examines both direct and indirect effects that occur because of the policy (unintended consequences)
- Separates the uncertainties and controls for other influences outside of the policy that may have an effect on the outcome
- Empirical validation
The need for data

- Accountability for spending of public funds requires:
  - Informed strategy and forecasting
  - Indicator-based joined-up policy
  - Coordination of plans and budgets
  - Monitoring
  - Measurement and evaluation of programmes and projects
  - Benchmarking
  - Learning
Indicators tell a story

- Do I need to invest in R&D or in Higher Education?
- In which areas should I invest predominantly?
  - In which areas am I already investing?
  - Which are important economic sectors, in mining, agriculture, industry, services, etc?
  - What are national or regional peculiarities? (health, environment, utilities, defense,...)
- Do I need to improve quality of higher education or research?
  - Are there sufficient links of universities and institutes to industry?
Singapore

The five strategic thrusts for the national R&D agenda are:

1. To intensify national R&D spending to achieve 3% of GDP by 2010
2. To identify and invest in strategic areas of R&D
3. To fund a balance of basic and applied research within strategic areas
4. To provide resources and support to encourage private sector R&D
5. To strengthen linkages between public and private sector R&D
Kenya Vision 2030

- The government will allocate 1% of GDP annually for the R&D sub-sector and motivate other stakeholders to participate in funding STI.
Tanzania

- Government funds for R&D are insufficient. Despite the pledge in 2007 to increase R&D funding to 1% of GDP, current funding remains at 0.18%, according to Dr E. Mbede, Director of Research at the Tanzanian Ministry of Communication, Science and Technology.
Botswana

- The policy will ensure a gradual increase in R&D investment to a target of at least two per cent of the country's GDP (gross domestic product) in four years' time.
Guided by a commitment reached in 2006 by African Union, ministers resolved that all African countries honour the commitment to devote at least one percent of gross domestic product (GDP) to R&D and set in place national ST&I policies, by 2015.
China

- China aims to put 2.2 percent of its GDP into research and development by 2015, says a draft of the country's 12th Five-Year Plan.
Qatar national research strategy

- Commitment to allocate 2.8% of GDP to research
- Quoted in newspapers as a reality, rather than a commitment
- Data are absent, but anecdotic evidence points in another direction
A few targets
The EU target

<table>
<thead>
<tr>
<th>Year</th>
<th>Situation 2000</th>
<th>Eurostat estimate</th>
<th>Target 2010</th>
<th>Target 2020</th>
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<tr>
<td>2020</td>
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</tbody>
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Notes:
- Target 2010: 1.80
- Target 2020: 2.00
China’s target

- Situation 1995
- China real data
- Target 2015

Target 2015

Situations and target trends from 1995 to 2015.
Intermezzo

Any questions?
An STI indicators model

Inputs (R&D expenditure, Human Resources)
- R&D survey
  - R&D personnel
  - R&D Expenditure

Black Box (innovation)
- Innovation statistics
  - since 2010

Output (patents, publications, high-tech products)
- Administrative data (patents)
- Publications databases
- High-tech data (trade)
What to measure

- **Inputs: R&D Surveys**
- **Inputs: Human Resource surveys**
  - Education statistics; Higher education statistics; mobility; labour force survey
- **Inputs: infrastructure**
- **Intermediate outputs: scientific publications; patents; design; copyright;**
- **Outputs: Prototypes; Plant varieties**
- **Outcomes: Innovation Survey**
Innovation Union Scoreboard 2011
Innovation Union Scoreboard (EU)

- 3 main types of indicators
  - Enablers
  - Firm activities
  - Outputs

- 8 innovation dimensions
  - Human resources
  - Open, excellent and attractive research systems
  - Finance and support
  - Firm investments
  - Linkages & entrepreneurship
  - Intellectual assets
  - Innovators
  - Economic effects
IUS indicators

- Doctorate graduates, educational attainment and student mobility
- (Co-)publications, patents, trademarks and designs
- R&D expenditure
- Innovation (SMEs) and Innovation expenditure
- High-growth innovative firms
- Venture capital
- Knowledge-intensive services (empl. and exports)
- Medium and high-tech product exports
More examples
UNESCO Institute for Statistics (UIS)

- Formerly UNESCO Office of Statistics; Division of Statistics on S&T
- Established in 1999
- September 2001 - the UIS moved from Paris to the University of Montreal, Quebec, Canada
- 30 November 2001 – UNESCO Director-General inaugurates the UNESCO Institute for Statistics in Montreal
- Director: Mr. Hendrik van der Pol
UIS presence around the world

UNESCO Institute for Statistics
UNESCO Institute for Statistics (UIS)

- United Nations data repository for:
  - Education
  - *Science, Technology and Innovation*
  - Culture
  - Communication
UIS is the UN lead agency for STI statistics

- Official STI data source for UNSD, WB, etc.
- Data publicly available at:  
  http://www.uis.unesco.org
- UIS Publications (can be downloaded from the UIS website): S&T Bulletins; Fact sheet, eAtlas on R&D statistics
- UNESCO Reports
Areas of work

- R&D personnel & expenditure
- Human resources devoted to S&T and international mobility
- Innovation data
- Longer term: Output & Impact
Lines of action

- STI survey operations and data guardianship
  - 1.1 R&D Survey
  - 1.2 Innovation Survey
- Training in STI statistics: workshops & other training activities
- Standard setting and methodological developments
- Analysis and publications
1. STI Survey operation and data guardianship

- Global survey on statistics of Research and Development (R&D)
- Biennial, since 2004
- Global database on R&D Statistics
- 2011: Pilot survey of Innovation Statistics
- 2013: First global data collection of innovation statistics
1.1 Survey on Statistics of Research and Development (R&D)

- Biennially.
- 5th round was launched in June 2012.
- Data and metadata released on UIS website (http://stats.uis.unesco.org).
- OECD and Eurostat provide data for their Member States.
- RICYT provides data for Latin America and for a few Caribbean countries.
- Cooperation with ASTII.
Research and Development

- First edition published in 1963!
- Sixth edition published in 2002
- De facto world standard
R&D: Definition

Research and experimental development (R&D) comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications.

Basic criterion: presence of an appreciable element of novelty and the resolution of scientific and/or technological uncertainty.
R&D covers 3 activities

- **Basic research**
  (no particular application or use in view)

- **Applied research**
  (directed primarily towards a specific practical aim or objective)

- **Experimental development**
  (directed to producing new materials, products or devices)
Exclusions

Excluded from R&D

- Education and training
- Scientific and technological services / Other science and technology activities
- Other industrial activities
- Administration and other supporting activities
Data collection: R&D Survey

R&D Personnel
- By sector of employment, occupation, qualification, and field of science
- In headcount and FTE
- By gender

R&D Expenditure
- By sector of performance and source of funds
- By type of activity and field of science
### UIS 2010 and 2012 Surveys on R&D: response rates & published data

<table>
<thead>
<tr>
<th>Regions (Countries and Territories covered)</th>
<th>Effective responses Q 2010</th>
<th>Effective responses Q 2012</th>
<th>Published data (by June 2012)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-Saharan Africa (45)</td>
<td>12 4 27% 30%</td>
<td>3 7% 6%</td>
<td>31 6 69% 70%</td>
</tr>
<tr>
<td>Arab States-Africa (9)</td>
<td>6 44% 50% 51%</td>
<td>0 0% 0%</td>
<td>6 67%</td>
</tr>
<tr>
<td>Asia (31, excl. Arab States &amp; OECD)</td>
<td>16 52% 51%</td>
<td>7 23% 23%</td>
<td>24 5 77% 67%</td>
</tr>
<tr>
<td>Arab States - Asia (12)</td>
<td>6 50% 51%</td>
<td>3 25% 23%</td>
<td>5 42% 67%</td>
</tr>
<tr>
<td>Americas (14, excl. RICYT &amp; OECD)</td>
<td>0 0% 0%</td>
<td>1 7% 7%</td>
<td>4 29%</td>
</tr>
<tr>
<td>Europe (16, excl. OECD &amp; Eurostat)</td>
<td>7 44% 51%</td>
<td>3 19% 23%</td>
<td>11 42% 69%</td>
</tr>
<tr>
<td>Oceania (17, excl. OECD)</td>
<td>0 0% 0%</td>
<td>0 0% 0%</td>
<td>3 18%</td>
</tr>
<tr>
<td><strong>Sub-total (144)</strong></td>
<td>45 31% 12%</td>
<td>17 12% 12%</td>
<td>84 59%</td>
</tr>
</tbody>
</table>

**Data from other sources:**

| OECD + Eurostat (44)                       | 45 100% 100% | 44 100% 100% | 44 100% |
| RICYT (26, incl. 10 Caribbean)             | 18 72% 73% | 19 73% 73% | 19 73% |

**Total (214)**

| 108 51% 37% | 80 37% 37% | 147 69% |

Note: Effective responses: number of returned questionnaires with data.
How many researchers are there?

Number of researchers worldwide

Source: UIS, August 2010
How many researchers are there?

Number of researchers worldwide

Source: UIS, August 2010

Note: Data for the USA are for 2006 instead of 2007
R&D personnel

- **Total R&D personnel (HC)**
- **Total R&D personnel (FTE)**

Researchers (HC) per million pop. (1)
Researchers (HC) per million population (2)
UNESCO Institute for Statistics

Researchers (HC) per million pop. (3)

Researchers per million inhabitants (HC)

Percentage of female researchers (1)
Percentage of female researchers (2)
Percentage of female researchers (3)

Researchers (HC) - % Female

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Botswana</td>
<td>2005</td>
<td>30.0</td>
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<tr>
<td>Malawi</td>
<td>2007</td>
<td>20.0</td>
</tr>
<tr>
<td>Zambia</td>
<td>2008</td>
<td>30.0</td>
</tr>
</tbody>
</table>
Researchers by qualification

- ISCED 5A %
- ISCED 5B %
- ISCED 6 %
- All other qualifications %

Botswana (2005)
Zambia (2008)
Researchers by sector of employment

- Business enterprise (%)
- Government (%)
- Higher education (%)
- Private non-profit (%)

Countries and Years:
- Botswana (2005)
- Malawi (2007)
- Zambia (2008)
R&D expenditure as a % of GDP (1)
R&D expenditure as a % of GDP (2)
R&D expenditure as a % of GDP (3)

- Botswana (2005)
- Zambia (2008)
Intermezzo

Any questions?
1.2 Innovation Statistics: Why?

- Medium-term objective of the International Review of S&T Statistics & Indicators 2002-03;
- May provide information on the business sector in developing countries that R&D statistics won’t supply;
- Many developing countries recently starting to carry out innovation surveys;
- UIS has a natural coordinating role as UN lead agency on STI statistics.
Innovation: the Oslo Manual

- Jointly with the EC
- Part of the Frascati family
- Used for CIS and national innovation surveys
- 1st edition 1992
- 2nd edition 1997 → coverage expanded to services
- 3rd edition 2005 → including non-technological innovation
What is innovation?

- Innovation is the implementation of:
  - New or significantly improved product or process;
  - New marketing or organisational method.

**Implementation:**

- A new or improved product is implemented when it is introduced on the *market*;
- New processes, marketing methods or organisational methods are implemented when they are brought into actual use in the *firm’s operations*.
Types of innovation - Product (1)

- Product Innovation:
  - Introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses;
  - New products: different characteristics or intended uses from previous products;
  - Significantly improvements: changes in materials, components, and other characteristics that enhance performance.
Types of innovation - Product (2)

- Product Innovation - examples:

  - New products:
    - The first microprocessors;
    - The first digital cameras;
    - The first portable MP3 player;

  - Significantly improvements:
    - Introduction of ABS braking, GPS navigational systems, or other subsystem improvements in cars;
    - The use of breathable fabrics in clothing;
    - Improvements in internet banking services, such as greatly improved speed and ease of use.
Types of innovation - Process (1)

- Process Innovation:
  - Implementation of a new or significantly improved production or delivery method (changes in techniques, equipment and/or software);
  - Intended to: decrease unit costs of production or delivery, increase quality, or produce or deliver new or significantly improved products.
Types of innovation - Process (2)

- Process Innovation - examples:
  - Introduction of a bar-coded goods-tracking system;
  - Introduction of GPS tracking devices for transport services;
  - Implementation of computer-assisted design for product development;
  - Implementation of a new reservation system in a travel agency.
Types of innovation - Marketing (1)

- Marketing Innovation:
  - Implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing;
  - Better addressing customer needs, opening up new markets, or newly positioning a firm’s product on the market → increasing firm’s sales;
  - Marketing method NOT previously used - part of a new marketing concept or strategy;
  - For both new and existing products.
Types of innovation - Marketing (2)

- Marketing Innovation:
  - Product design or packaging: changes in form and appearance that do not alter products’ functional or user characteristics + changes in the packaging;
  - Product placement: new sales channels;
  - Product promotion: new concepts for promoting a firm’s goods and services;
  - Pricing: new pricing strategies to market the firm’s goods or services.
Types of innovation - Marketing (3)

- Marketing Innovation - examples:
  - Development and introduction of a fundamentally new brand symbol;
  - First use of a significantly different media - product placement in a television programme;
  - Introduction for the first time of a franchising system.
Types of innovation - Organisational (1)

- Organisational Innovation:
  - Implementation of a new organisational method in the firm’s business practices, workplace organisation or external relations;
  - Increase firm’s performance by reducing administrative/transaction costs, improving workplace satisfaction, accessing non-tradable assets, or reducing costs of supplies;
  - Organisational method NOT used before - result of strategic decisions taken by management.
Organisational Innovation:
- Business practices: implementation of new methods for organising routines and procedures for the conduct of work;
- Workplace organisation: new methods for distributing responsibilities and decision making among employees for the division of work within and between firm activities + new concepts for the structuring of activities;
- External relations: new ways of organising relations with other firms or public institutions.
Organisational Innovation - examples:

- First implementation of a database of best practices;
- Establishment of new types of collaborations with research organisations;
- First implementation of an organisational model that gives the firm’s employees greater autonomy in decision making and encourages them to contribute their ideas.
Diffusion and degree of novelty

- Degree of novelty:
  - Firm;
  - Market;
  - World;

- Radical innovations:
  - Significant impact on a market;
  - Impact of innovations (as opposed to their novelty);
  - May become apparent only long after introduction.
Innovation activities (1)

- Innovation activities: all scientific, technological, organisational, financial and commercial steps which (intended to) lead to the implementation of innovations;
- Some innovation activities are themselves innovative, others are not novel but necessary;
- R&D not directly related to the development of a specific innovation.
Innovation activities (2)

- For product and process innovations:
  - Intramural (in-house) R&D;
  - Acquisition of (extramural) R&D;
  - Acquisition of other external knowledge;
  - Acquisition of machinery, equipment and other capital goods;
  - Other preparations for product and process innovations;
  - Market preparations for product innovations;
  - Training.
Innovation activities (3)

- Preparations for marketing innovations:
  - Activities related to the development and implementation of new marketing methods;
  - It includes acquisition of other external knowledge and of machinery, equipment, and other capital goods and training;
  - Expenditures for using these methods in daily business are NOT included.
Innovation activities (4)

- Preparations for organisational innovations:
  - Activities undertaken for the planning and implementation of new organisation methods;
  - It includes acquisition of other external knowledge and of machinery, equipment, and other capital goods and training.
Kinds of innovation activities

- Successful - resulted in the implementation of a new innovation (not necessarily commercially successful);

- Ongoing - work in progress, which has not yet resulted in the implementation of an innovation;

- Abandoned - before the implementation of an innovation.
Factors influencing innovation

- Objectives: Motives for innovating;
- Effects: Observed outcomes of innovations (Table 9);
  - Impacts on firm performance;
  - Time lag;
- Hampering factors:
  - Reasons for not starting innovation activities at all;
  - Factors that slow innovation activity or have a negative effect on expected results (Table 10).
Linkages

- Linkages: connections with other agents;
- Source, cost, level of interaction;
- Types of external linkages:
  - Open information sources;
  - Acquisition of knowledge and technology;
  - Innovation co-operation.
Appropriability

- Ability of enterprises to appropriate gains from innovation activities:
  - Formal methods: patents, registration of design, trademarks, copyrights, confidentiality agreements, trade secrecy;
  - Informal methods: secrecy that is not covered by legal agreements, complexity of product design, lead time advantage over competitors.
The UIS strategy on Innovation Statistics

- Inventory of innovation surveys in developing countries;
- Pilot data collection (19 countries in June 2011);
- Metadata collection 2012;
- 2013: Regular data collection every two years;
- Online worldwide database;
- Analysis and publications;
- Capacity building and training activities;
- Methodological developments and survey help;
- In partnership with international and regional organisations (ASEAN, AU/NEPAD, Eurostat, OECD, RICYT, ...).
Innovation inventory

- **Africa:**
  - 12 countries
  - 18 surveys

- **Asia:**
  - 14 countries
  - 38 surveys

- **LAC:**
  - 15 countries
  - 47 surveys

- **Europe:**
  - 26 countries
  - 57 surveys

- **North America**: *
  - 2 countries
  - 8 surveys

- **Oceania:**
  - 2 countries
  - 7 surveys

**Total:**
- 71 countries
- 175 surveys

*Work in progress; **Mexico is included in LAC.
## Innovation inventory

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<th>Number of surveys carried out</th>
<th>Number of surveys checked</th>
<th>Methodological base</th>
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<td>1</td>
<td>OM/CIS</td>
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<td>2. Egypt</td>
<td>2</td>
<td>2</td>
<td>OM/CIS</td>
</tr>
<tr>
<td>3. Ethiopia</td>
<td>1</td>
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<td>OM</td>
</tr>
<tr>
<td>4. Ghana</td>
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<td>OM/CIS</td>
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<tr>
<td>5. Lesotho</td>
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<td><strong>12 countries</strong></td>
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<td><strong>15</strong></td>
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*The first (unofficial) survey is included*
2011 UIS pilot data collection (1)

- Launch: June, 2011;
- Countries: 19 countries, 12 responses:
  - Asia: CHN, IDN, ISR, MYS, PHL, LKA
  - Africa: EGY, GHA, ZAF, TZA
  - Europe: RUS
  - LAC: ARG, BRA, CHI, COL, CRI, MEX, PAN, URY
- Observation period: most recent innovation survey for which data are available;
- Industrial coverage: All, Manufacturing, Services.
2011 UIS pilot data collection (2)

Topics:
- Basic methodology (metadata)
- Product innovation
- Process innovation
- Innovation activities and expenditures
- Funding
- Sources of information
- Cooperation
- Hampering factors
- Organisational innovation
- Marketing innovation
- All types of innovation
2011 UIS pilot data collection (3)

Product or process innovators:
Manufacturing firms that implemented product or process innovation (as a % of all manufacturing firms)

Eurostat min  Eurostat max
Product or process innovators by size:

Manufacturing firms that implemented product or process innovation by size class (as a % of all manufacturing firms in each size class)
2012 UIS metadata collection

- Launch: September, 2012;
- Countries: all countries with official innovation surveys;
- Methodological procedures of the national innovation surveys;
- Key contact person(s) for innovation statistics.
2013 UIS global data collection

- Launch: June, 2013;
- Countries: all countries with official innovation surveys;
- Observation period: most recent innovation survey for which data are available;
- Industrial coverage: mostly manufacturing;
- Topics: same as pilot publication.
Intermezzo

Any questions?
2. Capacity building: STI statistics workshops

- Increase the number of countries regularly producing quality S&T indicators.
- Create local capacities and establish sustainable local S&T statistics systems.
- Promote the use of S&T indicators for evidence-based S&T policy making.
- Share experiences with other developing countries and address problems.
- Gain knowledge about the particular characteristics of S&T statistics data.
- Demonstrate good practices in other countries of the region.
UIS STI Statistics workshops

2005: Uganda, India
2006: Indonesia, Senegal, Kazakhstan
2007: Tunisia, FYR of Macedonia, Jordan, Russia, Cameroon
2008: Oman, Cambodia, Botswana
2009: Kenya, Egypt
2010: Mali, Syria, Jordan*, Uzbekistan, Ethiopia*, Nepal

But also contributing to similar workshops of partner organisations (e.g. RICYT, NEPAD, other partner orgs)
2. UIS STI training workshops 2005-2011
Results of workshops

- Increased response rate – non-responding countries learn how to do it from UIS and neighbours.
- Immediate problems solved.
- Increased data quality – improved understanding of application of international standards.
- Face to face contacts = more effective networking.
- Inputs to UIS programme development.
3. Methodological developments
More methodological products

- Annex to the Oslo Manual
- OECD/UIS/Eurostat Careers of Doctorate Holders survey
- Technical Paper on the Conduct of an R&D survey (in preparation)
- Revision of the concept of Scientific and Technological Activities (in preparation)
- Country-level technical assistance on R&D and innovation surveys
4. Some publications

- Data publicly available at: http://www.uis.unesco.org
  http://stats.uis.unesco.org/
- UIS Fact Sheets
- UNESCO Science Report 2010
Collaborations / Partnerships

- UNESCO HQs
- World Bank
- Eurostat
- AU-NEPAD
- ADB
- ATPS
- ISDB
- EU-Medibtikar
- IDRC (Canada)
- IRD (France)

- UNESCO offices worldwide
- OECD
- RICYT (Latin America)
- ALECSO
- Arab Academy of Science
- ISESCO
- Inter-Academy Council
- INRS (Quebec, Canada)
- ASEAN
Collaboration with AU-NEPAD

- Cooperate in increasing the availability and improving the quality of international comparable STI statistics in Africa
- Support ASTII in facilitating the conduct of national STI surveys and the development of related indicators
- Develop and offer joint training courses in STI policy to African government officials
- Share relevant data collected by and from African countries
- Collaborate in supporting African governments to review and/or develop national STI policies and strategies
Conclusions

- Innovation is important for economic growth
- STI policies are essential
- Evidence-based
- Countries to establish sustainable and coordinated STI statistics systems, involving line ministries (S&T Ministries or Research Councils) and National Statistical Offices
- UNESCO can help
Thank you for your attention!

http://www.uis.unesco.org

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