Annexes

Gymnastics class, Taipei, China
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Annexes

Annex 1 Basic statistics on the production of social sciences

Measure for measure: quantifying the social sciences

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Introduction

More than half a century of effort has been devoted to the problem of quantifying national commitments to investment in research and experimental development (R&D) (Godin, 2008). The quantification of innovation is more recent, dating from the early 1990s. Such measurement and the construction of associated science, technology and innovation (STI) indicators are of interest to national authorities for monitoring and planning purposes as well as for determining international comparability. Notwithstanding this long history, such efforts face considerable difficulties – epistemological, definitional and methodological. It is the task of this paper to describe how research in the social sciences is quantified at the national level by means of standardized datasets. Comment is also provided on the quality and meaning of the data. The data are found at the end of this Annex, (Tables A to F) and cover the following:

Table A. Socio-economic data
Table B. Financing of R&D
Table C. Researchers
Table D. Student enrolments
Table E. Graduates
Table F. Scientific output

It should be noted that the data of the core tables, B to F, have been collated from different sources. At least three major actors are involved: education departments, agencies responsible for R&D surveys, and the owners of the bibliometric databases.

For purposes of international comparability, the approach to R&D measurement is 'standardized' by the methodological guidelines of the Frascati Manual (OECD, 2002), which first appeared in 1963 and is now in its sixth edition. The Organisation for Economic Co-operation and Development (OECD) operates as the de facto clearinghouse for the publication of its member and observer states' STI data (OECD, 2008). European Union (EU) law requires all member states to conduct regular standardized R&D surveys and to report the results to Eurostat, which then disseminates the aggregated information. The UNESCO Institute for Statistics (UIS) gathers STI data from UNESCO Member States by means of its own instrument, which is consistent with the OECD guidelines.

Further afield, Red de Indicadores de Ciencia y Tecnología (RICYT) is a non-governmental organization (NGO) that carries out a clearinghouse function for STI data in Latin America and the Caribbean and works in association with the UIS. In Africa, the S&T Secretariat of the African Union/ New Partnership for Africa's Development (AU/NEPAD) is driving efforts to quantify the R&D and innovation performance of the African Union members. The S&T Secretariat also follows the Frascati Manual guidelines. RICYT and AU/NEPAD collate data from national statistical agencies.

The socio-economic data (Table A) are 'unproblematic' and will not be commented upon here. Consequently, the paper begins with a consideration of research and experimental development (Tables B and C), which with its cousin, innovation, are understood as key drivers of economic growth and well-being. Tables D and E are also 'unproblematic', as they are extracts from education statistics. However, there are problems with the discipline boundaries pertaining to social sciences as opposed to the humanities. The assessment of scientific output (Table F) by counting publications is fraught with difficulties and deserves comment.

What counts as R&D?

The Frascati Manual is concerned with the inputs to R&D performance, namely finance and research personnel. National statistical agencies, or other designated parties, gather these data through a confidential questionnaire, using both census and purposive survey methods. Numerous problems of definition and scope make the collecting of R&D data a labour-intensive practice. Subsequently, a standard set of indicators is populated using the survey data.

The problems begin with the definition of R&D as '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' (OECD, 2002, p. 30). This inclusive definition covers basic and applied research and experimental development across all fields of inquiry in both the natural and social sciences. Care must be taken to distinguish between 'in-house' R&D (counted) and extramural R&D (excluded).

The Manual provides extensive guidance on what counts as R&D as opposed to 'related scientific and technological activities', which are generally excluded. What counts as R&D (for example, a new computing algorithm) and what does not (for example, routine database development) is a contested area. Novelty is a critical test. Clinical trials[1] in Phases I, II and III that determine the safety, side-effects and effectiveness of new drugs are included; scientific and technical services (STS), such as testing, conducting routine surveys, preparing maps and mineral exploration, are not. Scientific and technical education and training, and scientific and technological services may be essential to the performance of R&D, but are not generally counted as R&D (see §2.2–2.4 in OECD, 2002). However, where STS are part of an R&D project, they are counted. Feasibility studies are out, but a feasibility study of a research project is in.

The origins of aggregating R&D inputs lie in industry and natural sciences laboratories. This gives rise to persistent emphasis on the natural sciences, engineering and technology – to the extent that many countries do not count social sciences R&D in their business sector surveys. Counting R&D in the social sciences is approached with caution, and there is advice that 'projects of a routine nature, in which social scientists bring established methodologies, principles and models of the social sciences to bear on a particular problem, cannot be classified as research' (OECD, 2002, p. 48). Deciding what to count as R&D often involves a value judgement.

The collection methodology divides the universe of R&D performers into different sectors, but the boundaries between these are somewhat porous. The business sector constitutes all registered private companies as well as state-owned corporations trading at market prices. However, in some countries, state-owned corporations are counted in the government and not the business sector. Higher (tertiary) education generally refers to universities, whether public or private. However, France includes its publicly funded National Centre of Scientific Research (CNRS) in the higher education sector, while academies are split across the higher education and government sectors in the Russian Federation. The government sector comprises both state laboratories and department-based research institutes. State laboratories include entities such as the Chinese Academy of Social Sciences (CASS), the Human Sciences Research Council (South Africa), the Council of Scientific and Industrial Research (CSIR) (India) and the Institut de Recherche pour le Développement (IRD) (France). Department-based research institutes are entities that carry out research within internal divisions; common examples are in the fields of agriculture, water, statistics and the environment. But there are many anomalies: as already noted, in France the CNRS is counted as part of higher education, and the Chinese Academy of Social Sciences is a government-sector academic research organization, which also has its own graduate school.

The fourth sector is that of the not-for-profit organizations (NPOs) whose boundaries are even more difficult to define with precision. It appears that some statistical agencies include state-owned enterprises within the NPO category; in other countries, foreign-headquartered NPOs are excluded from national figures. The extent of the sector is generally unknown, the novelty test is difficult to apply, and so on. Indeed, many NPOs are active in 'development' or even 'development research' and do not follow the Frascati Manual guidelines to meet their reporting requirements, which means their research efforts are not recorded in national returns.

Defining and measuring R&D in the social sciences

From the UNESCO perspective, the Fields of Science (FoS) are those as defined in the International Standard Classification of Educational Disciplines (ISCED) of 1997. The FoS were revised for the OECD and agreed upon in 2006 (OECD, 2006). The ISCED and OECD Fields of Science

1. http://clinicaltrials.gov/ct2/info/understand#Q19

are very similar, the exception being education, which is a separate ISCED field. OECD counts education as a component of social sciences. This might suggest that the matter of FoS is settled, a done deal. Not so. The placement of education, psychology and archaeology serves as an example. The US National Science Board (NSB) separates psychology from the social sciences, deems archaeology a social science, and lists education under a separate category, 'professional'. The Thomson-Reuters journal classifications place education and psychology under the social sciences and archaeology under humanities.

Consequently, there is an element of blurring across the social sciences–humanities (SSH) boundary, and attempts to split off the social sciences cleanly from the humanities are subject to classification problems. This must be borne in mind when examining the data. In some countries the social sciences are combined with the humanities; in OECD datasets, data are presented as social sciences, business and law (SSBL), which is separated from the humanities, arts and education; UNESCO often treats education as a separate category, as in the *Education for All Global Monitoring Report* (UNESCO, 2008). To make comparability even more difficult, the US NSB and the UK Higher Education Statistics Agency (HESA) follow their own FoS classification systems.

It is currently impossible to precisely separate SSH into SS and H, and the designation SSH is therefore followed (Table C).

As is implied in the data in Table C, social sciences research is often specifically excluded from business-sector R&D surveys. Therefore, besides the general problem of the under-reporting of R&D, the under-reporting of the social sciences and the humanities' contribution to R&D in the business sector lies in the design of the assigning approach. In practice therefore, the main sectors in which SSH R&D is 'found' are in higher education and government laboratories, science councils or academies, as the case may be. By default, the universe of performers of R&D in social science is well defined and thus lends itself to a census approach. Yet, as the gaps in the datasets below attest, this assumption does not work in practice. Beyond these two sectors, there may be important think-tanks in the NPO sector, and, provided their activities are countable as R&D, they should be included if possible. Government think-tanks would, of course, be counted in the government sector. However, consulting firms in the business sector may conduct social science research for clients in other sectors. Care must be taken to ensure that this activity meets the criteria to be counted as R&D, and if it is countable, that it is correctly attributed.

Indicators derived from R&D surveys

National statistics agencies carry out the collecting of R&D data from which S&T indicators are derived. Standard financial indicators include gross expenditure on R&D (GERD), business sector expenditure on R&D (BERD), higher education expenditure on R&D (HERD), government expenditure on R&D (GOVERD), the ratio of GERD to gross domestic product (GDP), namely GERD:GDP, sources of funds by sector, expenditure by type of activity (basic or applied research, and experimental development), and expenditure by FoS.

The standard indicators concerning R&D personnel include the overall headcount (HC), and full-time equivalent (FTE) split according to gender, and personnel qualifications. Some countries can tabulate FTEs against FoS, but these are exceptions (Canada and Japan) rather than the rule. Data on researcher age and nationality are also collected in some countries.

Methodological issues

In the data collection process, the structure of the questionnaire is critically important. On the one hand, the response rate and quality of responses may be enhanced if the instrument is kept concise. On the other hand, agencies conducting surveys often seek to elicit as much information as possible, since future queries of the resulting database are difficult to predict. Data redundancy is preferable to data drought.

Where information is demanded by statute, or where it forms the basis for decisions on funding, the recipient of the questionnaire obviously has an incentive to respond; on the other hand, if the eventual use of an item is not obvious, a recipient may be less inclined to invest time and effort in providing a complete return. The greyness of the definitions and boundaries means that R&D surveys are more complex than, say, health or education surveys – they involve a great deal of estimation and approximation, especially as they are retrospective. It is 'easy' to count desks or schools, or record infant deaths. In contrast, the subjects of R&D surveys are unique, whether these are firms, universities or research institutes, and the quality of their institutional information systems is crucial for generating accurate data. It is generally accepted that GERD may be compiled to an accuracy of 10 per cent to 15 per cent.

The problem of measuring R&D goes beyond disciplinary classification. As mentioned above, the first difficulty is to identify where countable R&D takes place. The second is to determine who is contributing to the work (research-

ers, technicians, support personnel), and the third is to determine their FTE on research. Once these have been ascertained, it is possible to calculate research expenditure as the sum of current and capital expenditures. The vigour and rigour with which this measurement is effected vary between countries and sectors.

Estimating the number of social science researchers

Table C provides the official information available on researcher headcounts and FTEs. It is immediately obvious that the bulk of social science researchers are reported to be in higher education. An accurate estimation of the FTE is necessary for the calculation of HERD. International experience has shown that calculating HERD is difficult. In some countries, historic factors make for an uneasy relationship between higher education institutions and the central government, so that information flows are compromised. In others, the weakness of university management information systems leads to poor-quality returns.

The fundamental driver of a good survey is the extent to which university academics are prepared to disclose exactly how they spend their time: what proportion goes to teaching, what to research, what to consulting, and what to community service. It is tedious for academics to respond in this way; university managers cannot wrench the information from reluctant staff; central administrations are not equipped to collect such data; consequently, an approximation must often suffice. Another contested matter is how to count and where to attribute the research role of graduate students. The Frascati Manual guideline is that doctoral students and postdoctoral fellows should be counted as part of the university researcher cadre. In some countries, Master's students contribute to research, but this effort would be excluded by the above restriction.

Arriving at appropriate values for university researchers and graduate research students' FTE is critical for the estimation of HERD. Some countries rely on a self-reported FTE (South Africa); in Canada, predetermined factors are applied to researchers according to their rank and the type of institution in which they work.

In general, little information is forthcoming on the way that the FTE is arrived at. In some cases, though, it is found that FTE factors are based on historic academic diary studies. Some universities simply respond that their staff are contracted to spend a fixed proportion of their time on research, which predetermines their research FTE. Full-time doctoral students may be assumed to spend 100 per cent of their time on their research, but in some countries, graduate teaching assistants do both research and teaching, so that their research FTE must be less than 100 per cent. Other countries do not bother with the FTE calculation and only tabulate headcount data (USA).

The FTE and HC of many countries' government sectors are almost identical. They are equal for France, while the UK, Japan and Argentina show FTEs above 0.9. It appears that the assumption is made that staff are employed to do research, therefore they do research. But staff rarely spend all their time on research: a researcher in an agricultural research organization will spend time in meetings, may be part of a team offering testing services, or conduct training courses for agribusiness. None of this is R&D per se. And the problems multiply when we consider staff engaged in policy-related research in government departments or research institutes. Many government departments do not report this as research, even if the employee may have recently moved from a senior academic post to join government. The work this person did in academia may have appeared in academic literature; once they are in government, however, the same work is now deemed to be 'routine' or a related scientific activity (RSA), and thus not countable as R&D. In some cases, government departments may simply not respond to a survey carried out by a sister department, unless it is the national treasury, in which case the response rate will be high.

Moving to specifics, Table C presents headcount (HC) and full-time equivalent (FTE) data on researchers in fifty-five countries by sector and subject area. It is immediately obvious how incomplete these data are, even at an aggregate level. HC data disaggregated by the main sectors are available for only 38 countries, including thirteen for which no NPO sector data are presented. Aggregate FTE data are available for 53 countries, with 6 under-reporting the business sector and 27 providing no FTE data for the NPO sector.

Accordingly, when it comes to the disaggregation of researchers into the broad fields of science, engineering and technology (SET) and SSH, the data are even sparser. The list of countries for which the SET and SSH headcount and FTE data are more or less complete is restricted to twenty-five: the Czech Republic, Hungary, Poland, Romania, the Russian Federation, Slovakia, Slovenia, Turkey, Mexico, Chinese Taipei, Japan, Singapore, Austria, Belgium, Canada, Denmark, Germany, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain and Sweden. Of the world's five largest spenders on R&D, only Germany and

Japan appear in this list, as the data for China, the USA and France are incomplete. The UK data are also missing.

In order to present a more complete picture, other public data sources[2] are used to provide estimates of researcher HC and FTEs for France, the UK, the USA, China and the Russian Federation (Table A1.1).

incomplete, as many countries do not provide UNESCO, Eurostat or the OECD with suitable data. The available data have been captured for the years closest to 2000 and 2006 respectively.

Table D provides ISCED 5 and 6 enrolment data for 57 countries. It is obvious that there are a number of gaps in

Table A1.1 > Calculated headcount (HC) and full-time equivalents (FTE) for SET and SSH, selected countries and years

		Business	Higher education			Government		
		SET	Total	SET	SSH	Total	SET	SSH
France	HC	107,401	100,849	70,998	29,851	31,936	27,146	4,790
(2003)	FTE	100,646	59,047	43,695	15,352	31,936	27,146	4,790
UK*	HC		241,127	139,099	102,028	9,894	8,962	932
(2006)	FTE	95,592	67,719	39,059	28,660	9,311	8,563	748
USA	HC			297,000	275,000			
(2006)	FTE			120,000	111,000			
China	HC			-	-			
(2005)	FTE			166,400	55,508			
Russian Federation	HC	221,445	30,111	26,130	3,981	139,378	126,413	13,235
(2005)	FTE	237,959	70,494	61,595	8,899	154,827	140,425	14,402

*GOV for 2005.
Notes: SET Science, engineering and technology; SSH Social sciences and humanities

By combining the data of Table A1.1 with those of Table C, we can obtain a first-pass estimate of the FTE stock of SSH researchers in some thirty countries. This yields a total FTE across the four sectors of close to 0.5 million researchers, who are predominantly (85 per cent) in higher education.

The future generation of researchers

Students are both an input to and an output of innovation systems. Tables D and E show the flow of students – the new blood for innovation systems. The tables provide data on enrolment (input) and graduation (output) in undergraduate and postgraduate programmes in the social sciences at ISCED levels 5 and 6 respectively.[3]

Of interest are the time trends, the proportion of students registered for social sciences, business and law (OECD Category 310), the proportion of female students, and the eventual Ph.D. graduates. Here, too, the datasets are

the data and in some cases information is unavailable for the 2000 and 2006 reference years. With these caveats in mind one may estimate that global tertiary level enrolment rose from around 80 million students in 2000 to 120 million in 2006, an annual compound growth rate[4] of 7 per cent. It should be noted that China accounts for some 16 million of this figure and, if excluded, the global growth rate would fall to around 6 per cent.

Partial SSBL enrolment data (OECD Category 310) 2000 and 2006 (Table D) are available for the reference years for some 51 countries, notable exceptions being Egypt, the Russian Federation, China, Indonesia, and Nigeria. (The data for India show irregularity between 2000 and 2005 and are excluded from the total). With these limitations, one finds that total enrolment in SSBL increased from around 11.4 million in 2000 to 22.0 million SSBL students in 2006, a compound annual increase of 11 per cent, higher than the growth in all tertiary enrolments. In absolute numbers, one notes a decline in six countries: Bulgaria, Chile, Austria, Belgium, Portugal and Spain. In relative terms, the picture is different: there is a decline in the

2. France: OST (2006) tables I-2-33; I-2-34; I-2-36; I-2-39 for estimation of SET:SSH ratio.
   UK: HESA (2007) tables 8 and 12 for estimation of SET:SSH ratio.
   USA: NSB (2008) tables 2-7, 5-27 for estimation of SET:SSH ratio.
3. ISCED level 5 covers the first stage of tertiary education and level 6 the second (graduate) stage.
4. UNESCO Institute for Statistics table 15 shows an increase from 76 million to 122 million.

proportion of SSBL students in 15 countries and an increase in 24. Eastern Europe shows an overwhelming increase in 9 countries compared with a decline in 2. The 4 Asia/Pacific OECD member states show modest increases, with Japan having a slight decline. Western Europe is split, with 10 up and 9 down. Regarding the gender distribution, UIS data show an overall 50 per cent male:female ratio in SSBL.

Students in SSBL made up around 30 per cent of total tertiary enrolment in 2006, with a median value of 36 per cent and a range of 36 percentage points. High outlier countries (>50 per cent) are Latvia, Romania and South Africa, while lower outliers (<25 per cent) include Canada, Cuba, Finland, Ireland, the Republic of Korea, Pakistan and Tunisia.

Next, the data on graduates (Table E) are shown. These data may be aggregated to provide estimates of the world total of SSBL graduates for the comparator years. It must be remembered that such an estimate excludes China, India, Indonesia and Canada for which full data on SSBL graduates are not at hand. With this restriction in mind, we find that there were some 2.7 million SSBL ISECD 5–6 graduates in 2000 and 4.6 million in 2006, suggesting an annual growth of 11.7 per cent over the period. The major sites of the 2006 SSBL graduate production were the USA (1.0 million), the Russian Federation (0.8 million), Japan, Brazil and Egypt (0.3 million each), United Kingdom and Poland (0.2 million). The EU27 rose from approximately 900,000 in 2000 to 1,400,000 in 2006, at a lower growth rate of 9 per cent.

Finally, there is the issue of doctoral students – the seedbed of the next generation of researchers. The available Ph.D. enrolment data (China estimated; Germany unavailable at the time of data extract) show that in 2006 (or nearest year) there was a global total of some 1.9 million doctoral students. Of these, around 850,000 or 45 percent were women. The number of Ph.D. graduates by subject area is available for 42 countries for the years of interest.

A total of 276,846 students were awarded Ph.Ds in all subjects in 2006 against an enrolment of 1,652,088, giving a crude graduation rate of 16.7 per cent.

A derived indicator of interest is the number of Ph.D. graduates per million of the population. Data are available for 41 countries, with a median value of 148.6 and ranging from Sweden (426) to Argentina (11). The higher the proportion of FTE researchers, the higher the country Ph.D. enrolments are likely to be.

Publish or perish

Collecting data on scientific publications presents problems of definition, classification and attribution. 'Publications' include articles, reviews, letters, conference proceedings, books, chapters in books and so on. The categorization of publications presents immediate problems: disciplines must be assigned to specific subject areas, journal articles span disciplines, and journal titles also span disciplines. Various disciplines exhibit varying propensities to publish, and disciplines favour different publication modes. Health sciences journals may publish articles (case notes) of half a page; historians may prefer to publish books rather than a twenty-page journal article, and so on.

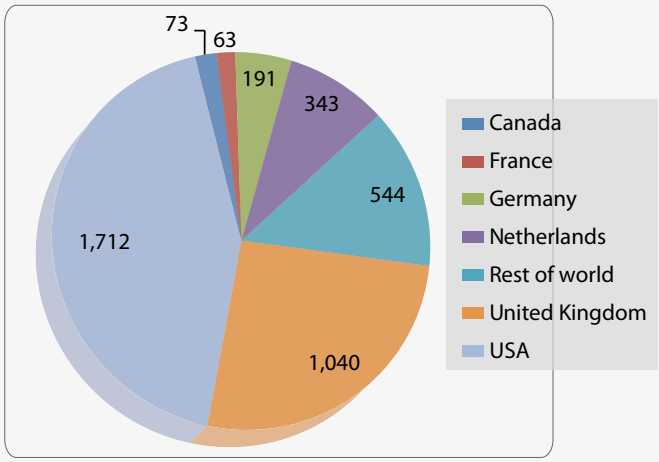
The interpretation and analysis of these data are the substance of bibliometrics. Publication counts, publication citations, and the rating of individual researchers (h-factor) are important attributes arising from the data analysis. The special character of publications in the social sciences is of critical importance to this paper.

Archambault et al. (2006) provide a review of the unique character of publications in the social sciences compared with those in the natural sciences. They address the more universalist nature of the natural sciences and the way that the universalist agenda is well served through the medium of the English language. Social science, on the other hand, whilst intrinsically universalist, is locally contextual, often addresses a local readership, and is better served by publication in local languages in local journals. Authors who work in languages other than English and wish to publish in English-language journals thus face the additional hurdle of either writing in English or paying for translation.

The standard tool for bibliometric analysis is the Thomson-Reuters set of databases, the best-known of which are those of the Web of Science,[5] namely the Science Citation Index Expanded (SCI-E), the Social Science Citation Index (SSCI), and the Arts and Humanities Citation Index (A&HCI). The Web of Science shows an inherent English-language bias when compared with other 'equivalent' databases, and Archambault et al. (2006) thus advise that when country comparisons are made, they should draw on more than one database. Consequently, we draw on the Web of Science and Elsevier Scopus.[6] Thomson-Reuters has quite naturally taken account of the language bias problem,[7]

5. http://www.isiwebofknowledge.com/
6. http://www.scopus.com/scopus/home.url
7. http://thomsonreuters.com/products_services/science/free/essays/regional_content_expansion_wos/

Figure A1.1 — Geographic distribution of journals indexed to Scopus social sciences, 2009



and since 2006 has significantly increased its coverage of social science journals beyond its English-language core. It must be borne in mind that such increases in coverage may introduce distortions in the time series.

Scopus also shows English-language bias. This is immediately obvious from Figure A1.1, which shows the geographic distribution of the social sciences journals that it indexes.

The SSCI captures some 2,800 journal titles, while Scopus Social Sciences covers close to 4,000. The combined Scopus subject areas of 'Social Sciences', 'Economics, Econometrics and Finance', 'Business, Management and Accounting' and 'Psychology' overlap somewhat with the SSCI; Scopus 'Arts and Humanities' is thought to closely match the A&HCI. This is the best that can be done without a journal-by-journal match across the databases.

The most obvious observation to be made of Table F is that publication data are available for many more countries than is the case for financial or personnel data. There are many reasons for this, especially for countries with relatively underdeveloped science systems, where national scientists working abroad and temporarily operating from local institutions may be driving the locally credited publication output. Another reason may be the self-interest of science professionals (publish or perish), which is independent of the action of local statistical agencies.

It is obvious from the Web of Science database that natural sciences articles vastly outnumber those on SSH, and given the disparity in the number of FTE researchers between the two, they should. The number of article counts recorded on SCI-E is eight times larger than that for SSCI and A&HCI combined.

The second observation is that there is a concentration by country. The five largest producers for the SCI-E are the USA (21.9 per cent), China (6.6 per cent), Japan (6.5 per cent), Germany (6.4 per cent) and the UK (5.5 per cent), which together account for approximately 47 pe cent of world production (double counting notwithstanding). The appearance of Chinese publications over the last decade is noteworthy.

Regarding the concentration of publications listed on the SSCI and A&HCI, two features stand out: first, a higher degree of geographic concentration, and second, that both China and Japan have very low numbers. The five largest volumes on the SSCI are the USA (38.9 per cent), the UK (12.1 per cent), Canada (5.6 per cent), Germany (4.4 per cent) and Australia (4.0 per cent). For the A&HCI, the list reads: the USA (41.1 pe cent), the UK (13.5 per cent), Canada (6.0 pe cent), France (5.7 per cent), and Germany (5.2 per cent). By comparison, the social sciences data from Scopus are ranked in the order: the USA (30.2 per cent), the UK (13.4 per cent), Canada (5.6 per cent), China (5.1 per cent) and Germany (4.6 per cent). For Scopus Arts and Humanities, the list reads: the USA (31.5 per cent), the UK (16.5 per cent), Canada (5.4 per cent), Germany (5.0 per cent) and France (4.5 per cent). Australia is in sixth place at 3.3 per cent.

The country rank ordering between the Web of Science and Scopus is remarkably consistent, with the exception of China.

According to the Web of Science SCI-E, SSCI and A&HCI databases for the listed countries, journal article production stands at 889,895, 101,804 and 17,675 respectively for a world total of some 1,1 million. For SCI-E citations North America and Western Europe account for 64 per cent, Asia and the Pacific 24 per cent, and other regions 12 per cent. For the SSCI, the proportions are more skewed at 85 per cent, 12 per cent and 5 per cent, while, for the A&HCI, the figures are 87 per cent, 7 per cent and 6 per cent respectively.

On the SCOPUS databases, the distribution for social science is 75 per cent, 17 per cent and 8 per cent respectively, and for Arts and Humanities 80 per cent, 11 per cent and 9 per cent. It appears that the SCOPUS database indexes journals that are more popular with authors outside North America and Western Europe.

Toward improving the measurement of R&D in the social sciences

The measurement of the inputs to and outputs from R&D is problematic in all countries; the systematic revisions of the Frascati Manual are evidence of a constant effort to improve the situation. But there is no absolutely standardized process for data collection, which means that it is addressed in varying ways according to the desire for accuracy, the resources available to those tasked with generating the data, the willingness of the respondents to engage and the perceived legitimacy of the survey process. Ultimately, the data are as reliable as the responsible national agency declares them to be. If the data are designated as official statistics, they have to be accepted as such. The comparability of the statistics per category is another matter.

It may be noted that since mid-2007 UNESCO-UIS has been developing guidelines for improving the measurement of R&D in developing countries. These guidelines may well have applicability in all countries irrespective of their development status, and apply to all fields of science, including social sciences.

The least complete datasets are those concerned with R&D personnel, which in turn determine the estimation of the inputs to R&D activity in both SET and SSH. This area could therefore be the main leverage point for improvement.

At the outset, it will be important that statistical agencies gather their data according to a common definition of what constitutes the social sciences, and what should be regarded as humanities. Nevertheless, the rapid shifts in discipline boundaries suggest that a review of discipline boundaries may be needed every five to ten years.

Provided the political will is there, it should be possible to mobilize quite modest resources to conduct an R&D survey focusing on the social sciences where this is currently unavailable. This work might best be given to a team of leading social sciences practitioners who are well-acquainted with country activity in the field. They will know where to look and who to ask regarding 'in-house' R&D in social sciences (and possibly humanities). It is unlikely that a postal survey conducted by the national statistical agency would achieve the same result. Drawing on the knowledge of informed experts is an effective way of improving R&D surveys in any field of science.

We might reasonably expect that such a purposive survey could be achieved by personal networking through brief telephonic or e-mail communication, thereby obtaining reasonable estimates of a headcount and the FTE of researchers for the social sciences. Once the FTE is known, we could estimate the labour costs. This, combined with data on the current and capital expenditure, provides an estimate of the total expenditure on R&D. On the income side, we must then track all sources of funds, which should ideally equate with the expenditure.

The approach could be extended to the business sector by concentrating on firms that are active in services, thus yielding a rough estimate of business-sector R&D in social sciences.

Any such R&D survey of the social sciences should, of course, be endorsed by the responsible national statistical agency.

The under-reporting of social sciences R&D is to the detriment of those active in the field. This under-reporting could serve to incentivize the social sciences research community to work more closely with national statistical agencies to ensure that a more complete and accurate survey is carried out. The professional self-interest that drives researchers to monitor the correct citation of their published works could be harnessed to achieve a reliable R&D survey. Ultimately, however, it comes down to the proper institutionalization of the survey, including the allocation of the necessary budget and personnel. If the survey is deemed to be serious, it will be supported. Institutionalization, not lip service, is key for a thorough survey.

While it is appreciated that the quantitative, indicator-generating approach of the Frascati Manual tells only one part of the story, that part needs to be told with conviction. The quantitative story should be told and complemented with the qualitative narrative which is so well provided by evaluation methodologies. In this way, the social sciences may better be appreciated for their integral contribution to social, economic and technological change.

Michael Kahn

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Table A > Socio-economic indicators, 2005

	Population	Gross national income	Gross domestic product/capita		Human Development Index
	million	PPP$ billion	PPP$ thousand	Gini coefficient	
Arab States					
Algeria	33	222	6.8	0.35	0.748
Egypt	74	329	4.4	0.34	0.716
Tunisia	10	79	7.9	0.4	0.762
Central and Eastern Europe					
Bulgaria	8	67	8.6	0.32	0.834
Czech Republic	10	205	20.1	0.26	0.897
Estonia	1.4	29	21.9	0.34	0.872
Hungary	10	171	16.9	0.28	0.877
Latvia	2	31	13.5	0.38	0.863
Lithuania	3	49	14.2	0.36	0.869
Poland	38	515	13.5	0.36	0.875
Romania	22	193	8.9	0.31	0.825
Russian Federation	143	1,523	10.6	0.41	0.806
Slovakia	5	85	15.8	0.26	0.872
Slovenia	2	44	22.2	0.24	0.923
Turkey	73	612	8.4	0.44	0.798
East, South Asia and Pacific					
Australia	20	622	32.2	0.35	0.965
China	1,305	8,610	6.6	0.47	0.762
Chinese Taipei	23	757	33.0	0.34	0.932
India	1,095	3,787	3.5	0.37	0.609
Indonesia	221	820	3.7	0.36	0.726
Japan	128	4,019	31.4	0.38	0.956
Korea (Republic of)	48	1,055	21.8	0.35	0.928
New Zealand	4	95	23.0	0.36	0.944
Singapore	4	130	29.8	0.43	0.918
Latin America and Caribbean					
Argentina	39	539	13.9	0.49	0.86
Brazil	186	1,534	8.2	0.57	0.807
Chile	16	187	11.5	0.55	0.874
Colombia	46	338	7.4	0.54	0.787
Mexico	103	1,034	10.0	0.46	0.842
Uruguay	3	34	9.8	0.45	0.859

Table A > Socio-economic indicators, 2005 (cont.)

	Population	Gross national income	Gross domestic product/capita		Human Development Index
	million	PPP$ billion	PPP$ thousand	Gini coefficient	
Venezuela	27	171	6.4	0.48	0.826
North America and Western Europe					
Austria	8	272	33.1	0.26	0.951
Belgium	10	342	32.6	0.28	0.948
Canada	32	1,040	32.2	0.32	0.967
Cyprus	0.8	23	29.2	0.29	0.912
Denmark	5	182	33.6	0.24	0.952
Finland	5	163	31.2	0.26	0.954
France	61	1,855	30.5	0.28	0.955
Germany	82	2,409	29.2	0.28	0.94
Greece	11	262	23.6	0.33	0.947
Iceland	0.3	13	42.6	0.25	0.968
Ireland	4	144	34.7	0.32	0.96
Israel	7	175	25.3	0.39	0.93
Italy	57	1,657	28.8	0.33	0.945
Luxembourg	0.5	41	85.1	0.26	0.956
Malta	0.4	10	24.2	0.28	0.894
Netherlands	16	530	32.5	0.31	0.958
Norway	5	187	40.4	0.28	0.968
Portugal	11	208	19.7	0.38	0.9
Spain	43	1,120	25.8	0.32	0.949
Sweden	9	284	31.4	0.23	0.958
Switzerland	7	276	37.1	0.34	0.955
United Kingdom	60	1,968	32.7	0.34	0.942
USA	296	12,438	42.0	0.45	0.95
Sub-Saharan Africa					
Nigeria	132	137	1.0	0.44	0.499
South Africa	45	548	12.1	0.58	0.67

Sources:
World Bank (2007), *World Development Report*; UNDP (2006), *Human Development Report*.

Table B > Expenditure on research and development, 2005

	GERD/capita PPP$/capita	GERD/GDP %	SSH/GERD %	
Arab States				
Algeria	4	0.07		U, O
Egypt	11	0.26		U, O
Tunisia[a]	65	1.03		U, O
Central and Eastern Europe				
Bulgaria	45	0.49		U, O
Czech Republic	286	1.41	5.8	O
Estonia	220	0.94		U, O
Hungary	160	0.94	14.6	O
Latvia	74	0.56		U, O
Lithuania	107	0.76		U, O
Poland	77	0.57	9.5	O
Romania	39	0.41	4.7	O
Russian Federation	126	1.07	3.0	O
Slovakia	81	0.51	9.8	O
Slovenia	336	1.46	9.0	O
Turkey	61	0.59	16.9	O
East, South Asia and Pacific				
Australia[b]	578	1.78	8.3	O
China	54	1.33	1.4	O
Chinese Taipei	638	2.45	3.1	O
India[c]	13	0.69		O, U
Indonesia[d]	1	0.05		O, U
Japan	1,007	3.32	4.6	O
Korea (Republic of)	636	2.98		O
New Zealand	290	1.16		O
Pakistan	9	0.44		U
Singapore	996	2.30		O
Latin America and Caribbean*				
Argentina	50	0.46	11.2	U, O
Brazil[e]	71	0.83		U, O
Chile[f]	77	0.67		U, O
Colombia	8	0.17		U, O
Mexico	57	0.46	18.0	O
Uruguay[g]	18	0.26		U, O
Venezuela	23	0.23		O
North America and Western Europe				
Austria[h]	830	2.44	7.8	O
Belgium	590	1.84	6.2	O
Canada	706	1.98	7.7	O
Cyprus	98	0.40		O, U

Table B > Expenditure on research and development, 2005 (cont.)

	GERD/capita PPP$/capita	GERD/GDP %	SSH/GERD %	
Denmark[i]	822	2.45	7.9	O
Finland	1,061	3.48	6.7	O
France	625	2.10		O
Germany	757	2.48	5.3	O
Greece	148	0.58		O
Iceland	990	2.77		O
Ireland	478	1.26	7.3	O
Israel	1,050	4.49	14.2	U, O
Italy	304	1.09		O
Luxembourg	1,099	1.57		O
Malta	111	0.54		O, U
Netherlands[j]	603	1.74	7.3	O, U
Norway	725	1.52	14.2	O
Portugal	161	0.81	15.5	O
Spain[k]	306	1.12	7.9	O
Sweden	1,304	3.80		O
Switzerland	1,015	2.90	2.8	O
United Kingdom	587	1.76		O
USA	1,093	2.62	5.5	O
Sub-Saharan Africa				
Mauritius	38	0.38		U, O
South Africa	78	0.92	12.4	O
Uganda	2	0.23		U

Abbreviations:
GERD Gross expenditure on research and development
HERD Higher education expenditure on research and development
SSH Social sciences and humanities

Sources:
O denotes OECD Main Science and Technology Indicators 2008–2.
U denotes Unesco Institute for Statistics
* http://www.ricyt.edu.ar

Notes:
a. Tunisia 2004
b. Australia 2004
c. India 2004
d. Indonesia 2001
e. Brazil 2004
f. Chile 2004
g. Uruguay 2006
h. Austria 2004
i. Denmark 2001
j. Netherlands HERD 2003
k. Spain 2002

Table C > Researcher headcounts (HC)

		Total			Business		
		SUM	SET	SSH	SUM	SET	SSH
Arab States							
Algeria	HC	13,805					
	FT	5,593					
Egypt	HC						
	FT						
Tunisia	HC	25,445					
	FT	14,650					
Central and Eastern Europe							
Bulgaria	HC	11,920			1,251		
	FT	9,840			1,157		
Czech Republic	HC	37,542	30,574	6,968	12,120	11,753	547
	FT	24,169	20,607	3,563	10,354	10,107	247
Estonia	HC	5,734			1,402		
	FT	3,331			883		
Hungary	HC	31,407	20,029	11,378	6,108	5,950	158
	FT	15,878	11,715	4,163	5,008	4,875	133
Latvia	HC	5,748			606		
	FT	3,282			468		
Lithuania	HC	11,918			916		
	FT	7,637			716		
Poland	HC	97,875	70,447	27,428	11,403	11,259	133
	FT	62,162	46,829	15,333	9,412	9,297	115
Romania	HC	29,608	25,449	4,159	10,644		
	FT	22,958	19,883	3,075	10,319		
Russian Federation*	HC	391,121	370,324	20,797	221,445	217,885	3,560
	FT	464,577			237,959		
Slovakia	HC	17,526	12,544	4,982	2,414	2,260	154
	FT	10,921	8,505	2,415	1,946	1,816	130
Slovenia	HC	7,644	6,168	1,476	1,858*	1,812*	46*
	FT	5,253	4,433	832	1,620*	1,576*	44*
Turkey	HC	83,190	53,605	23,505	10,952	10,742	210
	FT	39,139			9,456	9,307	149
Latin America and Caribbean							
Argentina	HC	49,050			4,715		
	FT	31,868			3,763		
Brazil	HC	143,864					
	FT	84,979			22,355		
Chile	HC	18,365			10,064		
	FT	13,427			6,724		
Colombia	HC	12,751			166		
	FT	5,632			136		
Mexico	HC	44,577	33,016	11,561	10,688	10,136	552
	FT	33,484	25,334	8,150	9,176	8,276	450

and full-time equivalents (FT) by sector, 2005

Higher education			Government			Not-for-profit			
SUM	SET	SSH	SUM	SET	SSH	SUM	SET	SSH	Source/Note
13,075			730						U
4,863			730						U
22,260			3,185						U
12,861			1,789						U
3,894			6,472			303			U
2,607			6,076			128			U
17,411	12,074	4,707	8,361	6,703	1,658	100	44	56	
7,576	5,688	1,888	6,113	4,778	1,335	127	34	93*	*National stats
3,618			622						U
1,905			474						U
19,086	9,948	9,138	6,213	4,131	2,082				
5,911	3,304	2,607	4,959	3,536	1,423				
4,368			773						U
2,224			589						U
9,124			1,878						U
5,116			1,805						U
72,261	46,111	25,795	14,094	12,750	1,344	117	27*	90	*National stats
40,449	26,525	13,924	12,175	10,956	1,219		51	76	
11,492	9,879	1,613	7,267	4,744	2,523	205	182	23	
5,386	4,772	614	7,082	4,644	2,438	171	148	23	
30,111	26,130	3,981	139,378	126,413	13,235	187	166	21	*Headcount for full-time staff only
70,494			154,827			1,298			
12,249	8,105	4,144	2,845	2,162	683	18	17	1	
6,458	4,751	1,707	2,503	1,926	577	14	13	1	
3,564	2,514	1,050	1,846	1,448	398	31	26	5	*2002
1,695	1,305	390	1,591	1,198	393	31	26	5	*2002
67,504	43,592	23,912	4,734	4,670	64				
25,434	16,541	8,893	4,249						
29,237			14,074			1,024			U
14,200			13,285			620			U
									U 2004
56,008			5,625			991			U 2004
6,820			615			866			U 2004
5,222			615			866			U 2004
11,275			589			727			U 2004
4,442			480			461			
24,183	14,599	9,584	7,217	6,666	551	2,483	1,615	874	2003
16,791	10,137	6,654	6,376	5,889	487	1,591	1,032	559	2002

Table C > Researcher headcounts (HC)

		Total			Business		
		SUM	SET	SSH	SUM	SET	SSH
Uruguay	HC	3,839					
	FT	1,242			12		
Venezuela	HC	4,626					
	FT	2,301			39		
East, South Asia and Pacific							
Australia	HC						
	FT	73,173			20,541		
China	HC						
	FT	1,118,698			696,413		
Chinese Taipei	HC	115,954	102,929	13,024	56,900	55,619	1,281
	FT	88,859	82,284	6,575	51,202	50,142	1,060
India	HC						
	FT	115,936			34,724		
Indonesia	HC						
	FT	42,722			253		
Japan	HC	861,901	737,648	99,935	519,360	514,713	4,647
	FT	705,659			481,496		
Korea (Republic of)	HC	224,702			154,306		
	FT	179,812			137,706		
New Zealand	HC	27,570			7,356		
	FT	17,235			3,690		
Singapore	HC	27,969	25,846	2,123	15,964	14,431	1,533
	FT	23,789	21,919	1,871	14,238	12,820	1,418
North America and Western Europe							
Austria	HC	44,127			20,587		
	FT	33,146					
Belgium	HC	48,757			20,850*		
	FT	33,146			17,991*		
Canada	HC						
	FT	125,300	105,870	19,460		76,280	
Cyprus	HC	1,424			317		
	FT	612			130		
Denmark	HC	29,791			12,281*		
	FT	19,453			9,651*		
Finland	HC	50,773			26,122		
	FT	39,130			21,967		
France	HC	251,599					
	FT	202,507			106,387		
Germany	HC	397,130*			175,040		
	FT	264,385*			157,836*		
Greece	HC	26,340			4,375		
	FT	14,371			3,797		

and full-time equivalents (FT) by sector, 2005 (cont.)

Higher education			Government			Not-for-profit			
SUM	SET	SSH	SUM	SET	SSH	SUM	SET	SSH	Source/Note
									U 2002
1,064			166						U 2002
									RICYT
1,748			514						RICYT
42,779	25,462	17,317	8,036				1,812	94	2002
221,908			168,774	161,885	6,889				
41,958	31,160	10,798	16,171	15,384	767	944	766	178	
23,180	18,425	4,755	13,790	13,152	638	687	565	122	
22,100			59,112						U 2000
26,138			16,331						U 2001
271,158	179,865	91,293	36,675	34,060	2,615	10,390	9,010	1,380	
181,214	127,918	53,296	34,035	32,290	1,745	8,924	7,894	1,030	
64,895			13,465			2,036			Excludes SSH
27,416			12,791			1,899			Excludes SSH
18,087			2,127						
11,731			1,812						U 2005
9,991	9,443	548	2,014	1,972	42				High NEC
8,187	7,739	448	1,365	1,360	5				High NEC
20,888	14,531	6,357	2,315	1,122	1,193	337	135	202	
8,280	6,130	2,150	1,030	470	560	134	75	62	
			2,511	2,063	448	260	255	5	*2001
13,853	9,918	3,935	2,273	1,881	392	250	247	3	
41,380	22,500	18,880	7,210	6,630	580		460		
807			222			78			U 2005
375			107						U 2005
15,682	10,403	5,279	2,834	2,142	692	410	400	10	*2001 Graduates assumed as researchers
8,242	5,593	2,649	2,104	1,666	438	208	203	5	*2001 Graduates assumed as researchers
18,495			5,622			534			MSTI 2007-2
12,879			3,772						MSTI 2007-2
66,290			25,889						
180,514	124,836	55,318	44,898	38,315	6,583				*U 2003
70,844	50,434	20,410	39,911	34,365	5,546				*2001
18,998			2,868			99			2001
8,544			1,980			50			2001

Table C > Researcher headcounts (HC)

		Total			Business		
		SUM	SET	SSH	SUM	SET	SSH
Iceland	HC	3,231			1,211		
	FT	1,859			853		
Ireland	HC	17,194			6,937*		
	FT	8,949*			5,971*		
Italy	HC	100,442*			29,360*		
	FT	66,702*			26,550*		
Luxembourg	HC	2,443*			1,807*		
	FT	2,091*			1,532*		
Malta	HC	972			262		
	FT	442			189		
Netherlands	HC				28,313		
	FT	45,517	40,501	4,366	22,414		
Norway	HC	36,888	27,619	9,269	14,369	14,327	42*
	FT	21,693	17,690	3,963	10,692	10,574	118
Portugal	HC	37,769	26,080	9,712	6,186	3,967	242
	FT	21,126	15,266	4,490	4,014	2,515	129
Spain	HC	181,023	136,010	44,653	43,627		
	FT	109,720	86,207	23,512	35,033		
Sweden	HC	82,496			42,476		
	FT	55,090			36,697		
Switzerland	HC	44,230			17,450		
	FT	26,105			16,275		
United Kingdom	HC						
	FT	174,559			93,717		
USA	HC						
	FT	1,387,882*			1,097,700		
Sub-Saharan Africa							
Nigeria	HC						
	FT						
South Africa	HC	39,266			7,480		
	FT	17,303			5,896		

Notes:
NEC Not elsewhere classified
SET Science, engineering and technology
SSH Social sciences and humanities
HC Headcounts
FT Full time equivalent
The sum of the breakdown may not add up to the total.

Sources:
Data from OECD Research and Development Statistics 2008/1 for year 2005 unless otherwise stated
U denotes UNESCO Institute for Statistics
RICYT Table 11 from http://www.ricyt.edu.ar
MSTI 2007-2 denotes OECD Main Science and Technology Indicators 2007-2
Eurostat: http//epp.eurostat.ec.europa.eu/portal/page/portal/education/data/database
Web sites accessed mid 2009

and full-time equivalents (FT) by sector, 2005 (cont.)

Higher education			Government			Not-for-profit			
SUM	SET	SSH	SUM	SET	SSH	SUM	SET	SSH	Source/Note
1,018			678			324			2001
520	365	155	424			68	21	47	2001
9,800	6,360	3,440	457	393	64				*2001
4,390	3,150	1,240	419	362	57				*2001
69,844	44,786	25,058	18,818	16,299	2,519	5,045	3,291	1,753	*2001
46,920	34,123	12,797	14,454	12,489	1,965	2,923	2,065	858	*2001
205	121	84	431	353	78				*U
176	94	64	383	315	58				*U
676									Eurostat
225				18					Eurostat
			7,807			614			2001
15,750	11,178	4,113	6,799			554*	110	253	2001, *National stats
17,977	10,401	7,576	4,542	2,891	1,651				*National stats
7,512	4,898	2,614	3,449	2,218	1,231				
21,384	13,568	7,816	5,602	4,974	628	4,597	3,571	1,026	
10,956	7,668	3,289	3,338	2,759	578	2,819	2,325	494	High NEC
108,823	66,084	42,379	28,212	25,988	2,224	361	311	50	
54,028	32,398	21,629	20,446	18,598	1,848	213	178	35	
34,942	17,483	8,358	4,771	2,768*	2,003*		307		*Adjusted. High NEC
15,851	10,488	3,639	3,018						High NEC
26,010			770						2000
9,425			405						2000
			10,188	9,028	1,160				2001
67,719			9,311	8,387	924				
			48,187			11,800**			*Rounded total, **1999
28,879			2,664			243			U
9,235			1,974			199			

Table D > Student enrolments, by level, total, social science, business and law, and gender, 2000 and 2006

		All fields	SSBL	% SSBL	% Female	All fields	% Female	
	Level	ISCED 5-6	ISCED 5-6	ISCED 5-6	ISCED 5A	ISCED 6	ISCED 6	Source/ Note
	Year							
Arab States								
Algeria	2000	544,009			...		...	U
	2006	817,968	318,136	39	59	37,787	45	U
Egypt	1999	2,447,088				16,675		U
	2006	2,594,186			49			U
Tunisia	2000	180,044			...	10,334	...	U
	2005	325,325	57,062	18	68	22,800	55	U
Central and Eastern Europe								
Bulgaria	2000	261,321	105,198	40	57	3,091	47	E
	2006	243,464	103,395	43	54	5,153	50	E
Czech Republic	2000	253,695	59,782	24	48	15,222	35	E
	2006	338,009	93,217	28	53	22,646	38	E
Estonia	2000	53,613	21,859	41	56	1,251	55	E
	2006	68,286	26,605	39	62	1,972	54	E
Hungary	2000	307,071	114,763	37	54	4,302	42	E
	2006	438,702	182,453	42	58	7,965	47	E
Latvia	2000	91,237	42,819	47	65	1,003	52	E
	2006	131,125	71,049	54	64	1,809	60	E
Lithuania	2000	121,904	37,456	31	58	2,023	55	E
	2006	198,868	83,165	42	60	2,878	57	E
Poland	2000	1,579,571	681,454	43	58	22,239	44	E
	2006	2,145,687	877,299	41	57	32,725	49	E
Romania	2000	452,621	189,723	42	51		-	E
	2006	834,969	417,599	50	56	21,694	48	E
Russian Federation	2000		...		56	111,024	43	U
	2006	9,167,277	...		58	147,181	43	U
Slovakia	2000	135,914	34,722	26	50	7,173	38	E
	2006	197,943	56,056	28	58	10,739	43	E
Slovenia	2000	83,816	35,186	42	59		-	E
	2006	114,794	49,903	44	62	1,057	47	E
Turkey	2000	1,015,412	290,098	18	...	19,857	35	E
	2006	2,342,898	1,110,426	47	43	32,575*	39	E. *U
Latin America								
Argentina	2000	1,766,933			57	5,931	58	U
	2005	2,082,577	824,161	40	55	4,981	57	U
Brazil	2002	2,781,328	1,448,445	52	57	102,192	55	U
	2005	4,572,297	1,852,373	41	57	119,141	55	U
Chile	2000	452,177	181,879	40	48	7,705	40	U
	2006	661,142	170,129	26	52	2,753	41	U
Colombia	2001	934,085	421,184	45	53	55,911	49	U
	2006	1,314,972	563,394	43	53	1,131	34	U
Cuba	2000	158,674	...		54	1,428	53	U
	2006	681,629	163,495	24	61	4,129	43	U
Mexico	2000	1,962,763	783,409	40	49	7,911	38	U
	2006	2,446,726	968,044	40	51	13,458	41	U
Uruguay	2000	97,641	...		61		...	U
	2006	113,368	44,299	39	62		40	U
Venezuela	2000	668,109	...		60		...	U
	2006	1,381,126	...		...		...	U

Table D > Student enrolments, by level, total, social science, business and law, and gender, 2000 and 2006 (cont.)

		All fields	SSBL	% SSBL	% Female	All fields	% Female	
	Level	ISCED 5-6	ISCED 5-6	ISCED 5-6	ISCED 5A	ISCED 6	ISCED 6	Source/ Note
	Year							
East, South Asia and Pacific								
Australia	2000	845,132	277,980	33	56	27,615	47	U
	2006	1,040,153	394,673	38	55	40,417	50	U
China	2000	7,364,111	...		...	54,038	22	U
	2006	23,360,535	...		44**	167,267*	...	U.* PhD 2000 Estimates** 2003
Hong Kong (China), SAR	2000				52*		40*	U *2003
	2006	155,324	56,194	36	53	5,508	42	U
India	2000	9,404,460	5,630,412	60	38	55,019	36	U
	2005	12,852,684	...		40	84,140	40	U
Indonesia	2001	3,017,882	...		42	53,799	34	U
	2006	3,657,429	...		47	62,065*	35	U. *PhD for 2005
Japan	2000	3,982,069	1,183,013	30	37	59,007	25	E
	2006	4,084,861	1,198,169	29	41	75,028	30	E
New Zealand	2000	171,962	50,387	29	58	3,336	47	U
	2006	237,784	82,690	35	59	5,325	51	U
Pakistan	2002	385,506	...		43	8,155	31	U
	2006	820,347	150,503	18	45	10,389	27	U
Republic of Korea	2000	3,003,498	624,265	21	36	31,787	25	U
	2006	3,204,036	691,884	22	37	43,443	34	U
North America and Western Europe								
Austria	2000	261,229	115,799	44	50	24,531	42	E
	2006	253,139	88,589	35	53	16,819	46	E
Belgium	2000	355,748	119,172	34	49	2,348	35	E
	2006	394,427	108,352	28	51	7,482	41	E
Canada	2000	1,212,161	322,438*	27	58	26,221	45	*U 1999
	2004	1,326,711	335,037*	25	58	34,716	46	*U 2003
Cyprus	2000	10,414	3,673	35	77	72*	-	E. *U 2002
	2006	20,587	9,763	47	73	302	49	E
Denmark	2000	189,162	44,335	23	52	4,648	42	E
	2006	228,893	67,618	30	59	4,751	46	E
Finland	2000	270,185	62,727	23	54	19,750	47	E
	2006	308,966	69,459	23	54	22,145	52	E
France	2000	2,015,344	...		55	94,327	47	E
	2006	2,201,201	759,984	35	56	77,056	46	E
Germany	2000	2,054,800	553,346	27	45		...	E
	2006	2,289,500	627,648	27	48		...	E
Greece	2000	422,317	169,181	40	51	2,096	40	E
	2006	653,003	205,998	32	53	22,483	44	E
Iceland	2000	9,667	3,278	34	64	18	33	E
	2006	15,721	5,969	38	65	156	58	E
Ireland	2000	160,611	32,710	20	55	2,904	45	E
	2006	186,044	43,031	23	58	5,146	48	E
Israel	2000	255,891	85,921	34	58	6,647	51	U
	2006	310,014	119,923	39	55	9,715	53	U
Italy	2000	1,770,002	712,872	40	56	13,177	49	E
	2006	2,029,023	741,190	37	57	38,262	52	E

Table D > Student enrolments, by level, total, social science, business and law, and gender, 2000 and 2006 (cont.)

		All fields	SSBL	% SSBL	% Female	All fields	% Female	
	Level	ISCED 5-6	ISCED 5-6	ISCED 5-6	ISCED 5A	ISCED 6	ISCED 6	Source/ Note
	Year							
Luxembourg	2000	2,437	...		46	23	.	E
	2006	2,692	1,218	45	54*	24	52*	E. *U 2004
Malta	2000	6,315	2,182	35	53	15	7	E
	2006	8,900	3,927	44	...	64	36	E
Netherlands	2000	487,649	195,952	40	50	4,556	42	E
	2006	579,622	217,163	38	51	7,475	42	E
Norway	2000	190,943	52,338	27	60	2,125	47	E
	2006	214,711	69,918	33	60	5,047	46	E
Portugal	2000	373,745	133,011	36	56	11,680	52	E
	2006	367,312	115,808	32	55	20,512	56	E
Spain	2000	1,828,987	673,970	37	53	65,675	51	E
	2006	1,789,254	570,202	32	54	77,056	51	E
Sweden	2000	346,878	88,311	26	60	20,714	43	E
	2006	422,614	110,665	26	61	21,377	49	E
Switzerland	2000	156,879	55,999	36	44	12,933	34	U
	2006	204,999	76,022	37	49	17,324	40	E
United Kingdom	2000	2,024,138	475,195	24	53	74,242	41	E
	2006	2,336,111	630,423	27	55	94,180	45	E
USA	2000	13,202,880	...		56	293,202	42	E
	2006	17,487,475	4,779,632	27	57	388,685	52	E
Sub-Saharan Africa								U
Nigeria	1999	699,109			26*	9,262	39*	U. *2003
	2005	1,391,527			36	8,385	24	U
South Africa	2000	644,763	303,325	47	54	6,795	38	U
	2006	741,380	392,201	53	55	9,828	42	U

Notes:

SSBL denotes social science, business and law as defined by UNESCO and OECD

Sources:

E denotes Eurostat: http//epp.eurostat.ec.europa.eu/portal/page/portal/education/data/database

U denotes UNESCO Institute for Statistics

Table E > Student graduation, by level, total, social science, business and law, and gender, 2000 and 2006

	Year	ISCED 5-6 All fields	ISCED 5-6 SSBL	ISCED 5-6 % SSBL	ISCED 5-6 % F SSBL	PhD	PhD SSBL	F PhD F SSBL	PhD/ million	Source
Arab States										
Algeria	2004	91,811	47,091	51	63					U
	2006	107,515	54,285	51	62					U
Egypt	2000	291,191	248,069	85						U
	2006	396,240	322,625	81						U
Tunisia	2000	19,586								U
	2006	56,559								U
Central and Eastern Europe										
Bulgaria	2000	46,718	22,493	48	68					E
	2006	45,383	21,700	48	65	583	99	57	49	E
Czech Republic	2000	38,376	12,852	34	59					E
	2006	69,312	19,914	29	64	2,023	290	120	173	E
Estonia	2000	6,441	3,323	52	69					E
	2006	11,541	4,226	37	74	143	18	7	149	E
Hungary	2000	59,883	23,640	40	55					E
	2006	69,756	30,529	43	70	1,012	165	86	89	E
Latvia	2000	15,260	6,320	41	67					E
	2006	26,414	14,792	56	72	106	24	13	42	E
Lithuania	2000	25,241	7,431	29	67					E
	2006	43,343	17,739	41	74	326	77	52	100	E
Poland	2000	344,339	127,371	37	66					E
	2006	504,051	214,939	43	69	5,917	745	377	144	E
Romania	2000	67,940	28,215	42	59					E
	2006	174,821	84,205	48	63	3,180	619	294	122	E
Russian Federation	2000	1,190,567	...	...						U
	2006	1,870,973	847,023	45		29,850*	5,910*		209	U. *NSB
Slovakia	2000	22,699	6,301	28	57					E
	2006	40,190	11,026	27	64	1,218	202	105	171	E
Slovenia	2000	11,991	4,782	40	64					E
	2006	17,145	8,504	50	68	395	76	41	178	E
Turkey	2000	190,080	52,165	27	47					E
	2006	373,375	140,672	38	47	2,594	493	185		E
East, South Asia and Pacific										
Australia	2000	168,913	62,318	37	52					U
	2006	284,910	119,226	42	56	4,763*	569*		238	U. *NSB 2004
China	2000	1,775,999								U
	2006	5,622,795				23,446*	1,309*		18	U. *NSB 2004
Hong Kong (China), SAR	2003	40,361	13,221	33	65					U
	2006	41,080	13,450	33	64					U
India	2000									U
	2006					13,733*			13	U. *NSB 2003
Indonesia	2001	476,971								U
	2004	612,975								U
Japan	2000	1,081,435	265,069	25	32					E
	2006	1,067,939	288,599	27	39	15,979	1,686	586	132	E
New Zealand	2000	42,791	11,419	27	55					U
	2006	59,320	22,301	38	57	623*	66*		156	U. *NSB 2004

Table E > Student graduation, by level, total, social science, business and law, and gender, 2000 and 2006 (cont.)

	Year	ISCED 5-6 All fields	ISCED 5-6 SSBL	ISCED 5-6 % SSBL	ISCED 5-6 % F SSBL	PhD	PhD SSBL	F PhD F SSBL	PhD/ million	Source
Pakistan	2000									U
	2006									U
Korea (Republic of)	2000	519,719	110,035	21	48					U
	2006	605,160	120,580	20	47	7,946*	1,351*		166	U. *NSB 2004
Latin America and Caribbean										U
Argentina	1999	136,878								U
	2001	140,099	70,371	50	59	685º	161º		11	U.ºRICYT.
Brazil	2001	347,978	151,540	44	55					U
	2005	757,553	277,572	37	54	9,366º	890º		44	U.ºRICYT.
Chile	2000	53,417	26,343*							U. *2003
	2006	73,203	22,931	31	52	249º	34º		12	U.ºRICYT.
Colombia	2002	65,720	30,411	46	59					U
	2006	115,488	60,092	52	51	39º	10º			U.ºRICYT.
Cuba	2000	16,967								U
	2006	100,874	3,956	4	63	447º				U.ºRICYT.
Mexico	2000	299,146	132,372	44	55					U
	2005	380,413	165,482	44	59	2,325*	382*			U.*NSB.
Uruguay	2000	7,629								U
	2006	8,485	2,796	33	66	21º				U.ºRICYT.
Venezuela	2000	60,912	26,109	43	66					U
	2006	138,557								U
North America and Western Europe										
Austria	2000	24,981	6,892	28	50					E
	2006	34,825	10,031	29	58	2,158	684	335	306	E
Belgium	2000	68,225	20,768	30	54					E
	2006	81,567	23,060	28	58	1,718	261	99	148	E
Canada	1999	225,020	77,341	34	60					U
	2002	246,589				3,709*	657**		116	U.*NSB **OECD
Cyprus	2000	2,813	930	42	659*					E
	2006	3,858	1,687	44	61	29	7			E
Denmark	2000	39,017	9,432	24	40					E
	2006	47,539	14,463	30	52	910	125	57	158	E
Finland	2000	35,635	8,228	23	68					E
	2006	40,044	9,451	24	71	1,409	210	113	373	E
France	2000	508,189	190,844	38	63					E
	2006	643,604	267,695	42	63	9,818	1,931	931	138	E
Germany	2000	302,095	62,263	21	43					E
	2006	358,706	98,619	22	50	24,946	4,451	1,628	316	E
Greece	2001	38,963								E
	2006	64,387	16,753	28	67	1,248	94	31	118	E. PhD 2005
Iceland	2000	1,779	550	31	56					E
	2006	3,397	1,160	34	59	10			33	E
Ireland	2000	42,009	13,039	31	58					E
	2006	59,184	20,566	35	59	979	115	65	171	E
Israel	2000	62,363	20,928	34	58					U
	2004	76,726				1,135*	114*		162	U. *NSB

Table E > Student graduation, by level, total, social science, business and law, and gender, 2000 and 2006 (cont.)

	Year	ISCED 5-6 All fields	ISCED 5-6 SSBL	ISCED 5-6 % SSBL	ISCED 5-6 % F SSBL	PhD	PhD SSBL	F PhD F SSBL	PhD/ million	Source
Italy	2000	201,290	74,235	37	55					E
	2006	432,068	144,718	33	53	10,188	1,877	970	111	E
Luxembourg	2000	680	335	49						E
	2006									E
Malta	2000	2,003	816	41	39					E
	2006	2,676	1,182	44	52	1				E
Netherlands	2000	76,927	27,439	36	48					E
	2006	117,392	44,892	38	52	2,993	566	247	167	E
Norway	2000	29,935	7,717	26	51					E
	2006	33,529	9,058	27	50	882	153	64	151	E
Portugal	2000	48,533	19,022	39	74					E
	2006	71,828	23,102	32	60	1,094	196	112	360	E
Spain	2000	260,225	91,195	35	62					E
	2006	285,957	80,830	28	64	7,159	1,342	623	184	E
Sweden	2000	42,390	8,830	21	58					E
	2006	60,762	15,044	25	63	2,660	262	106	426	E
Switzerland	2000	55,970	19,792	35	35					E
	2006	56,320	27,022	48	44	3,198	566	218	422	E
United Kingdom	2000	504,081	154,957	31	55					E
	2006	640,848	195,519	31	56	16,466	2,978	1,530	254	E
USA	2000	2,150,954	877,707	41	56					E
	2006	2,639,006	1,005,047	38	56	56,067	10,912	6,221	142	E
Sub-Saharan Africa										U
Nigeria	1999	58,455			44					U
	2004	174,602			41					U
South Africa	2000	103,203	41,293	40	53					U
	2006	124,676	53,440	43	58	1,100			24	U

Notes:

SSBL denotes social science, business and law as defined by UNESCO and OECD

F Female

Sources:

NSB denotes National Science Board 'Science and Engineering Indicators 2008' Appendix Table 2-40

RICYT Table 20 from http://www.ricyt.edu.ar

E denotes Eurostat: http//epp.eurostat.ec.europa.eu/portal/page/portal/education/data/database

U denotes UNESCO Institute for Statistics

OECD denotes OECD *Education at a Glance* (2008)

Table F > Articles abstracted to the Thomson-Reuters and Scopus databases, 2007

	Thomson-Reuters			Scopus	
	SCI-E	SSCI	A&HCI	SOCSCI	ARTS
Arab States					
Algeria	870	8	1	21	2
Egypt	3,106	58	11	91	7
Tunisia	1,408	24	2	54	4
Central and Eastern Europe					
Bulgaria	1,586	33	5	83	6
Estonia	696	86	8	91	14
Hungary	3,686	172	43	309	70
Latvia	229	16	0	12	0
Lithuania	810	64	54	177	37
Poland	10,615	258	75	426	44
Romania	2,062	69	50	97	29
Russian Federation	21,717	390	114	299	78
Slovakia	1,049	108	71	159	59
Slovenia	1,833	137	39	343	20
Turkey	14,322	848	77	1,052	44
Latin America					
Argentina	4,758	136	52	232	47
Brazil	16,705	813	72	1,627	153
Chile	2,815	207	106	336	82
Colombia	889	113	9	230	16
Mexico	7,727	668	91	423	10
Uruguay	396	13	3	20	0
Venezuela	944	25	13	110	6
East, South Asia and Pacific					
Australia	22,376	4,167	523	4,540	293
China	62,063	1,980	197	5,225	261
Chinese Taipei	16,444	1,341	31	1,481	28
India	26,810	630	51	1,496	90
Indonesia	543	59	9	105	6
Japan	60,557	1,489	109	1,988	103
Korea (Republic of)	22,818	874	72	934	53
New Zealand	4,397	899	121	1,031	83
Singapore	5,449	485	44	582	31
North America and Western Europe					
Austria	7,267	525	84	614	57
Belgium	10,484	1,158	254	1,263	130
Canada	35,763	5,861	1,074	5,719	479
Cyprus	289	68	13	114	4
Czech Republic	5,116	263	86	302	25
Denmark	7,975	833	78	783	59
Finland	7,076	894	87	963	69

Table F > Articles abstracted to the Thomson-Reuters and Scopus databases, 2007 (cont.)

	Thomson-Reuters			Scopus	
	SCI-E	SSCI	A&HCI	SOCSCI	ARTS
France	42,563	2,200	1,018	2,872	396
Germany	59,628	4,678	924	4,651	438
Greece	7,320	457	84	738	65
Iceland	397	62	10	61	4
Ireland	5,045	754	146	592	48
Israel	9,615	1,371	236	1,197	131
Italy	33,355	1,758	362	2,214	181
Luxembourg	176	21	1	33	1
Malta	60	10	4	9	1
Netherlands	18,772	3,573	316	3,559	194
Norway	5,739	992	84	997	61
Portugal	4,938	289	33	463	26
Spain	27,338	2,298	518	2,519	193
Sweden	14,381	1,860	131	1,616	116
Switzerland	14,241	1,302	124	1,310	92
United Kingdom	51,844	12,749	2,426	13,732	1,450
USA*	205,320	40,877	7,367	30,874	2,770
Sub-Saharan Africa					
Nigeria	1,287	112	12	217	16
South Africa	4,226	669	150	778	84

Notes:

Thomson-Reuters:

SCI-E Science Citation Index – Expanded

SSCI Social Science Citation Index

A&HCI Arts and Humanities Citation Index

Scopus:

SOCSCI combines the subject areas of social science, business, psychology and economics

ARTS covers the subject area of arts and humanities

* USA from National Science Board 'Science and Engineering Indicators 2008' Appendix Table 5-34

Annex 2
Bibliographical databases and repositories

This annex provides a brief overview of some of the main bibliographical databases (and bibliometric indices) with relevance to the social sciences. The main aim of this annex is to give the non-expert reader a brief explanation of the differences between the databases used by the various authors in this Report.

Bibliographical databases

Bibliographical databases are indices of publications which mostly include information on the authors, title, date of publication, publisher and so on. They are used primarily to find literature. Since the late twentieth century various national and disciplinary bibliographical databases have been constructed. These databases may be accessible online, and sometimes include links to the full text of the publications.

A specific subset of bibliographical databases can be used for bibliometric analyses. These indices contain standardized data, which, besides the general bibliographical entries, include information on the number of citations the publication has received, those publications to which it refers, and the institutional addresses of the authors. This additional and standardized information allows for the evaluation of the knowledge claims contained in these databases in terms of their visibility, and indicates the number of citations they receive. By extension, the databases are used to evaluate research systems, research organizations and (in combination with peer review) individual researchers. In addition, they are used for mapping the dynamics of science systems. The bibliometric indices currently in use tend to be restricted to publications in a limited set of 'highly visible' journals. For a discussion of the limitations of the existing bibliometric indices for the evaluation of knowledge claims in the social sciences see, among others, Archambault and Larivière and other contributions in Chapter 7 of this Report.

Bibliometric databases

The two main bibliographical databases used for bibliometric analyses are Thomson Reuter's Web of Science (WoS) and Elsevier's Scopus.

The WoS includes the:

- Science Citation Index Expanded (SCI-E), which mainly, though not exclusively, contains the publications in natural and life science journals going back to 1900. The SCI Expanded contained 8,150 journals at the end of 2009.
- Social Science Citation Index (SSCI), which contains journals classified as belonging to the social sciences going back to 1956. The SSCI contained 2,759 journals at the end of 2009.
- Arts and Humanities Citation Index (A&HCI), which contains journals classified as belonging to the arts and humanities going back to 1975. The A&HCI contained 1,516 journals at the end of 2009.

There is some overlap in the coverage of these three main citation indices. Furthermore, the WoS also offers the so-called Journal Citation Reports, which provide various visibility indicators for journals in both the natural and social sciences.

In recent years, Elsevier launched a competitor to the WoS, Scopus. This index offers the analyst a similar data source and similar functionality as that offered by the WoS indices.

As with the WoS, it is also possible to restrict searches to the social sciences or subsets within that broad field. The main difference between the two databases is that the journal coverage is different. According to the information provided on its website, Scopus contains 16,500 journals. It is reported to contain 5,100 social science titles (which encompass more than just journals). The producers of both indexes are actively expanding their coverage, and the figures presented in this section may already have been surpassed. The geographical and linguistic bias of Scopus is said to be lower than that of the WoS. (Most of) Scopus references only go back to 1996 at present.

National science citation indices

Besides these international bibliometric databases, national citation indices have also been developed as of the 1990s. The most prominent examples of these are the Chinese Science Citation Indices and the Chinese Social Science Citation Indices (see also Wei in this Report). The Russian Federation is also making attempts to compile a Russian Science Citation Index (see Pipiya in this Report). In Spain, efforts have been made to establish a Spanish-language counterpart of the Thomson Reuter's WoS Journal Citation Reports in the social sciences (see Cruz and Jimenez in this Report). Considering the limited inclusion of Chinese, Russian and Spanish-language journals in the international citation indices, these different types of national citation indices may play an important role in the evaluation of research in these countries.

Disciplinary bibliographical databases

There are a large number of bibliographical databases which are restricted to journals in a specific disciplinary field. Examples of these disciplinary databases are ECONLIT, Worldwide Political Science Abstracts (WPSA), Sociological Abstracts and Psychinfo. These disciplinary bibliographical databases can also be used for output analyses. For various reasons, they are less suitable for other bibliometric analyses (see also van Raan in this Report).

Other bibliographical databases

A complete list of bibliographical databases would be very long – most libraries worldwide, for example, maintain a bibliographical database of their stocks. See, for example, Ammon (international bibliography of the social sciences) as well as Waast, Arvanitis, Richard-Waast and Rossi in this Report for potential uses of these databases for analyses of social science dynamics. In addition, there are a large number of national and disciplinary bibliographical databases which can be used to identify and retrieve literature from various sources. 'Humanindex' is an example of an institutional bibliographical database containing over 48,000 references to books, articles, presentations and catalogues in the social sciences and humanities produced by the researchers of the Universidad Nacional Autónoma de México.

Open access (journal) repositories

The open access repositories which have been set up in recent years deserve a special mention. Some of these are regionally based, such as AJOL (see Mouton in this Report) in sub-Saharan Africa, and SCIELO, REDALYC and CLACSO in Latin America (see Babini in this Report). See also Perakakis et al. (in this Report) for more information on developments in open access.

JSTOR is an example of a not-for-profit multidisciplinary journal repository which requires a library subscription. Cairn is a portal offering free access to almost 70,000 French- language journal article abstracts and old articles (full text) as well as to recent articles after payment.

Open access repositories

As mentioned in the introduction, there are also repositories containing a wide variety of textual sources. Important examples in the social sciences are, for example, Research Papers on Economics (RePEcs IDEAS), the Social Science Research Network (SSRN), and E-LIS for documents on library and information science. Besides disciplinary repositories, there are also national repositories such as the French CNRS HAL. Finally, there are institutional repositories which contain textual output from a single institution, such as the Igitur Archive Universiteit Utrecht, Universitat Politécnica de Catalunya UPCommons, the Agecon Search Research in Agricultural and Applied Economics, King Fahd University of Petroleum and Minerals ePrints, and Kyoto University Research Information Repository. Examples and visibility rankings of general repositories and institutional repositories can be found at http://repositories.webometrics.info/top400_rep_inst.asp. Apart from open access repositories, there are also services that only collect and store information for subscribers.

Journal directories

A final subset of bibliographical databases which should be mentioned here consists of the journal directories compiled by, among others, Ulrich. This Ulrich directory contains bibliographical and publisher information for more than 300,000 periodicals of all types – including academic peer-reviewed journals but also popular magazines, newspapers,

newsletters and so on. In contrast to the bibliographical and bibliometric databases discussed in this annex, these journal directories do not contain data on individual articles. While unsuitable for bibliometric analyses, they may be complementary. Several authors in this Report have made use of this directory to make statements about the geographical and linguistic biases of existing bibliometric databases (see also Archambault and Larivière as well as Gingras and Mosbah-Natanson in this Report).

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Annex 3
Supplementary figures and tables

Annex to Chapter 4

Table A4.6 > Development of inter-regional collaboration links over time

	Period	North America	Western Europe	Southern, Central and Eastern Europe and CIS	Arab States	East Asia and the Pacific	South Asia	Latin America and the Caribbean	Sub-Saharan Africa	Oceania
North America	1989–1993	x	0.607	0.330	0.089	0.313	0.160	0.215	0.154	0.219
	1994–1998	x	0.570	0.285	0.068	0.355	0.125	0.218	0.137	0.188
	1999–2003	x	0.580	0.249	0.065	0.296	0.091	0.198	0.141	0.180
	2004–2008	x	0.566	0.221	0.059	0.306	0.092	0.191	0.127	0.152
Western Europe	1989–1993	0.607	x	0.098	0.047	0.070	0.060	0.059	0.067	0.146
	1994–1998	0.570	x	0.192	0.049	0.087	0.057	0.081	0.110	0.163
	1999–2003	0.580	x	0.203	0.058	0.123	0.075	0.102	0.147	0.181
	2004–2008	0.566	x	0.215	0.064	0.147	0.085	0.125	0.139	0.202
Southern, Central and Eastern Europe and CIS	1989–1993	0.330	0.098	x	0.000	0.013	0.013	0.007	0.000	0.021
	1994–1998	0.285	0.192	x	0.009	0.018	0.004	0.006	0.004	0.020
	1999–2003	0.249	0.203	x	0.011	0.018	0.008	0.006	0.008	0.017
	2004–2008	0.221	0.215	x	0.012	0.016	0.015	0.009	0.006	0.024
Arab States	1989–1993	0.089	0.047	0.000	x	0.000	0.008	0.007	0.014	0.005
	1994–1998	0.068	0.049	0.009	x	0.003	0.000	0.000	0.011	0.007
	1999–2003	0.065	0.058	0.011	x	0.014	0.017	0.017	0.011	0.008
	2004–2008	0.059	0.064	0.012	x	0.003	0.019	0.010	0.010	0.021
East Asia and the Pacific	1989–1993	0.313	0.070	0.013	0.000	x	0.027	0.002	0.116	0.071
	1994–1998	0.355	0.087	0.018	0.003	x	0.028	0.010	0.039	0.095
	1999–2003	0.296	0.123	0.018	0.014	x	0.030	0.014	0.032	0.107
	2004–2008	0.306	0.147	0.016	0.003	x	0.047	0.012	0.027	0.124

Table A4.6 > Development of inter-regional collaboration links over time (cont.)

	Period	North America	Western Europe	Southern, Central and Eastern Europe and CIS	Arab States	East Asia and the Pacific	South Asia	Latin America and the Caribbean	Sub-Saharan Africa	Oceania
South Asia	1989–1993	0.160	0.060	0.013	0.008	0.027	X	0.008	0.016	0.028
	1994–1998	0.125	0.057	0.004	0.000	0.028	X	0.019	0.015	0.027
	1999–2003	0.091	0.075	0.008	0.017	0.030	X	0.014	0.021	0.039
	2004–2008	0.092	0.085	0.015	0.019	0.047	X	0.016	0.018	0.014
Latin America and the Caribbean	1989–1993	0.215	0.059	0.007	0.007	0.002	0.008	x	0.014	0.015
	1994–1998	0.218	0.081	0.006	0.000	0.010	0.019	x	0.015	0.011
	1999–2003	0.198	0.102	0.006	0.017	0.014	0.014	x	0.019	0.010
	2004–2008	0.191	0.125	0.009	0.010	0.012	0.016	x	0.022	0.029
Sub–Saharan Africa	1989–1993	0.154	0.067	0.000	0.014	0.116	0.016	0.014	x	0.022
	1994–1998	0.137	0.110	0.004	0.011	0.039	0.015	0.015	x	0.021
	1999–2003	0.141	0.147	0.008	0.011	0.032	0.021	0.019	x	0.031
	2004–2008	0.127	0.139	0.006	0.010	0.027	0.018	0.022	x	0.034
Oceania	1989–1993	0.219	0.146	0.021	0.005	0.071	0.028	0.015	0.022	x
	1994–1998	0.188	0.163	0.020	0.007	0.095	0.027	0.011	0.021	x
	1999–2003	0.180	0.181	0.017	0.008	0.107	0.039	0.010	0.031	x
	2004–2008	0.152	0.202	0.024	0.021	0.124	0.014	0.029	0.034	x

Table A4.7 > Countries by region

1	North America	Canada , USA
2	Western Europe	Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Wales, England, Scotland, Northern Ireland
3	Southern, Central and Eastern Europe and CIS	Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Cyprus, Czech Republic, Estonia, Georgia, Hungary, Israel, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Montenegro, Poland, Republic of Moldova, Romania, Russian Federation, Serbia, Slovakia, Slovenia, The former Yugoslav Republic of Macedonia, Tajikistan, Turkey, Turkmenistan, Ukraine, Uzbekistan
4	Arab States	Algeria, Bahrain, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libyan Arab Jamahiriya, Morocco, Oman, Qatar, Saudi Arabia, Somalia, Sudan, Syrian Arab Republic, Tunisia, United Arab Emirates, Yemen
5	East Asia and the Pacific	Brunei Darussalam, Cambodia, China, Fiji, Hong Kong (China) SAR, Indonesia, Japan, Kiribati, Lao People's Democratic Republic, Malaysia, Marshall Islands, Micronesia, Mongolia, Myanmar, Nauru, Palau, Papua New Guinea, Philippines, Republic of Korea, Samoa, Singapore, Solomon Islands, Thailand, Tonga, Tuvalu, Vanuatu, Viet Nam
6	South Asia	Afghanistan, Bangladesh, Bhutan, India, Islamic Republic of Iran, Maldives, Nepal, Pakistan, Sri Lanka
7	Latin America and the Caribbean	Antigua and Barbuda, Argentina, Bahamas, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, Uruguay, Venezuela
8	Sub-Saharan Africa	Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, São Tomé and Príncipe, Senegal, Seychelles, Sierra Leone, South Africa, Swaziland, Togo, United Republic of Tanzania, Uganda, Zambia, Zimbabwe
9	Oceania	Australia, New Zealand

Annex to Chapter 5

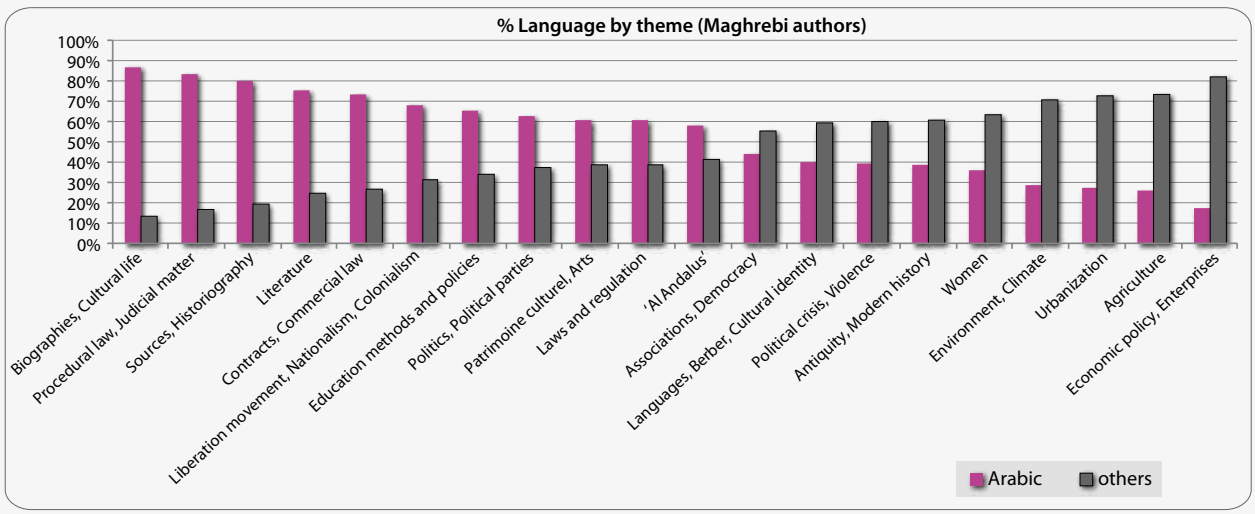
Table A5.2 > Evolution (emergence and decline) of the main scientific themes in the social sciences in the Maghreb

Themes	1980–1986	1987–1992	1993–1998	1999–2004
Procedure, judicial precedents	-8,5	-8,8	-6,4	18,7
Contracts, Corporate law	-2,4	0,0	-4,0	5,1
Literature, Arts and civilization, Poetry	-5,5	-3,0	-6,4	12,0
Laws and regulations	-2,0	-5,0	0,0	5,0
New themes**	-8,0	-3,0	0,0	9,0
Politics, political parties	-4,5	-3,2	0,0	7,4
Political crisis, Islam in politics	-8,7	-2,9	3,5	5,0
Languages, Berber, Cultural identity	-7,9	-4,6	0,0	7,9
Cultural heritage	-6,0	0,0	-3,0	7,0
Environment, Climate	-6,0	0,0	8,0	-4,0
Sources, Historiography	-3,0	0,0	5,0	0,0
Women, Women's condition	-3,5	3,4	3,4	-3,3
Economic policy, Enterprises	0,0	5,2	11,0	-14,2
Urbanization	0,0	4,2	0,0	-3,3
'Al Andalus'	0,0	6,6	0,0	-4,4
Antiquity, Modern history	5,6	7,3	-5,1	-14,4
Liberation movements, Nationalism	5,7	0,0	0,0	-4,6
Agriculture	7,2	3,6	5,3	-12,7
Education methods and policies	0,0	0,0	0,0	2,4
Biographies, Cultural life	0,0	0,0	0,0	0,0

Notes: Figures in the table represent a v-test of a theme which measures whether the theme is over-represented (v > 0), under-represented (v < 0) or normally represented (v = 0) in the corpus during a period of time. We highlighted, for each theme: in yellow, its emergence (v becomes > 0), in green, its apex (v is maximum), in orange its slowdown (v decreases) and in red its regression.

** New themes that appeared in the last period and thus have no precedent: Associations and democracy; Local development; Communication and media; Human rights.

Figure A5.4 — Language and themes in the social sciences in the Maghreb, 1985–2004



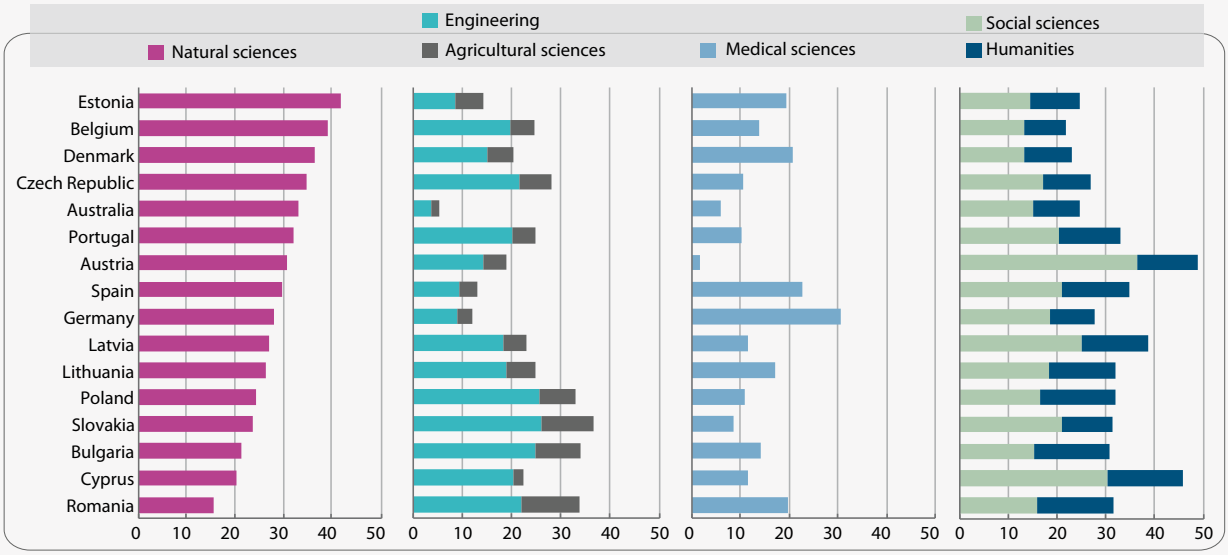
Annex to Chapter 8

Table A8.3 > Median age at graduation of doctorate holders having

		ARG	AUS	AUT	BEL	BGR	CHE	CYP	CZE	DNK	ESP
Natural sciences	Women		31.0	30.4	28.0	34.0	30.0	29.0	36.0	31.8	29.0
	Men		31.0	31.4	28.0	35.0	30.0	28.0	38.0	30.9	30.0
	Total	**34.0**	**30.0**	**31.1**	**28.0**	**35.0**	**30.0**	**29.0**	**39.5**	**31.1**	**30.0**
Engineering	Women		31.0	30.9	29.0	34.0	30.0	0.0	33.5	31.7	31.0
	Men		31.0	32.5	28.0	45.0	31.0	28.0	40.0	31.1	32.0
	Total	**33.0**	**31.0**	**32.4**	**28.0**	**44.0**	**31.0**	**28.0**	**39.5**	**31.2**	**32.0**
Medical sciences	Women		35.0	27.8	28.0	42.0	30.0	37.0	37.0	36.2	33.0
	Men		35.0	32.7	30.0	44.0	32.0	34.0	38.5	34.7	34.0
	Total	**33.0**	**35.0**	**28.8**	**29.0**	**43.0**	**31.0**	**36.0**	**40.0**	**35.2**	**33.0**
Agricultural sciences	Women		34.0	30.8	31.0	30.0	29.0		32.0	33.9	30.0
	Men		34.0	29.6	29.0	39.0	31.0		35.0	33.8	33.0
	Total		**33.0**	**30.1**	**30.0**	**34.0**	**30.0**		**35.5**	**33.9**	**31.0**
Social sciences	Women		41.0	28.4	30.0	35.0	0.0	31.0	37.5	34.2	35.0
	Men		41.0	30.5	33.0	37.0	0.0	42.0	40.0	33.3	37.0
	Total	**34.0**	**41.0**	**30.1**	**31.0**	**37.0**	**0.0**	**37.0**	**41.5**	**34.0**	**36.0**
Humanities	Women		40.0	33.8	29.0	39.0	36.5	36.0	37.5	38.5	36.0
	Men		40.0	39.7	31.0	37.0	36.0	40.0	35.0	35.8	38.0
	Total	**34.0**	**40.0**	**33.8**	**30.0**	**39.0**	**36.0**	**39.0**	**37.5**	**36.8**	**37.0**
All fields	Women		34.0	30.3	29.0	35.0	31.0	31.0	36.5	34.1	31.0
	Men		34.0	31.5	29.0	40.1	31.0	33.0	38.3	32.4	33.0
	Total	**34.0**	**34.0**	**31.1**	**29.0**	**38.0**	**31.0**	**32.0**	**39.5**	**33.1**	**32.0**

Sources: OECD, 2009, OECD/UNESCO Institute for Statistics/Eurostat data collection on careers of doctorate holders.

Figure A8.5 — Distribution of 1990–2006 doctoral graduates over main fields of science (selected OECD countries), 2006



received their degree between January 2005 and December 2006 (selected OECD countries)

EST	FIN	ISL	JPN	LTU	LTV	NOR	POL	PRT	ROM	SVK	SWE	USA
36.0	32.0	31.0	28.0	31.0	32.0	32.0	31.0	33.0	34.0	29.0	32.0	30.2
32.0	32.0	31.0	30.0	32.0	33.0	31.5	30.0	34.0	36.0	31.0	32.0	30.7
30.0	**32.0**	**31.0**		**31.0**	**32.0**	**31.7**	**30.0**	**34.0**	**35.0**	**31.0**	**32.0**	**30.5**
37.0	34.0		33.5	31.0	32.0	30.7	32.0	34.0	38.0	30.0	32.0	30.2
32.0	33.0		34.0	29.0	32.0	31.1	32.0	36.0	43.0	30.0	32.0	31.0
34.5	**33.0**			**30.0**	**42.0**	**31.0**	**32.0**	**36.0**	**40.0**	**30.0**	**32.0**	**30.8**
38.0	38.0	32.0	33.5	35.0		38.5	33.0	39.0	39.0	39.5	37.0	37.2
31.0	36.0	42.0	32.0	38.0		38.3	33.0	42.0	42.0	34.0	38.0	34.6
32.5	**37.0**	**33.0**		**37.0**		**38.4**	**33.0**	**42.0**	**40.0**	**37.0**	**37.0**	**36.1**
49.0	35.0		32.5	32.0		33.2	30.0	37.0	36.0	33.0	33.0	33.1
48.0	39.0		33.5	32.0		36.1	31.5	38.0	38.0	29.0	36.0	33.4
32.0	**35.0**			**32.0**		**34.3**	**31.0**	**38.0**	**37.0**	**31.0**	**34.5**	**33.2**
33.0	40.0	35.0	32.0	30.0	42.0	40.2	31.0	40.0	34.0	30.0	37.5	36.1
35.0	40.0	38.0	35.0	29.0		39.0	31.0	40.0	39.0	29.0	37.0	35.9
31.0	**40.0**	**36.5**		**29.0**	**35.0**	**39.4**	**31.0**	**40.0**	**36.0**	**30.0**	**37.0**	**36.0**
34.0	41.0		44.0	34.0		37.9	31.0	42.0	40.0	34.0	39.0	34.7
33.0	41.0		34.5	31.0		38.4	31.5	44.0	42.0	31.0	38.0	35.3
37.5	**41.0**			**34.0**	**35.0**	**38.2**	**31.0**	**42.0**	**41.0**	**31.5**	**39.0**	**35.0**
37.0	37.0	34.0	33.0		37.0	36.0	31.0	38.0	37.0	31.0	34.0	33.2
32.0	35.0	32.5	32.0		33.0	34.4	31.0	38.0	39.0	31.0	33.0	32.4
33.0	**36.0**	**33.0**			**33.0**	**35.0**	**31.0**	**38.0**	**38.0**	**31.0**	**33.0**	**32.7**

Table A8.4 > Breakdown of 1990–2006 employed

	Austria	Canada	Cyprus	Czech Republic	Denmark
LEGISLATORS, SENIOR OFFICIALS AND MANAGERS	17.6	10.3	27.3	10.4	13.6
PROFESSIONALS	67.0	87.2	72.7	80.7	77.0
Physical, mathematical and engineering science professionals	1.5	14.4	3.0	3.7	3.9
Life science and health professionals	0.6	3.7	2.0	0.4	1.9
Teaching professionals	15.9	41.3	59.6	54.6	48.5
Other professionals	49.0	27.8	8.1	22.1	22.7
Business professionals	8.1	5.1	3.0	2.9	7.4
Legal professionals	26.1	0.3	0.0	6.8	2.7
Archivists, librarians and related information professionals	0.4	0.6	1.0	0.6	0.0
Social science and related professionals	13.9	19.1	3.0	7.8	12.6
Writers and creative or performing artists	0.4	2.7	1.0	0.1	0.0
Religious professionals	0.1	0.0	0.0	0.0	0.0
OTHER OCCUPATIONS	15.4	2.5	0.0	8.8	9.4
TOTAL	100.0	100.0	100.0	100.0	100.0

Note: All doctoral graduates for Canada and Iceland, 1987–2005 doctoral graduates and 2005 data for Denmark, 1990–2006 doctoral graduates for the other countries.

Sources: OECD (2009), OECD/UNESCO-UIS/Eurostat data collection on careers of doctorate holders.

social science doctoral graduates by occupation in selected OECD countries, 2006

Germany	Iceland	Latvia	Lithuania	Poland	Portugal	Romania	Slovakia	Spain	USA
7.6	22.9	12.3	7.7	1.5	2.6	9.2	2.8	3.4	6.5
77.5	77.1	87.0	92.3	96.1	96.5	82.4	83.2	93.6	91.7
14.3	0.0	4.4	0.9	1.5	0.5	0.2	1.7	0.9	2.2
	4.6	0.0	2.6	0.3	0.3	0.1	0.9	2.0	2.5
17.6	51.7	71.3	68.3	80.5	90.4	67.7	63.1	78.8	38.9
43.5	15.0	11.3	20.5	13.7	5.2	14.3	17.6	9.8	48.2
15.1	1.3	1.7	7.0	7.7	0.2	0.6	2.3	2.0	4.5
17.6	0.0	2.0	6.4	2.1	0.9	8.6	3.4	4.4	0.3
	0.0	0.0	0.0	0.3	0.0	0.0	0.3	0.4	0.2
	12.5	6.1	7.2	3.5	4.0	4.7	9.1	2.8	42.0
	0.0	0.7	0.0	0.0	0.0	0.4	0.6	0.2	0.7
	0.0	0.0	0.0	0.1	0.0	0.0	0.3	0.0	0.2
14.9	0.0	0.7	0.0	2.4	0.9	8.4	13.9	3.0	1.8
100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0