Chapter 2
The Design and Methods of the Comparative Study

2.1 Introduction

The research project 'The Changing Academic Profession' was a collective effort of scholars from 19 countries (or more precisely from 18 countries and the 'special administrative region' of Hong Kong; for reason of simplification, we will refer to 'countries' in the subsequent text). The participating scholars had to cope with a conflicting situation. On the one hand, they intended to undertake a joint questionnaire that required a high degree of consensus or at least a readiness for compromise in order to develop a largely identical questionnaire for all countries. On the other hand, they wanted to reflect the specific issues of the academic profession in their own country, and they had to do this among others, because they had to raise the necessary funds for the national component of the project within their own country. Therefore, this project required a substantial period of careful preparation where choices had to be made as regards the target group, the conceptual framework and the themes of the questionnaire as well as many operational issues, and additionally many decisions in these domains had to be added in the course of the project work.

The conceptual and thematic choices have been discussed thoroughly in the introductory chapter. Therefore, only the key conceptual and thematic choices will be outlined in this chapter.

It should be pointed out that an international project with decentralised responsibilities requires central coordination as regards the formulation of the joint questionnaire, the sampling and surveying approaches and eventually the creation of a joint data set. Therefore, the scholars involved in the CAP project established a methods commission chaired by Martin J. Finkelstein (Seton Hall University, South Orange, NJ, USA) and including Elizabeth Balbechevsky (University of Sao Paulo, Brazil), Hamish Coates (Australian Council for Educational Research, Australia), Tsukasa Daizen (Hiroshima University, Japan), Jesus Galaz-Fontez (Autonomous University of Baja-California, Mexico), Amy Metcalfe (University of British Columbia, Canada) and Michele Rostan (University of Pavia, Italy). The methods commission consulted all national teams repeatedly and eventually took the final

decisions as regards all key issues of the formulation of the international master questionnaire, the setting for standards for the survey process and the rules for the establishment of the international data set. The establishment of the international data set was undertaken by a data team coordinated by Ulrich Teichler (International Centre for Higher Education Research, University of Kassel—INCHER-Kassel—in Germany).

2.2   The Target Group

2.2.1   *Countries*

The initiators of the CAP project aimed similarly as those of the first comparative survey on the academic profession, that is, the Carnegie study, to include countries from all over the world; they wanted to include countries where concepts of higher education had emerged in the past which had been internationally influential; they wanted also to include all of the very large countries in the world. Last but not least, they intended to include as many countries as possible that had participated in the Carnegie survey in order to measure change over time by comparing the results of the two studies. Efforts were made to identify scholars willing and suitable to be active in such a comparative study, and the final number of countries eventually depended on these scholars' success in raising the necessary funds within their respective countries.

Eventually, ten countries were represented in the CAP which had been covered already in the Carnegie survey (in alphabetical order): Australia, Brazil, Germany, Hong Kong, Japan, the Republic of Korea, Mexico, the Netherlands, the United Kingdom and the United States of America. While four countries participating in the Carnegie study eventually are not represented in the CAP study (Chile, Israel, Russia and Sweden), nine countries were newly incorporated into the CAP study: Argentina, Canada, China, Finland, Italy, Malaysia, Norway, Portugal and South Africa. Thus, the CAP study comprised altogether 19 higher education systems: 18 countries and the special administrative region of Hong Kong.

It should be added that scholars from some additional countries were involved in the preparation of the CAP project but eventually did not get the necessary financial means for participation, for example, France, India and Russia.

The 19 higher education systems might be grouped according to various dimensions, for example, continent, higher education philosophy or extent of expansion of higher education (e.g. enrolment rate). In various analyses of the data, the authors of the CAP teams, in fact, chose different classifications. However, the CAP team recommended differentiating at least between the 13 'mature higher education systems' (sometimes also called 'advanced' in the various publications of the project) and the 6 'emerging higher education systems', the latter being Argentina, Brazil, China, Malaysia, Mexico and South Africa. The distinction was primarily

made between the former being high-income countries and being in principle self-sustainable in research training and the latter being middle-income countries where large numbers of scholars are trained for the academic career abroad.

2.2.2   Institutions

As academics' addresses had to be collected in most countries with the help of institutions of higher education, an institutional target group (rather than a programme target group or a functional target group) had to be defined. Academics who are professionally active at higher education institutions that offer a baccalaureate degree (Tertiary Type A according to the OECD classification or Level 5A of the UNESCO ISCED-97 classification) or any higher credential became the target population. Thus, the CAP survey, in contacting potential respondents through institutions, might include some institutions that provide both bachelor programmes and other shorter or vocationally tertiary education programmes, but those tertiary education institutions were excluded that only offered short or vocationally oriented tertiary education (Tertiary Type B or ISCED Level 5b) programmes, for example, junior and community colleges in various countries and kôtô senmon gakkô in Japan. Excluded as well were public research institutes without a teaching function (e.g. Max Planck institutes in Germany). Some countries (e.g. Argentina) excluded private institutions of higher education, if overall they played a marginal role within the system.

Some countries, indeed, included junior colleges, and others included public research institutes. In those cases, the respondents from these institutions were not incorporated into the international CAP data set.

2.2.3   The Academic Profession

The target population of the CAP study are persons employed full-time or at least a substantial part of their work time at an institution of higher education for teaching and/or research purposes. Through this definition, two types of persons were excluded in principle that might not be consistently distinguished: auxiliary staff (e.g. teaching assistants in US terms, *wissenschaftliche Hilfskräfte* in German terms) and staff primarily active in management and service functions.

The practices varied as regards addressing persons not employed full-time. In the beginning, the researchers of the various countries agreed to include full-time employed academics as well as part-time employed academics if they are regular employees and are paid to serve at least half of the regular work time. In practice, however, two countries included only full-time academics. Various others aimed to address full-time academics but did not exclude a minority from the data set who happened to be employed part-time. Other countries deliberately targeted part-time

employed academics as well as full-time as long as the part-timers were employed at least half-time. Finally, two Latin American countries included also academics employed or working on honorarium basis for less than half-time, if they were obvious members of the academic profession, for example, professionals in law or medicine who were hired to serve a regular professorship.

In the analysis of the data, three *subgroups of respondents* played an important role. First, as already pointed out, countries were grouped into *mature versus emerging higher education systems*.

Second, academics were divided according to type of *higher education institutions*. The term 'university' in this comparative study refers to institutions that are more or less equally in charge of teaching and research, while 'other higher education institutions' are those with a dominant teaching function. These terms were viewed as the most suitable brief formulations to underscore the different functional portfolios of the varying institutions which are often similarly reflected in the tasks of their academic staff, even though some institutions with a clearly dominant teaching function might also be called 'university' in some countries (e.g. in China, Japan and Korea) and even though some institutions with both major teaching and research tasks might not be named 'university' (e.g. institute of technology, *Technische Hochschule*).

Third, the respondents were classified as *senior versus junior academics*. Senior academics were named those respondents who were employed in staff categories equivalent to full professors and associate professors in the United States of America. All other academics were classified as junior academics. Actually, the borderline between senior academics and junior academics cannot be drawn clearly in all of the countries participating in the CAP project.

2.3   Conceptual Framework and Themes Addressed

The underlying concepts and thematic areas have been already discussed in the introductory chapters. Therefore, some issues can be briefly sketched here, while others need further explanations. The scholars involved in the preparation of the comparative study agreed to raise six major research questions:

1. To what extent are the nature of academic work and the trajectory of academic careers *changing*?
2. What are the external and internal *drivers* of these changes?
3. To what extent do changes *differ between countries and types of higher education institutions*?
4. How have the *academic professions responded*—attitudinally and behaviourally—to changes in their external and internal environment?
5. What are the *consequences* of the changes and faculty responses to them *for the attractiveness of an academic career*?
6. What are the *consequences for the capacity of academics*—and their universities—to contribute *to the further development of knowledge societies and the attainment of national goals*?

The choice of themes has been influenced by the preceding Carnegie study undertaken in the early 1990s. Notably questions regarding career and employment as well as a few regarding teaching were repeated to provide the opportunity to measure change over time. However, most of the questions of the CAP questionnaire were newly formulated—in part in order to improve the formulations but mostly in order to take up new themes considered important in the light of the priorities of the project and the changing situation of the academic profession.

The emphasis on 'change' in the title of the CAP project affected the formulation of the questionnaire and the analysis and interpretation of findings in different ways. First, *three thematic areas* were chosen *that have become more prominent and pervasive in recent years* in setting conditions for academic work and possibly characterising academic work itself:

– The growing expectation or pressure to demonstrate the visible *relevance* of academic work
– The increasing *internationalisation* (and possibly globalisation or regionalization) of the context and possibly the essence of academic work
– The growing *managerial power* and steering in higher education

Second, ways were chosen of measuring change over time with the help of *identical or similar questions to those posed in the predecessor questionnaire*. This can be interpreted clearly historically; for example, one could try to establish whether young researchers have more responsible roles in research vis-à-vis professors these days than the previous generation of young researchers. Or this can be interpreted as biographic and historical interaction: Did the proportion of women being junior academics of the early 1990s succeed to be promoted to senior academics in about the same proportion today, or is the proportion of senior academics today clearly lower than that of junior academics a generation ago, thus confirming concepts such as the 'glass ceiling'?

Third, *perceptions of change* were explicitly addressed. Respondents were asked whether they have observed change in some respect—since a few years, since the start of their academic career, etc.: Actually only a few questions of this kind were posed because such views might be biased retrospective judgments. Moreover, even if not retrospectively biased, a report about increased resources for academic work might only mirror the increasing success of an individual in the course of his or her career possibly effected by seniority but might not be valid for indicating whether resources for academic work have grown on average in the respective country.

As a rule, identical questions for all countries were preferred. Specific questions were posed in the individual country questionnaires for two reasons:

– First, national specifications are needed in various cases, for example, types of educational institutions and staff categories.
– Second, some of the individual country questionnaires were supplemented by themes to be of special interest within the conceptual framework of the respective scholars or as specific higher education issues within the respective countries.

In principle, the teams of the individual countries participating in the CAP were *free to delete some questions or items in the national questionnaires*, if they were viewed as irrelevant, regulated for everybody, sensitive or otherwise disturbing. Actually, very few of the common questions and items were deleted in national versions of the master questionnaire. Thus, the international CAP project team succeeded in agreeing to a highly standardised questionnaire with 53 identical or similar questions—mostly with response categories provided—with about 400 variables. The time needed to respond was estimated to be about 40–50 min. at the outset, whereby the actual time certainly was spread more widely.

2.4   Sampling Design and Number of Respondents

The sampling design for the respective national CAP surveys was recommended by the CAP Methods Group based on a proposal prepared by the CAP project coordinator William K. Cummings. Actually, the sampling design was shaped by three factors: the analytic goals of the project, the design effect of the sampling design selected by each country and the structure of higher education in each country.

2.4.1   Analytic Goals

Early on, the project decided on an *effective completed sample of 800 for each participating country*. For inferring population characteristics from sample data, a certain minimum completed sample size is necessary to attain respectable confidence intervals. To obtain decent confidence intervals for a descriptive proportion such as the proportion of a population that agree on some issue, a completed sample size of circa 300 is helpful. To cross-tabulate the first variable with a second and get good confidence intervals, we need to nearly double the sample size. To bring in a third level of analysis, further expansion is required. It was in this manner that the project decided on an effective completed sample size of 800—it will easily enable statistically significant analysis up to the third level of analysis. The figure 800 is for the actual number who respond and not for the number sampled.

Our expectation was that respondents in each nation would be representative of the population of academic staff. Thus, the goal in CAP sampling was to obtain a completed effective sample of 800.

2.4.2   Design Effect (Deff Coefficient)

The project explored a number of sampling designs, including *simple random sampling*, where each respondent in the population has an equal probability of being included; *stratified sampling,* wherein the population is broken into subgroups, but

the sampling ratios in the subgroups are equal; *stratification with unequal sampling ratios between groups* to oversample small subgroups who might be marginalised if sampling ratios were equal; and *cluster sampling* wherein several units (A) from the population of units are first selected, and then within each unit, a certain number of individuals are selected (B).

2.4.3 Structure of Higher Education

The overall project sought to adjust sampling design to the structure of the individual national systems of higher education, ranging from small and relatively homogeneous systems to those which are larger and more diverse in terms of institutional types. It adopted the following basic sampling principles:

In countries, where there are relatively few institutions (50 or less) and they are somewhat similar, the best approach was seen to develop a list of all academics in the institutions and randomly sample the target sample of 1,800 academics (600 * 1/.33 or the response rate ratio).

Where there are *many institutions* and they are similar, a one- or two-stage cluster sample was recommended: In the one-stage sample, a moderate number of institutions were to be selected (perhaps 20), and then all of the academics in those institutions were selected. Because of the cluster sample design, a multiple of 600 academics would need to be selected (Deff (=3 plus) * 600) or somewhere upwards of 1,800 academics. In the two-stage sample, a larger number of institutions were randomly selected (A = 50 plus), and then within each of these, a relatively small samples of academics (B = circa 12–15) are randomly selected so that A * B = Deff * 600 or approximately 1,800. Further steps had to be taken into consideration if the higher education system of a particular country was considered to be more heterogeneous.

As already pointed out in the first case, the sample had to be based on an estimate of the response rate. For example, if 800 responses are desirable and a response rate of one-third could be expected, one had to sample at least 2,400, or similarly, if 1,800 responses were strived for and if a *response rate* of one quarter could be expected, one had to sample at least 7,200.

The scholars in the individual countries opted for *different strategies in sending the questionnaires*. Some mailed questionnaires only, and some sent the questionnaires through mail and online. In three countries (Canada, Korea and the USA), the questionnaires were available only online. In South Africa, student assistants at each participating universities distributed the questionnaires to the individual academics' offices; also in Mexico, the questionnaires were 'delivered by hand'.

The questionnaires were sent to some 100,000 academics selected in the various countries in 2007–2008 and only in the Netherlands in 2010. The number of *reminder actions* varied by country (e.g. two in Germany, three in Canada and five in the USA). Eventually, 25,819 valid responses were received, that is, from respondents fitting to the target groups, whereby the questionnaire was sufficiently complete to be used in the subsequent analysis.

Table 2.1 Survey 'The Changing Academic Profession': number of respondents (weighted cases) by status and institutional type

	Universities		Other HEIs		
	Seniors	Juniors	Seniors	Juniors	Total
Argentina	105	810	–	–	915
Australia	200	669	76	286	1,377
Brazil	364	186	311	274	1,147
Canada	743	416	–	–	1,159
China	1,309	1,697	204	375	3,640
Finland	208	810	74	232	1,374
Germany	152	888	91	41	1,215
Hong Kong	191	377	–	–	586
Italy	1,061	645	–	–	1,711
Japan	189	45	701	187	1,126
Korea, Republic of	127	37	503	243	909
Malaysia	262	650	45	176	1,219
Mexico	556	121	861	310	1,973
Netherlands	208	208	394	400	1,209
Norway	391	509	31	34	986
Portugal	102	431	51	766	1,510
South Africa	421	176	3	3	749
United Kingdom	288	612	7	32	1,369
United States	424	420	144	121	1,109
Total	7,301	9,707	3,496	3,480	25,282

After a *process of weighting* the respondents by institutional type, and academics' rank and gender in order to counterbalance biases in the composition of the data as compared to the composition of the academic staff in the respective countries, a final data set with 25,282 weighted cases was created. Table 2.1 provides an overview regarding the number of responses according to the final data set.

In almost all countries, the desired minimum number of 800 respondents has been reached. In a few countries, in contrast, the number of the responses surpassed clearly the approximate number strived for. Notably, more academics than anticipated responded in China.

The *response rates* cannot be established precisely for all countries as a consequence of complex procedures of contacting potential respondents. In some cases, the questionnaires were sent out by the individual institutions of higher education, and no detailed respective information was provided. In some countries, it is not clear whether the number of responses refer to all responses or to those responding to major parts of the questionnaire. Actually:

– Extremely high response rates are reported for China (86%) and Mexico (70%) and possibly a non-reported high rate in South Africa where questionnaires have been carried from office to office.
– Response rates above 30% are stated for Norway (36%), Italy (35%), Argentina (34%) and Germany (32%).

– Response rates between 20 and 30% are most frequent: Finland and Malaysia (28% each), Netherlands (26%), Brazil (25%), Australia (24%), Japan (23%) and USA (21%).
– Response rates below 20% (in several cases online survey only): Canada (17%), United Kingdom (15%), Hong Kong and Korea (13%) and Portugal (4%).

It should be noted that the response rates have been about 40% on average in the Carnegie survey, thereby varying between 70% and almost 30%. In the CAP survey, the response rates have been around 30% on average, and they are lower in almost all countries that already participated in the Carnegie study. The only exception is Germany, where the response rate was exceptionally low in 1992 (28%) and a moderate increase can be observed in 2007 (32%). Altogether, increasing survey fatigue, lower participation rates in online surveys as well as incomplete response in online surveys have contributed to an overall decline of the response rates. However, there are no indications that the decline of the response rate has led to an enlarged sample bias, and as pointed out below, major biases according to various criteria can be counterbalanced by a weighing of responses.

2.5   Data Coding and Analysis

The project teams of the individual countries were responsible for the data entry and for the first step of data cleaning. Subsequently, the data were transferred to a central team of CAP data coordinators—Oliver Bracht, René Kooij and Florian Löwenstein, with advisory support by Harald Schomburg und Ulrich Teichler—at the International Centre for Higher Education Research (INCHER-Kassel) of the University of Kassel in Germany.

In order to have an information basis for a compatible handling of the data gathering of the various countries, the Methods Group and the central data coordinators—under the leadership of Hamish Coates—developed a '*national survey audit schedule*' asking the individual country teams to provide detailed information on various procedural steps they had undertaken, notably:

– Whether more than a single version of a questionnaire was employed and, if so, how they varied
– In which respects the national questionnaire differs from the international CAP master questionnaire
– What procedure had been undertaken in the translation of the questionnaire from the English master version to other versions and whether any problems occurred which affected the international comparability of results
– Whether they had employed paper and/or online surveying
– How the academic profession as well as the higher education institutions were defined for inclusion into the survey (respectively, what was excluded)
– How the sampling design and the actual sampling procedure compared
– When the survey has been undertaken

– How the potential respondents have been approached
– How many follow-ups have been undertaken
– How many persons have been addressed and actually have responded
– What procedures have been undertaken and what decisions have been made regarding completeness of answers, unexpected data errors, etc.
– What the characteristics of the national data set are that might have to be taken into consideration in the production of a central data set

Initially, the central data team established an *international codebook*. This was necessary to ensure the compatibility of data entry in the individual countries. Moreover, it served the accommodation of the country-specific categories (e.g. ranks of academic staff and types of higher institutions) in the international data set. In order to ensure comparability of the various data files, a number of further coding modifications had to be undertaken, because some countries have opted for additions, modifications or deletions of individual questions and items.

Subsequently, the central data team at INCHER-Kassel undertook—with advice of the CAP Methods Group—various steps of further *data cleaning*. In the first stage, it developed a detailed list of questions according to which the individual country teams were asked to prepare reports about the survey procedures as well as about the data quality. In subsequent steps, the country teams were asked to answer specific questions as regards visible problems of the national data set, for example, perceived incongruities or large amounts of apparently missing data. In this process, new questions and incongruities surfaced, and various steps of inquiries, new definitions of codes, new productions of data sets, etc. turned out to be necessary. Moreover, a set of decisions had to be taken as regards the handling of missing data. Finally, a country was incorporated in the data set where the survey could be undertaken only 3 years later. As a consequence, the whole process from the first steps of data entry towards the final data set stretched from spring 2008 to the release of the final data set in September 2011.

As part of the overall process of international data coordination, *sample weights* were made. The central data team at INCHER-Kassel team solicited basic population data from the individual countries on the national distribution of the academic profession by institutional type, academic field, gender and academic rank (professor, etc.). These were used to weight the actual sample values to reflect the basic population parameters across all participating countries.

All CAP country teams were given access to the international data set, and—in order to facilitate the further analytical work—sets of standard frequency tables were provided. Thus, each team could undertake comparative analyses from the outset. The process of writing analyses, presenting them at conferences and publishing the results already started in 2008. Readers of the publications have to bear in mind that the early reports still might be based on data sets that slightly deviate from the final data set made available in September 2011.

In the course of the project, various new indices and other scores were created by the members of the CAP team. In some instances, they were provided as part of

the central data set, for example, 'international activities', 'international mobility status', 'varied teaching activities' and 'publication index'. In other instances, they were produced and used by individual national CAP teams.

2.6   Utilisation of Data

The project 'The Changing Academic Profession' is a federated project. The various national teams, in principle, are the 'owners' of the national data. They volunteered to make the data available to their colleagues of the CAP teams in the other countries in order to produce an international data set. This enables the national team from the outset to analyse their national data in comparative perspective. Moreover, this provided the basis to undertake comparative analyses jointly.

In the same spirit, the team members have been responsible themselves for the use of data within the publications and other reports. A glance at the first more than 100 articles published based on the CAP data suggests, first, that the use of provisional data sets in the first few years, before the final data has been produced in September 2011, has led to some, though altogether moderate, inconsistencies between the publications. Second, analyses vary substantially to the extent they provide information only on all respondents of each country participating or they differentiate between status groups, types of higher education institutions and possibly other characteristics.

Finally, it is worth noting that the first analyses are rich in demonstrating similarities across countries and differences between countries but often do not succeed in discussing the national contexts and characteristics of higher education which might explain the findings. In sum, we might argue that collaboration in the CAP project succeeded well for creating a good quality of a data set. It turns out to be more difficult to cover the issues of the academic profession in the individual countries well with the help of a common international questionnaire and to provide sufficient information about each country in order to interpret the findings comparatively in a well-informed way.