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Mapping research systems in developing countries

Project overview



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PROJECT OVERVIEW

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1. Background

This document provides an overview of the origination, research design and methodology and main elements of a comprehensive study on National research systems in developing countries conducted under commission of the UNESCO Forum on Higher Education and research.

At a workshop held on the 6th and 7th of April 2006 at UNESCO, Paris, the objectives of a proposed study on national research systems were formulated as follows:

....to learn more about research systems in developing/poor countries, and to help strengthen research and research capacity. Thus, the project supports research on and for development so that developing/poor countries may articulate and have ownership of these systems which are key assets for their development.

At a subsequent meeting, it was decided that a "follow up group be established (consisting of) Dr Johann Mouton, CREST/South Africa, Dr Roland Waast IRD/Paris, Dr Lazar Vlasceanu UNESCO CEPES/Romania, Dr Carthage Smith ICSU/Paris with support to be given by Dr Christina von Furstenberg (Social Sciences) and Dr Tony Marjoram (Science) who are members of the UNESCO Forum Coordinating Committee. It was also decided to invite Drs Mouton and Waast "to undertake a literature search of major reports on the subject of National Research Systems, dividing the task according to their areas of experience". And finally, it was suggested that "a report on the findings of this search /mapping exercise be presented at the UNESCO Forum's Global Colloquium (29 November – 1 December 2006) which would deal with current challenges for universities (especially in developing countries) as part of national research systems".

In further reflection on this Brief, the authors decided to refer to this study as a meta-review of existing country studies as the request goes beyond a standard review of the literature. A meta-review (or systematic review) is a study which has both a descriptive and “evaluative” aim. Its descriptive aim is to describe and summarize in sufficient detail the key elements of a particular study (i.e. date, coverage, study objectives, data sources and methodologies used and key findings). In addition it usually also has an evaluative aim, that is, to make a judgment on the quality of the study being reviewed. This would entail commenting on the reliability and recency of data sources, appropriateness of design and methodology as well as the extent of the coverage of the study.

The further clarification and elaboration of the Brief entailed a number of decisions around the demarcation of the studies. Two were paramount: the matter of time and the selection of countries to be included in the Meta-review.

Dateline

It was decided to review studies that had been published between 1990 and 2005. The authors would ideally have liked to confine this review to studies over the past 10 years only. However, we believed that – given the focus on poor and developing countries (cf. below) – that we might in some cases come across studies published in the early nineties only.

Selection of countries (and regions)

In the final selection of the list of the countries, we employed the following criteria for inclusion:

- The developing and poor countries of the world
- Non-OECD countries and also not including the newly industrialized countries
- Countries that have not already been well researched even if they fall into the two categories above¹
- Countries with at least some minimal R&D capacity

¹ These would then rule out countries such as China, Brazil, India and South Africa

The final criterion was included, for two reasons; (1) given the focus of the overall project on assisting countries with poorly or underdeveloped R&D (and S&T) capabilities, we thought it would be reasonable to begin with those countries where such a minimal capacity exists; (2) for pragmatic considerations in order to keep the number of country studies for this review manageable. The inclusion of this criterion implied that one has some way of operationally define R&D capacity. Although we are aware that this is not an uncontested decision, we have decided to take the annual number of publications in the ISI Web of Science as a criterion and only to include countries which have produced at least 200 scientific papers over the 3 years period (2002 – 2004)².

This criterion produced the following list of countries to be included in our review.

African Region

BENIN, BOTSWANA, BURKINA FASO, CAMEROON, ETHIOPIA, GABON, GAMBIA, GHANA, IVORY COAST, KENYA, MALAWI, MALI, , NIGERIA, SENEGAL, SUDAN, TANZANIA, , UGANDA, ZAMBIA, ZIMBABWE,

Arab Region

ALGERIA, BAHRAIN, EGYPT, IRAN, JORDAN, KUWAIT, LEBANON, MOROCCO, OMAN, SYRIA, TUNISIA, U ARAB EMIRATES

Asia Region

BANGLADESH, INDONESIA, MALAYSIA, NEPAL, PAKISTAN, PHILIPPINES, SINGAPORE, SRI LANKA, THAILAND, VIETNAM,

Latin American and Caribbean Region

ARGENTINA, BOLIVIA, CHILE, COLOMBIA, COSTA RICA, CUBA, ECUADOR, JAMAICA, MEXICO, PANAMA, PERU, TRINIDAD & TOBAGO, URUGUAY, VENEZUELA,

²

We have selected this rather low cut-off point keeping in mind that a significant proportion of the research and scholarship produced in these countries does not appear in journals indexed in the ISI. Bibliometric data provided by Dr Robert Tijssen, at CWTS, Leiden.

After this initial selection process we subsequently – as we proceeded with the collection of country studies and other data – discovered that we could not find any studies for those countries underlined above. Because the biggest impact would be on the Africa region, we finally decided to substitute four new countries in the place of those that we could not cover in this review. We, therefore, included in the Africa meta-review the following three countries: Lesotho, Namibia and Rwanda. In our selection of countries in the Arab region, we also managed to include two other country studies (Qatar and Saudi Arabia) in the place of Egypt and Iran that could not be covered. No changes were necessary for the final countries selected for Asia nor for Latin America. In summary, our study compiled 54 country reviews:

- Africa (18 countries)
- Arab region (12)
- Asia (10)
- Latin America (14)

2. Research design and methodology

Given the large number of countries to be covered as well as potential diversity of studies to be reviewed we adopted a two phased approach:

- Phase 1: Utilizing the knowledge and resources of a small number of research co-workers to collect relevant material and complete a first round of study mapping (the collection and mapping phase).
- Phase 2: Comparative and integrative review of the first round study maps by ourselves (the integrative review phase).

2.1 Phase 1: The collection and mapping phase

Based on previous studies and collaborations we were able to call upon a number of knowledgeable and well-placed researchers to assist us in the execution of this commission. Most notably we were able to secure the collaboration of Daniel Villa-Vicencio (Mexico) and Venni Krishna (India) and their collaborators to assist us with the compilation of the Latin America and Asia country reviews respectively.

Their key tasks were twofold:

- To work through available and known collections of studies as well as systematically summarize all possible sources of information (government resources/ websites/ S&T studies centres) in order to identify studies that meet the criteria for inclusion as outlined above.
- To produce a summary “map” of each study in accordance with a framework which we have developed (cf. below).

In addition to being able to call upon the co-operation and resources of these two persons, we were also able – especially with regard to the country reviews in Africa and the Arab region – to optimize on recent and current studies being undertaken by ourselves and immediate colleagues. Three such studies are noteworthy:

- The first was a project, funded by the South African Department of Science and Technology. This project supported the work of scholars at CREST and High Impact Innovation and enabled us to compile a total of 22 country profiles. Fourteen of the country studies included in our compilation of 17 studies were therefore co-funded under this joint project.
- The second is the *Science in Africa* project co-ordinated by Roland Waast and Jacques Gaillard with funding from the European Commission and the French Ministry of Foreign Affairs at the end of the 1990s. The latter produced 14 country profiles of which three in particular were used in the present project (Burkina Faso, Cameroon and Cote d’Ivoire, all of them drawing from fieldwork by H. Khelfaoui and also of J. Gaillard for Cameroon). The complete set of original reports from this project is available at www.ird.fr/science/dss.
- The compilation on the Arab region benefited greatly from the fact that the work on a few country profiles corresponded with an initiative supported by the European commission which had similar objectives: the *ESTIME* project (Evaluation of Scientific and Technological capabilities in Mediterranean countries) coordinated by Rigas Arvanitis aiming at the description of the scientific and technological capabilities in 8 research partners countries of the Mediterranean (Morocco, Tunisia, Algeria, Egypt, Lebanon, Syria, Jordan and

Palestinian Territories). In particular, the Estime reports on Jordan and the Lebanese Republic authored by Pénélope Larzillière and Jacques Gaillard respectively are reproduced in full in the present compilation. The English reports from the ESTIME project are available at www.estimate.ird.fr.

- The refinement of some of the African country reports further benefited from a recent study that CREST conducted under commission for SARUA (Southern African Regional Universities Association) and which involved more detailed country studies of the S&T systems in the 15 SADC countries.

In the final analysis, it is very evident that we would not have been able to complete this project in the degree of detail achieved if it had not been for the fact of these other initiatives that we could build on and benefit from.

2.2 Phase 2: The integrative review phase

In the compilation of the 53 country reviews, we requested our various collaborators to comply – as closely as possible – with a framework that we had developed for the purposes of this study. This framework comprised the following elements:

- Some considerations about the History of science in the (country, region) under review:
 - The governance of science in the country
 - Available policies (especially S&T and R&D)
 - R&D performers (Establishments/ Institutions)
 - Informal S&T structures (Academies, Associations, Trade unions, Journals, etc = Scientific Community)
 - S&T Human Resources (Description + Considerations about the Profession of researcher: status, salaries, etc)
 - Research Funding (Public or private; National and international; Trends)
 - Research Output
 - Scientific co-operation and agreements (Description: formal agreements; main partners (measure through bibliometrics);

doctrines, practices and evolution; types and amount of funding – if available). Local collaborations (scientific and socio-economic).

Given the specific origins of the various country reviews and the fact that some studies had been completed under different terms of reference, not all of our country studies managed to comply with the framework provided above. It is also the case that even where it was possible in theory to comply with this framework, the available data and statistics would not allow for full “compliance”. The end result is that our 53 country studies conform to varying degrees (and with different emphases) with the framework outlined above.

Once the 55 country reviews had been completed we commenced work on four integrative and summary Regional reports and this final Synthesis report. The four Regional Reports (Arab and Latin America reports written by Roland Waast and Africa and Asia reports written by Johann Mouton).

2.3 Phase 3: The integrative review phase

The first two phases, discussed above, culminated in the production of first versions of all the country, regional and synthesis reports. These were submitted to UNESCO in January 2008. Subsequently, based on extensive feedback and comments received from various people, it was decided that that another year would be set aside for the project in order to improve the quality and scope of the project outputs even more. One reason for this decision was that a number of studies had subsequently been conducted by drs. Mouton and Waast in under projects and which could benefit the UNESCO reports. This phase therefore consisted of the following:

- Updating of all statistical sources across all reports
- Further improvement in the quality of some country reports which were deemed to require further attention
- Further additions and refinements to the country mapping template
- Further refinements of two of the regional reports
- The construction of four regional and one integrated bibliography.

The final country reviews range on a continuum from “emic” to “etic”: from studies produced by authors who live in the country concerned and know it intimately to authors who had to rely on available reports, documents and statistics on the country but However, the reader should of course keep in mind that our Brief only required a meta-review of existing studies. Our commission was to collect, standardize and compile 53 country studies using a standardized framework so as to enable us to draw some preliminary conclusions about these research systems. In addition our Brief was also to utilize the information gained through this exercise in order to construct a new Country Template that could be used in future in-depth country studies. We, therefore, do not regard this constraint as in any way invalidating what we have produced. In fact, it highlights some of the epistemological and methodological challenges that a comprehensive venture of this nature inevitably faces.

3. Project deliverables

This study produced a wealth of reports and more than 1400 pages of text:

- A final synthesis report
- Four regional reports
 - African regional report
 - Arab regional report
 - Latin American regional report
 - Asia regional report
- Fifty-five country reports
 - Sub-Saharan Africa compilation (18 countries)
 - Arab compilation (12 countries)
 - Latin American compilation (14 countries)
 - Asia compilation (10 countries)
- A mapping template
- A consolidated bibliography
- Four regional bibliographies