The Changing Academy – The Changing Academic Profession in International Comparative Perspective 23

Futao Huang
Timo Aarrevaara
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Teaching and Research in the Knowledge-Based Society

Historical and Comparative Perspectives

Springer

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Volume 23

The landscape of higher education has in recent years undergone significant change. This has been particular the case for research training, academic life, employment, working conditions and entrepreneurial activities of universities around the globe. The academy is expected to be more professional in teaching, more productive in research and more entrepreneurial in everything. Some of the changes involved have raised questions about the attractiveness of an academic career for today's graduates. At the same time, knowledge has come to be identified as the most vital resource of contemporary societies. The Changing Academy series examines the nature and extent of the changes experienced by the academic profession. It aims to address these changes from an international comparative perspective, focusing at both the higher education system level as well as the STEM fields of science, technology, engineering and mathematics in particular. It explores both the reasons for and the consequences of these changes. The series considers the implications of the changes for the attractiveness of the academic profession as a career and for the ability of the academic community to contribute to the further development of knowledge societies and the attainment of national goals. It provides analyses on these matters drawing initially on available data-sets and qualitative research studies with special emphasis on the international studies of the Changing Academic Profession and the national surveys in STEM fields. Among the themes featured will be: • Relevance of the Academy's Work • Enrolment, graduation and the institutional setting of STEM • Research, development and technology policies with regards to STEM • Internationalization of the Academy Governance and Management • The new generation in the academic profession – the doctoral graduates Editorial Board: Elisabeth Balbachevsky, Department of Political Science, University of Sao Paulo, Brazil Jung Cheol Shin, Department of Education, Seoul National University Ulrich Teichler, International centre for Higher Education research (INCHER), University of Kassel William Cummings, Graduate School of Education and HD, George Washingtion University Akira Arimoto, Kurashiki Sakuyo University, Okayama.

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ISSN 2214-5346 ISSN 2543-0378 (electronic)
The Changing Academy – The Changing Academic Profession in International Comparative Perspective
ISBN 978-3-031-04438-0 ISBN 978-3-031-04439-7 (eBook)
https://doi.org/10.1007/978-3-031-04439-7

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

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Chapter 1
Introduction: Some Considerations into the Teaching-Research Nexus

Futao Huang, Ulrich Teichler, and Timo Aarrevaara

Abstract This chapter begins with a short introduction to academics' teaching and research activities from a historical and comparative perspective. In the second part, it presents a brief sketch of previous studies, primarily focused on academics' teaching, research, and the nexus of their teaching and research. In the final part, it summarizes relevant findings from three international comparative surveys, focused on responses' teaching and research activities and their perceptions of the linkage and/or separation of teaching and research. Also, it explains the purpose, research questions, and the organization of this volume.

Changes in Academics' Teaching and Research

Teaching and research are the two key activities of faculty members in higher education institutions (HEIs). It is generally agreed that academics were primarily engaged in teaching activities from the emergence of medieval universities in continental Europe in the eleventh century to the establishment of the University of Berlin in 1810. The universities of Bologna and Salerno in Italy and the University of Paris became the model for all later medieval universities. Despite some differences in educational organization and content between universities, the existing research suggests that academics' core activities were teaching and, in most cases,

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F. Huang et al. (eds.), *Teaching and Research in the Knowledge-Based Society*, The Changing Academy – The Changing Academic Profession in International Comparative Perspective 23, https://doi.org/10.1007/978-3-031-04439-7_1

their teaching was concerned primarily with professional or vocational education in the continental European countries (Cobban, 1975). The generation of new systematic knowledge, nowadays generally called research, did not play any role in some countries, while in others it had been a secondary activity for centuries.

The emergence of nation-states has had considerable impact on academics' teaching activities, as they were increasingly asked to serve their nations by producing civil servants, technicians, theologians, etc. The most typical example is that academics were required to provide modern scientific and technical contents in newly founded specialized institutions such as École Polytechnique and École Normale Supérieure, to train bureaucrats and specialists for the new government. The clear differentiation of functions between HEIs and research institutions such as the Collège de France and the Muséum National d'Histoire was strengthened under the Napoleonic regime. It also largely affected the formation of the idea of higher education in Soviet Union with a separation of functions between universities and research institutions. Faculty members did not conduct real modern research, and neither did they consider research as the same important responsibility as teaching in HEIs until the University of Berlin was founded (Charle, 2004). It is widely acknowledged that the research-based university model, in particular the idea of the unity of teaching and research, rapidly and profoundly impacted higher education both in Germany and abroad. They not only affected the modernization of national higher education systems in central, eastern, and northern Europe (Rüegg, 2004) but also Japanese academics' emphasis on research and the creation of the mission of Peking University in the 1920s when the German model was introduced to the two countries (Gottlieb & Keith, 1997). The model further expanded to Korea and Taiwan through Japanese colonization. Importantly, the Humboldtian idea impacted the establishment of the Johns Hopkins University in 1876, which is considered the first research university in the USA. It led to the revolution of higher education in the USA by integrating teaching and research and the development of doctoral education (Clark, 2006).

Later than the French and German models, the basic character of English higher education was formed by the early twentieth century (Ben-David, 1962). Aristocratic elite education and utilitarian training were provided in different institutions, but the unity of teaching and research was not emphasized. Compared to both German and British HEIs, "American universities have tried not only to teach and create new science but also new applications and professions catering for the élite as well as the masses" (Ben-David, 1962, p. 76). Much research indicates that despite differences in the degree of impacts, these four models of higher education were transferred to other countries and affected the formation of academic systems and characteristics of the academic profession in these countries to different extents especially since the early twentieth century (Perkin, 2007).

The postwar period, particularly the Cold War period, saw the formation and strengthening of diverse types of national higher educational systems that naturally affected the pattern of academics' teaching and research activities (Ben-David, 1977). For example, the New China and other socialist countries established a similar academic system as the Soviet Union based on the planned economy: a clear

separation of function between HEIs in which academics were only involved in teaching professional and technical education and academies or research institutions outside HEIs where unitarian and applied research was undertaken. In comparison, most academics in North America and continental European countries were engaged in both teaching and research or tried to balance the two. However, changes occurred in higher education worldwide in the different phrases below.

During the 1960s and 1970s, the enormous increase of student numbers and its consequences for teaching and learning were in the limelight of higher education policies. Higher education diversified all over the world, whereby the academically more prestigious sector took care of a strong role of research along with teaching and the less prestigious sector focused exclusively or predominantly on teaching (Light, 1974). The separation of teaching and research was informal in many countries, while it was manifested by different institutional types in other countries (Trow, 1974). Further, academics in the industrial societies came to be expected to be not only involved in teaching and research but also in more diverse academic activities (Clark, 1983). A similar view was reemphasized as a general definition of scholarship by Boyer (1990), which he described as being discovery, integration, application, and teaching.

Since the 1980s, three major changes occurred in the academic profession worldwide. They include the following: a stronger emphasis placed on research; as also signaled by the concept "knowledge society," more attention paid to the relevance of research along with the persistent emphasis placed on academic quality; and efforts of steering the views and the activities of the academic profession through a stronger power of university management, the establishment of varied evaluation schemes, efficiency pressures, and mechanisms of incentives and sanctions. Prior studies highlight the diversification of academics' work roles and responsibilities. For example, the academic professions' role in the recruitment of academics, education, peer review, and quality of academic work is crucial. However, beyond this traditional definition, there is an increasing group of higher education professionals coping between academic and supportive or service roles. The academic profession works in part-time or full-time positions, in different work conditions with fixed-term or permanent contracts, and in one or several HEIs (Kehm, 2015; Rhoades, 1998).

Since the 1990s, because of conceptual changes of knowledge (Gibbons et al., 1994) and environmental changes within higher education, such as massification and globalization (Valimaa, 2001), some researchers took it for granted that academic work would be fragmented and academic positions would mainly focus on either teaching or research and sometimes only on management (Clark, 1994). In recent years, if we look at various changes occurring in academics' teaching and research activities in the EU countries and some countries in East and Southeast Asian countries such as China, Korea, Singapore, and Malaysia, two opposite trends have happened to their academics in relation to the nexus of teaching and research. For example, the implementation of the Bologna Declaration, particularly the Tuning Project, has led to a gradual departure from the "unity of teaching and research" to the increased emphasis on professional, vocational, and technical

education at the first-circle education at the European dimension. This would inevitably affect academics' teaching and research, as well as their perceptions of the relationship in teaching-research nexus (Nikos et al., 2020). In contrast, academics in many countries that used to belong to the Soviet bloc and the British colonies have been asked to be engaged in research. With a stratification of national higher education systems and the establishment of national research universities, particularly the quest for world-class universities in Asian countries, a new type of academics who are primarily involved in research came into existence. One of typical examples is the emergence of a large number of Chinese academics who are engaged in research in several research-intensive universities such as universities of Peking and Tsinghua.

Relevant Studies

There is little doubt that the argument of teaching and research and their relationships is a long-standing and controversial issue. As almost all chapters in this volume have reviewed literature in their country case studies from different perspectives, this part only presents a brief sketch of previous studies, primarily focused on academics' teaching, research, and the nexus of their teaching and research.

With respect to the existing study on academics' teaching and research nexus, there seem to be several conflicting and opposing views. For example, it has been argued that teaching and research are separate activities (Barnett, 1992; Hattie and Marsh, 1996; Marsh & Hattie, 2002), whereas, on the other hand, some researchers have insisted that those academic activities be intrinsically related and connected to each other (Braxton, 1996; Ramsden & Moses, 1992). Moreover, some researchers stated that the relationship between the two is far more complicated than this (Coate et al., 2001; Neumann, 1996; Taylor, 2008). In analyzing the responses to academics' preference on teaching and research and their perceptions of the relationships between the two in the Carnegie Foundation and CAP (Changing Academic Profession) surveys and other information available as well, Arimoto (Arimoto, 2015; Arimoto & Ehara, 1996) created a typology of the teaching-research nexus. They include the German model or the research-emphasized model, the Anglo-Saxon model or the teaching and research-balanced model, and the Latin American model or the teaching-centered model. Perhaps these models cannot cover all types of academics worldwide from the 1990s to the early 2000s, but these models empirically depict growing variations in academics' teaching and research and their views of the two activities.

While many researchers admitted the complicated relationships between teaching and research, some researchers argued that there are two main approaches for simplifying the understanding of the nexus between teaching and research: what is a mode of the nexus (positive, negative, supportive, or reinforced)? In which direction does it occur (does research lead to teaching or vice versa)? And most of them believed these two approaches are intertwined with each other. The mode of

teaching and research nexus has produced different results in a number of previous studies (Robertson, 2007). In terms of the direction of the nexus, although it is more generally accepted that research is likely to lead to teaching activity (Smeby, 1998), some studies claim that teaching-led research based on the concept that "good teaching causes good research" (Elton, 2001) can be a potential model in the practice of teaching undergraduate students (Harland, 2016). Those studies basically agree that there is a mode of nexus between teaching and research.

In terms of factors affecting teaching, research, and their relationships, while some earlier research suggests that the change in the dynamics of the relationship between teaching and research can vary according to the national contexts of higher education which are tightly connected to idiosyncratic elements of national settings (Clark, 1994), recent research identified more and various possible factors which could influence the nexus and should be considered. For example, Smeby (1998) discovered that the nexus also varied according to the level of program as well as the academic discipline. Even though there was no empirical analysis, Taylor (2007) suggested a range of key drivers that shape the nature of the teaching and research nexus: these were categorized as ideological factors and environmental factors. Ideological factors could be institutional, mission related, or pedagogical based on ideas, beliefs, and philosophy. Environmental factors could be external forces or the conditions of institutions that may influence teaching and research, such as assessments, market forces, competition, or differential funding arrangements. More importantly, many case studies based on the CAP project examined how the relationships between teaching and research can differ according to the institutional and individual characteristics such as career stage, educational level, and academic discipline, generation, sex, academic rank, taught academic discipline, and type of institution (Mathieson, 2019; Shin et al., 2014; Teichler & Arimoto, 2014; Zhang & Shin, 2015).

Compared to the earlier research above, Tight's point needs to be further studied and elaborated (2016), for he emphasized the importance of research into the nexus of teaching and research at different levels. As he argued, we might do well to limit the emotional commitment often embodied in thinking about the association between research and teaching and do more to explore in detail what actually happens in practice. While paying attention to the global trends is important, we cannot neglect what is happening to teaching and research at the national and/or institutional level.

The Background and Organization of This Volume

In order to examine and discuss whether and to what extent the changes in the global landscape of higher education and research and policies in national higher education had exerted any influences on the views and activities of academics, including their teaching and research, as well as their perceptions of the linkage and/or separation of teaching and research since the late 1980s, three international

comparative surveys were carried out in individual countries and systems (cf. below). Relevant findings from these surveys have illustrated what is discussed in the previous section to some extent below.

According to the general report of the first international survey of the academic profession, the Carnegie international surveys of academics in 1991–1992 (Boyer et al., 1974; Altbach, 1996), as regards academics' teaching and research, among 13 countries and Hong Kong that participated in the international survey of the academic profession in 1991–1992, a majority of academics is committed to teaching and research and to its traditional values of autonomy, academic freedom, and the importance of scholarship, but a division of labor between academics across countries and an increased emphasis on research was identified. For example, the majority of professors in several countries reported their interests lie primarily in teaching, while the majority in other countries preferred research, and in almost all countries, a strong record of successful research is important for faculty advancement. Further, academics are affected by the major trends evident in universities worldwide—accountability, massification, managerial controls, deteriorating financial support from public sources, and others. Research funds are scarcer and are often tied to applied outcomes and increasingly linked to private interests. These factors have, not surprisingly, negatively affected the working conditions of the academic profession (Altbach, 2000).

The complexities of academics' teaching and research and their relationships at the global level are somewhat empirically illustrated by relevant findings from the second international survey, which is the CAP international surveys in 2007–2008 (Teichler et al., 2013). Altogether, 17 countries and Hong Kong participated in the surveys. Some common changes and challenges in relation to teaching and research can be summarized as follows (RIHE, 2010):

- There was a widening gap between teaching and research activities evident not only among different systems but also within systems.
- Academic activities were seemingly fragmented, and new divisions of labor were noted within the academic profession.
- Increased numbers of articles and books were published by academics.
- There were increased pressures on faculty, especially on young faculty in the research arena.

This volume reports findings of the third survey: the international surveys of the Academic Profession in the Knowledge-Based Society (APIKS) starting in 2017. The APIKS survey was implemented based on the Carnegie Foundation survey of 1992 and the CAP survey of 2007–2008 and their successor studies. It provided a platform for more than 20 higher education systems and their teams with the essential data on the CAP in a knowledge-based society. It includes their general work situation and activities, teaching, research, external activities, governance and management, external activities, career and professional situation academics in formative career stages, and personal background. The international database of the APIKS survey is based on strong foundation of voluntary scholarly work and highly decentralized, loosely coordinated structure and practices for conducting

comparative research (Aarrevaara et al., 2021). It is worthwhile to mention that largely similar to the previous two international surveys, the academic profession in the international database of the APIKS project refers to full-time academics affiliated in HEIs and working in research, teaching, external activities, societal impact of the academy, or academic leadership posts. As the APIKS survey consists of 22 higher education systems, it is not possible for all the teams to follow a similar definition of the academic profession. For this reason, each team has defined its population for a national survey and defines peculiarities of its definition in each chapter of this volume.

As some questions had been asked similarly and were identical, a change over time can be reported for countries participating in two or three of these surveys. Most of the chapters in this volume are contributed by authors who participated in the International Conference on Academics' Teaching and Research that took place in March 2019 in Hiroshima, Japan, based on their presentations. The Hiroshima conference was the first international conference that was organized after the international surveys had been carried out in 22 higher education systems based on the APIKS project since 2017. The key purpose of the Hiroshima conference was to share the preliminary findings from national surveys focused on teaching, research activities, and the nexus between teaching and research. Twenty national teams from Asia, Europe, and North and South America that had completed their national surveys participated in the conference and reported their preliminary findings. Some of these preliminary APIKS findings based on the Hiroshima conference were published as a Special Issue for the APIKS in Higher Education Forum (Postiglione&Kim, 2020). We present some key points from the participating teams' presentations and discussions based on their data analysis in the conference (Huang, 2019).

First, in general, at least two broad groups are identifiable based on participating teams' responses to the APIKS international surveys. One group reflects teaching-oriented systems in which more than half of academics believe that their primary interest is in teaching or in both teaching and research but with a leaning toward teaching. Typical examples include Argentina, Portugal, Russia, Taiwan, and the USA. The other more research-intensive group refers to China, Croatia, Estonia, Finland, Lithuania, Mexico, Japan, South Korea, Sweden, and Turkey. Their faculty are primarily focused on research or both research and teaching but leaning more toward research. Further, in both types of higher education systems, there are research-intensive universities and teaching-oriented universities of applied sciences, colleges, polytechnics, or equivalent HEIs. These include Estonia Finland, Germany, Japan, Portugal, and USA. Compared to the 1991–1992 survey and the CAP survey, it appears that the proportion of participating teams that show a greater preference for research has increased in absolute terms.

Second, compared to the previous two international projects, it seems that increasing numbers of academics emphasize both teaching and research activities and seek to balance the two activities. For instance, as suggested in the chapter on Lithuania, the Lithuanian higher education system has developed from a pre-Humboldtian model, which emphasized the separation of teaching and research, to

a post-Humboldtian model which pays the same attention to teaching as it does to research, although teaching and research roles, administration, and resources have become increasingly differentiated.

Third, interestingly, a small number of participating teams showed a tendency to move from an emphasis on research to a greater stress on teaching compared to previous national surveys. For example, countries like Argentina, Canada, and Portugal all reported that their faculty show less interest in research than they did when the CAP surveys were administered in their countries about 10 years ago.

Fourth, as regards the relationships between teaching and research, for example, their responses to the statement that "teaching and research are hardly compatible with each other" in the questionnaire, despite incomplete responses, most national teams, including Canada and Japan, answered with a "strongly disagree." For their responses to the other statement that "your research activities reinforce your teaching", a majority of participating teams agree with it. They include Canada, China, Lithuania, Slovenia, and Turkey.

Finally, as reviewed in the existing research above, differences in institutional type, academic rank, gender, discipline, and employment status had the most impact on academics' perceptions of teaching, research, and the nexus between them, let alone social and national contents. For example, in many European continental countries, the differences between universities and nonuniversity sectors such as polytechnic institutions are considerable, whereas there are more obvious differences between national and private universities in Japan and between leading universities and local universities in China. Furthermore, these variations are also apparent between STEM and non-STEM disciplines.

This volume shares similar aim of research as to that of the Hiroshima conference. Namely, it attempts to address common themes relating to teaching, research, and the nexus between teaching and research based on key findings from the APIKS survey. However, the volume is more specifically concerned with the following research questions and emphasizes both the historical and comparative standpoints, while country cases are analyzed and discussed:

- Did the views and activities change in the directions expected on the basis of the generally dominant policies and context trends?
- Did the proportion of academics decline for whom teaching and research is clearly linked?
- Is the nexus viewed more beneficial or more conflicting than it was viewed in previous surveys?

According to the research questions and the analytical perspectives, we suggested the following template for each chapter:

- An argument/rationale for the relevance of the chosen theme (topic/focus) with a particular view to the currently changing global, national, and institutional contexts.
- A brief introduction to the national higher education system and the most striking characteristics of the academics in your country especially since the early 2000s.

– An explicit research design and account of the data used in your chapter.
– A comprehensive analysis and discussion of the survey data based on your national survey and international database in light of the research questions above.
– Research findings and implications: what are new findings of your research? Are there any implications derived from your research for the research agenda in terms of emerging and new research questions, for policy recommendations or institutional practice, and for individual academics' academic activities?

Obviously, the purpose, research questions, and suggested template have largely determined the organization of this volume. The whole volume is divided into two broad parts. Part I deals with the research questions mainly from the historical and comparative perspectives. It includes six country case studies: Chap. 2 Argentina, Chap. 3 Canada, Chap. 4 Germany, Chap. 5 Japan, Chap. 6 Portugal, and Chap. 7 Malaysia. Some countries that participated in all the three international surveys use three different sets of data to explore time series changes in their academics in 1992, 2007, and 2017 like Korea. Some country cases only analyze the CAP and the APIKS data like Malaysia. In Chaps. 8, 9, 10, 11, and 12 that include Lithuania, Finland, Korea, Russia, and Turkey, the focus is placed on the analysis and discussion of the three main themes of the volume-teaching, research, and the teaching-research nexus—from the international and comparative perspectives. Although some chapters in part II do not make time series changes in their academics' teaching and research, almost all the chapters in the volume compare their academics to one or a group of overseas reference countries in these regards by using the APIKS international database. In addition, there are two separate chapters in the volume. One is the Introduction and the other is Conclusion that concentrates on the discussion of what we know about the teaching and research nexus in the knowledge-based society, including issues such as global challenges of teaching and research nexus, methodological opportunities and drawbacks of the APIKS comparative research project, and new findings from the international surveys.

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Chapter 2
The Argentine Academic Profession: Conditioning Factors in the Relationship Between Teaching and Research

Cristian Pérez Centeno and Martín Aiello

Abstract This chapter examines the relationship between teaching and research activities performed by academics in Argentine state universities on the basis of the results gathered in the Academic Profession in the Knowledge-Based Society (APIKS) international study, which is being conducted in around 30 countries worldwide.

The present study puts forward three hypotheses which challenge how academic research activities, type of research conducted, number and kind of contributions made, research location, and source of funding are associated with material and subjective factors. More specifically, the study addresses the ways in which the type of contract (position and dedication), chosen discipline, generation of belonging, doctoral education, gender, and preference for teaching and/or research influence the distribution of research activities among Argentine academia.

The APIKS results show a double shift: on the one hand, an increase in the number of hours dedicated to research—even when contracts are structured around teaching tasks—and, on the other hand, a weakened persistence of a statistical association between different factors of the Argentine academic profession and the performance of research activities, foreseeing, perhaps, a generalization of research, independent of teaching contracts.

To conclude, the relevance of symbolic factors is foregrounded to explain the development of research activities conducted in addition to the teaching activities the academics are hired for, even when this could suggest a donation of their work. Beyond material resources, the system allocates symbolic capital among those conducting research activities, which leads to beneficial conditions for the development of the academic career.

Keywords Academic profession · University · Argentina · Teaching · Research

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F. Huang et al. (eds.), *Teaching and Research in the Knowledge-Based Society*, The Changing Academy – The Changing Academic Profession in International Comparative Perspective 23, https://doi.org/10.1007/978-3-031-04439-7_2

Introduction

The academic profession as a theoretical concept is defined in relation to knowledge production and transfer. The presence of these two interrelated functions involves the search for new scientific and technical knowledge, its communication, and its reproduction, which stems from the need of other professionals to acquire such knowledge for learning and application, as well as to sustain their ability to produce new knowledge. Knowledge production and reproduction, therefore, are associated with research and teaching and with two systems that do not necessarily share the same regulations: the national system of science and technology and the higher education system.

A previous study related to the Changing Academic Profession (CAP) project (Aiello & Rebello, 2012) highlighted the need to situate the Argentine academic profession within the university system, given that it is here where both functions—knowledge production and transfer—are combined. As a result, professional activities performed in these institutions (mainly state ones) may be conceptualized as academic. As Castells (1996) pointed out more than a quarter century ago, the capabilities of societies and their place within division of labor are influenced by the productivity linked to the use of knowledge. This emphasizes the political component of knowledge production, which takes on a new significance from the related public redistribution project.

In this sense, the concept of academic profession, which in theory links both teaching and research activities, transcends abstraction to find a direct relation in the way societies define their place within the global division of knowledge production and transfer. The Argentine university system had been characterized by a possibility of linking these two functions, especially after the University Reform of 1918; however, by the mid-twentieth century, several external and internal constraints led to a shift of focus toward professional undergraduate education (Escotet et al., 2010). This early massification and professional orientation paved the way for the foundation of the Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET—National Scientific and Technical Research Council) in 1958, which promoted careers in research outside the university realm. The science and technology system thus became "independent" of the higher education system, making the analysis of the Argentine academic profession more complex.

This "independence" does not mean that no relation exists between the two systems; rather, that takes place between disciplines and educational levels (undergraduate or postgraduate). There are certain discipline types—for instance, hard pure sciences, in the sense given by Becher and Trowler (2001), minoritarian in the number of teachers and students at university education level—that have a higher incidence in this relation. Similarly, the training of researchers tends to be linked to academic postgraduate education, in particular doctoral degrees (Krotsch & Aiello, 2019). As regards teaching, there are conditions that guide this relation, adding to the strong inclination toward professional undergraduate studies. Two of the most significant factors affecting this relation are the type of academic workload and the

type of formal appointment to universities. As we will see, full-timers only represent a minority, and professional responsibilities are basically determined by teaching functions and needs. In fact, in traditional universities of "Humboldtian" roots, this orientation is reinforced by the incorporation of academics into "chairs."

Despite the strong professionalist orientation of the Argentine university system and a contractual structure centered on teaching, the CAP study has revealed that Argentine academic respondents are more inclined to do research than teaching. For instance, almost 60% of academics opted for research activities, either exclusively or as a preference. Likewise, this trend was more pronounced in relation to academic position (chairs), availability of full-time contracts, and chosen discipline (in particular hard and soft sciences). A curious and unexpected finding in our research was that novel academics showed an inclination toward research that was significantly greater than the overall mean (Fernández Lamarra & Marquina, 2008). In real terms, academics reported a greater number of weekly hours dedicated to research activities than to teaching, even during the class period (Fernández Lamarra, 2012).

These results were interpreted as direct effects of the public policies implemented in the 1990s in the academic profession—mainly, the processes of evaluation and accreditation, the foundation of the Agencia Nacional de Promoción Científica y Tecnológica (ANPCyT—National Agency for the Promotion of Science and Technology), and the availability of competitive research funding and incentive programs for researchers, primarily adopted by novel academics as a means of access to and promotion in the academic career (Fernández Lamarra & Marquina, 2008).

In a previous study (Aiello & Pérez Centeno, 2016), we found that poor material conditions for research development do not represent an obstacle to the identification of Argentine academics who perform that function. Within this context, then, it is important to examine the way work is organized among academics, the type of research they conduct, and their means of communication in order to understand the relationship between teaching and research. Also, a historical perspective would allow us to observe the dynamics of this relationship in the realm of university, science, and technology policies.

As Marquina (2020) argues,

> [In peripheral countries], the academic profession involves individuals who experience change differently and perform teaching and researching activities at the university in accordance with fluctuating regulations that concurrently reverberate across the institution. This profession also fosters values and beliefs that are nurtured by the history of the university system and that have been reconstituted in the face of the massification of the different higher education systems and the regulations adopted in recent decades. These changes have been interwoven with similar processes at a global level in a distinguishable academic world that translates, for all Latin America, into an academic profession that is undoubtedly fragmented. (p. 70)

To carry out this analysis, we have examined the relationship between academic teaching and research activities in Argentine state universities based on results gathered from the Academic Profession in the Knowledge-Based Society (APIKS)

international study that is being carried out in around 30 countries worldwide.[1] To contextualize these findings, we analyze the conditions affecting the link between teaching and research and provide background to this link within academia.

Furthermore, to reveal which academics are engaged in research, the type of research they conduct, and the contributions they make, we sought to establish a degree of incidence of particular material and identity factors inherent to the teaching practice, such as type of contract, position and employment status, chosen discipline, generation of belonging, doctoral education, gender, and preference for teaching and/or research.

Methodologically, teaching characteristics were considered variables, and research characteristics were taken as dependent variables from questions related to professional career and professional situation (section A of the questionnaire: position, discipline, employment status, education, and generation), working conditions (section B: preference for teaching and/or research), gender (section H), and research (section C).

To conclude, we organized the results gathered from the contextualization made, the former link between both academic functions, and the previous results available.

The Relationship Between Teaching and Research in the Argentine University System

In the last 15 years—especially since the CAP study was carried out in Argentina—we have witnessed a series of studies on the academic profession that

> have, for the first time, allowed for a deep and systematic approach in the field that continues to broaden and deepen, outlining the singularity of the national case in relation to international trends, favoring its comparison and contextualization at a global and regional level and incorporating the participating Argentine academics into international scientific networks. Some of the studies conducted outside this framework have also contributed to the visibility of this matter and the systematization of its study. (Pérez Centeno, 2017, 227–228)

These studies have demonstrated that particular characteristics, such as position, employment status, chosen discipline, generation of belonging, or gender, have become defining factors of professional practice. Thus, by virtue of these "structural characteristics," the academic profession appears fragmented, hierarchical, and very diversified (Marquina et al., 2021). Some authors even argue that there are different academic professions based on the interaction of these characteristics (Pérez Centeno, 2015).

In the context of Argentina and given the professional character of the Argentine university, we may observe that academics are hired mainly for teaching (only

[1] APIKS builds on two previous studies: a study carried out by the Carnegie Foundation for the Advancement of Teaching in the 1990s and a study conducted in the framework of the CAP project during the last decade. All three are based on the application of the same survey, implemented internationally by a growing number of countries.

11.01% are full-timers), yet they perform a variety of tasks beyond the scope of their contract. Based on the CAP study results, those authors that have delved into the relationship between teaching and research found that the regular schedule of many academics often includes a significant number of hours dedicated to research, even when they do not meet the contractual conditions to do so (Pérez Centeno, 2012).

This new feature began to be adopted as a result of the university reforms of the 1990s, uprooting a working condition that had been "structured around the classroom, having built its own identity and ethos on knowledge and alumni. These had, until then, been the distinctive features of [the academic] profession and, at the same time, a source of prestige and personal pride" (Leal et al., 2012).

Strictly speaking, not only research activities were adopted but also activities related to outreach and transfer, administration, and academic tasks—mainly ad honorem—including the participation in peer committees for the evaluation of institutions, programs, projects, teachers, and scientific articles; the incorporation of academic associations and networks; the participation in scientific committees; and the training of new researchers. Still, activities related to research are the most significant, given that the system has exerted considerable pressure by means of material and symbolic incentives with the aid of public policies aimed at the distribution of resources and prestige among academics who engage in research, submit and publish their results, produce patents, and hold postgraduate degrees, especially doctoral degrees.

These efforts brought about a transformation in the role of the academic, associating it with having a high level of postgraduate education and the responsibility to develop both teaching and research activities. This may be because academic activity began to be assessed in terms of productivity criteria in research rather than teaching, with the implementation of different incentives and regulations that shaped a model of academic work that, until then, was only limited to specific disciplines (Marquina and Fernández Lamarra, 2008; Leal & Robin, 2006).

This strong push toward research influenced academia in a significant and generalized way, although there were several particularities regarding the structural characteristics of the profession. Thus, the CAP study demonstrated that these characteristics of the academic profession involve a differentiated commitment to research and, as a result, a differentiated distribution of inherent material and symbolic resources. For instance, there was no significant difference between academics with part-time and full-time contracts in relation to the number of hours dedicated to their duties. What could be observed, however, was a higher level of "donation" of work, ad honorem, mainly to be able to engage in research and meet the typical requirements of academic performance. As noted above (Aiello & Rebello, 2012; Marquina, 2013), academics carry out research and teaching activities in public universities regardless of their contract, employment status, or working conditions. This constitutes, therefore, an inherent and distinguishable aspect of the local academic profession.

There has been a steady and growing pressure in this regard in recent decades owing to the rise in science and technology investments, both inside and outside the university, which has made research more appealing, such as when these

investments have considerably shrunk and led to a higher competition for spaces and resources for research. The official approval of the 2015 Convenio Colectivo de Trabajo para Docentes de Instituciones Universitarias Nacionales (Collective Labor Agreement for Teachers at National University Institutions) may eventually affect this scenario by laying out regulatory criteria for the university teaching career.

APIKS data would likely shed some light on how the relationship between teaching and research has evolved during the last decade so as to learn which teachers are engaged in research, the type of research they conduct, where this research is performed and how it is funded, and the kinds of contributions teachers are able to make today.

Hypothesis: Incidental Factors in the Relationship Between Teaching and Research

Research development levels suggest that professional research-related academic activity in Argentina is conditioned by the following structural characteristics:

- *Type of contract, position, and employment status*: teachers (in contrast to associated professors) and full-timers (in contrast to contracted part-timers dedicated to teaching) may enjoy better material conditions for their activities.

This could exacerbate with time, given that the professional structure is stable, yet pressure to engage in research increases. This can be observed in the generational analysis or in the comparison between CAP and APIKS results.

- *Chosen discipline*: academics teaching pure disciplines with a focus on research rather than on professional education may be more affected or have a higher hourly workload than those dedicated to applied disciplines, either hard or soft.

Nevertheless, it is worth noting the importance of identity factors that may influence the inclination toward research and that conflict with each academic's teaching contract. Aiello and Pérez Centeno (2016) have demonstrated that the level of identification has an impact on some aspects of the academic profession, such as job satisfaction or academic interest in teaching or research. Moreover, this influence may sometimes be more determinant than material conditions themselves. The authors summarize their findings by concluding that it is likely that identity aspects outweigh a lack of appropriate "objective" conditions for the development of the profession—as if, somehow, academics created their own "subjective" conditions of identification and job satisfaction, triggering a voluntary professional workload as a result of budget restraints or job insecurity.

The analyzed factors are:

- *A preference for teaching and/or research*, which may influence the number of hours dedicated to research
- *Holding a doctoral degree*, which may suggest an interest in research

- *Gender*, which tends to explain some differential behaviors and conceptions or else replicate unequal situations within academia that may correlate with the academics' own identity and, thus, with the activities they perform (it should be noted that, in CAP and as regards this subject, no differences were found in relation to academic gender [Aiello and Pérez Centeno, 2016])

We thus put forth the following hypotheses:

1. To engage in research activities, academics must meet specific professional characteristics, whose prevalence is greater among:

    1.a. Senior professors
    1.b. Full-time professors
    1.c. "Consolidated" (i.e., well-established) professors
    1.d. Professors working as teachers in pure disciplines
    1.e. Professors who have a preference for research
    1.f. Professors holding a doctoral degree

2. The type of research conducted (pure, applied, with a commercial or social orientation, with an international outreach, or with a disciplinary or multidisciplinary character) is subject to the structural characteristics of the profession and the remaining characteristics selected (preference for research, holding a doctoral degree, and gender).
3. Results gathered from the research activities conducted differentiate themselves according to the structural characteristics of the profession and the remaining characteristics selected in such a way that the variety of contributions made is greater among those academics who enjoy more favorable conditions for research (senior, full-time, and consolidated professors), work as teachers in pure disciplines, have a preference for research, or hold a doctoral degree.

Data and Methodology

In order to explore the formulated hypotheses and provide answers to the questions raised in this study, we selected questions from the APIKS survey that allowed us to establish a relation between professional characteristics of interest and the performance of research activities.

After the selection of questions (detailed below), we established variables and categories from the APIKS data matrix to operationalize these characteristics for their statistical treatment.

To achieve this, the APIKS results (Table 1.1) were considered as follows:

- *Independent variables (IV)*: teaching characteristics such as position (senior/junior), employment status (full time/part time), generation (novel/intermediate/consolidated), gender (male/female), education (with or without a doctoral degree), discipline (hard pure/hard applied/soft pure/soft applied), and preference

Table 1.1 Logical model of analysis of data gathered on teaching and research

H)	Research question	IV	DV
1	Who are engaged in research?	A1 (position) A2 (discipline) A3 (employment status) A5 (education) A8_1 (generation) B2 (inclination toward teaching/research) H1 (gender)	D1 (conduct research) B1 (hours dedicated to research)
2	What type of research is conducted?		D2 (type of research)
3	Which are the contributions made?		D3 (number of academic contributions in the last 3 years) D4 (type of publications)

Source: Table created by the authors

for teaching and/or research (their interests lie primarily in teaching/both, but leaning toward teaching/both, but leaning toward research/primarily in research)

- *Dependent variables (DV)*: variables related to research, such as academic research, weekly workload in hours dedicated to research (during or after class hours), type of research conducted (pure/applied/with a commercial orientation or toward technology transfer/with a social orientation/with an international outreach and orientation/based on a discipline/multidisciplinary), and the number and type of contributions they make

In regard to *position*, academics were grouped into two categories: senior (heads of chairs, associates, and adjuncts) and junior (heads of practical works and tutorials and assistant professors) in accordance with analysis criteria established by the APIKS international project.[2]

For *chosen discipline*, the categorization suggested by Becher and Trowler (2001) was used, which classifies sciences according to character (hard/soft or pure/applied), so that the responses gathered in the survey (question A2) were categorized based on the four possible groups (hard pure, soft pure, hard applied, and soft applied). Grouping was made according to STEM (science, technology, engineering, and mathematics) belonging and the corresponding crosstab, but the results are not presented in this work because they are not explanatory (with the exception of specific cases).[3]

[2] The APIKS survey reviewed each academic position in accordance with the national denomination—heads of chairs, associates, adjuncts, heads of practical works and tutorials, or assistant professors. Nevertheless, because of the international comparison criteria established in APIKS—which ensure a comparison of results with the CAP survey—an ad hoc recategorization was carried out in the two categories defined in the project (used in this article): senior, for the three higher categories, and junior, for the two lower categories. This coincides with the international concepts of "academics" and "developing academics."

[3] Although the international APIKS project emphasizes a disciplinary classification based on the STEM categorization (encompassing all disciplines linked to science, technology, engineering, and mathematics), the traditional classification by Becher and Trowler (pure/applied and hard/soft sciences) appears to be more productive in terms of the analysis of the relation between teaching and research activities (Pérez Centeno, 2012). Despite examining both classifications, this article confirms the explanatory power of the Becherian classification in contrast to the one based on STEM disciplines.

For *dedication*, we relied on the international criterion of APIKS which groups academics either as full-timers or part-timers. In the case of Argentina, the latter group includes those academics who are part-timers and those working under a semi-exclusive contract.

To analyze the *generational* aspect, we also followed the international criterion, grouping academics according to their novel, intermediate, or consolidated character based on the year their academic activity began (question A8_1 of the survey) and following the approach put forth by Marquina et al. (2021). Therefore, novel academics who began their academic career in 2008 or later have 10 or less years of experience in the profession and less than 37 years of age; intermediate academics who obtained their initial position between 1995 and 2007 have about 25 years of experience in the profession and less than 50 years of age, whereas consolidated academics have more than 25 years of experience and 50 years of age or more.

In order to determine whether an academic was engaged in research, the variable D1 response was considered whereby respondents had to inform the type of existent collaboration in their research, inferring that a nonresponse to the items implied that no research was being conducted.

Lastly, to study the association between the analyzed variables, we resorted mainly to the chi-square statistical chart and the following significance scale related to that association: $*p < 0.05$, $**p < 0.01$, and $***p < 0.001$. In all cases, we also calculated the likelihood ratio, both to confirm the chi-square results and to use a more appropriate statistical indicator, whether the variables permitted it or required it. Nevertheless, in no case did these indicators differ when determining the association (or nonassociation) between the considered variables; hence, the tables only show the aforementioned significance degree of association.

When the relation resulted from qualitative and quantitative variables, we also calculated the Eta coefficient, which allows for the consideration of the incidence of the studied factors in dependent variables and, thus, the incidence of the independent variable within the dependent one.

Results Analysis

(a) *Which Academics Are Engaged in Research?*

APIKS reveals that most state university teachers in Argentina (72.4%) are engaged in research (Table 1.2). This figure represents about 9 out of 10 full-time academics and about 7 out of 10 part-time academics (under a specific teaching contract). Moreover, within this group, those academics who conduct research were more than double in number to those who do not.

Table 1.3 shows that the number of weekly hours dedicated to research does not significantly differ from the number of teaching duties during the class period. Additionally, during the working period without classes, the number of hours dedicated to research increases (with a 15% rise).

Table 1.2 Percentage of researchers without a teaching contract

	Research		Total (%)
***$p = 0.000$	Conduct research (%)	Do not conduct research (%)	
Full time ($n = 145$)	93.8	6.2	100.0
Part time ($n = 809$)	68.6	31.4	100.0
Total ($n = 954$)	72.4	27.6	100.0

Source: APIKS Argentina (*$p < 0.05$, **$p < 0.01$, and ***$p < 0.001$)

Table 1.3 Average of hours dedicated to academic activities without class period

		Total			Full time			Part time		
B1		Class time	No class time	Avg.	Class time	No class time	Avg.	Class time	No class time	Avg.
Teaching	hrs	13.0	5.8	9.4	15.4	7.1	11.3	12.6	5.6	9.1
	SD	8.7	6.0		8.5	6.8		8.7	5.8	
Research	hrs	10.6	12.1	11.4	14.9	17.1	16.0	9.7	11.1	10.4
	SD	11.3	12.9		10.2	12.8		11.3	13.7	
Externally oriented activities	hrs	2.4	2.6	2.5	3.2	3.2	3.2	2.1	2.4	2.3
	SD	4.6	5.3		3.9	4.2		4.1	5.0	
Administration and services within academia	hrs	3.4	3.1	3.2	6.6	6.3	6.5	2.8	2.5	2.7
	SD	6.4	6.4		8.3	8.8		5.9	5.7	
Other academic activities	hrs	3.0	2.9	3.0	2.3	2.3	2.3	3.2	3.1	3.2
	SD	6.4	6.3		4.5	4.7		6.7	6.7	
Average		**32.4**	**26.5**	**29.5**	**42.4**	**36.0**	**39.2**	**30.4**	**24.7**	**27.6**

Source: APIKS Argentina (SD: standard deviation)

What can be observed here is that academia informs a working schedule closer to a full-time employment status than to the general structure of part-time contracts (10 hrs per week), typical of the country's university system. Thus, the working schedule does not befit the contract structure: contracts are partial, yet professional commitments far exceed them.

On the other hand, a comparison between the average contract hours and the reported working hours provides an interesting and sensitive piece of data. Teacher contracts reported in the APIKS survey account for a mean of 16.8 hrs per academic professional[4]; however, the average hours worked are 32.4 hrs. That is, academics work almost twice as much of the time they are actually hired for, and most of the

[4] To calculate it, we took into consideration that a full-time contract involves a weekly workload of 40 hrs (according to the national standard); a semi-exclusive contract, a weekly workload of 20 hrs (or 50% of full-time contract hours); and a part-time contract, 10 weekly hours (or 25% of full-time contract hours).

extra workload conducted within that contract scheme is related to research. Given that the basis for academic hiring is for teaching duties (part time), the working period outside the classroom should noticeably reduce the workload. Yet Table 1.3 shows that workload only decreases in about 6 hrs (less than 20% of their working hours).

This result is far from surprising, for it refers to a "selvedge mark" of the Argentine academic profession since its founding: its vocational character, ad honorem, which grants personal and professional prestige. Although the current situation is unlike the one experienced during the 1918 reform, ad honorem contracts have grown in number and represented a significant segment of the traditional university system, especially in historical universities with a high enrollment rate. Today, this has translated into new forms of work donation—as observed in the figures above (see part-time academics in Table 1.3, whose workload generally involves more hours dedicated to research than teaching)—a scheme that goes structurally unquestioned and unopposed.

If we consider academic position (Table 1.4), we observe that, as expected, senior academics who occupy higher ranks engage in research at a higher rate than junior academics (78.3% vs. 68.9%) and that the group not engaged in research represents a lower number among senior academics than among juniors (21.7% and 31.1%, respectively).

Certainly, we did not expect to find this level of generalization of research duties, but the results show that professional academic practice in relation to research is still associated with a type of contract—both for position and employment status—and that, despite nuanced differences, it is widely distributed among both groups. Still, we must take into account that the number of junior researchers represents the majority within the group of teachers, since the general structure of Argentine academia is strongly pyramidal. As a result, out of the total number of academics engaged in research, almost 6 out of 10 are junior.

Another element observed, which contradicts our assumptions, is that performance of research duties as part of the academic activity is rather generalized, even though, as we have seen in the case above, it is not independent of the generation of belonging (Table 1.5). The rate of novel researchers is rather lower than the general mean, and yet it is still high (almost 7 out of 10) and not radically different from the rest of the groups.

Table 1.4 Percentage of researchers without a position

	Research		Total
**p = 0,001	Conduct research (%)	Do not conduct research (%)	(%)
Senior (n = 360)	78.3	21.7	100.0
Junior (n = 594)	68.9	31.1	100.0
Total (n = 954)	72.4	27.6	100.0

Source: APIKS Argentina (*$p < 0.05$, **$p < 0.01$, and ***$p < 0.001$)

Table 1.5 Percentage of researchers by generation of belonging

*p = 0,013	Research		Total (%)
	Conduct research (%)	Do not conduct research (%)	
Consolidated (n = 236)	73.7	26.3	100.0
Intermediate (n = 293)	77.8	22.2	100.0
Novel (n = 425)	68.0	32.0	100.0
Total (n = 954)	72.4	27.6	100.0

Source: APIKS Argentina (*$p < 0.05$, **$p < 0.01$, and ***$p < 0.001$)

In other words, pressure to incorporate research tasks increases with time and encompasses all generational groups because the professional position structure is stable, yet pressure to engage in research is continuously on the rise.

If we consider teaching disciplines as a factor affecting research (Table 1.6), we may indeed observe an incidence. In fact, pure sciences have a higher research rate than applied sciences: 83.1% vs. 16.9% for hard sciences and 81.0% vs. 19.0% for soft sciences. In the applied sciences, the proportion of researchers is lower, around two-thirds: 69–31% for hard sciences and 64.6–35.4% for soft sciences.

We also observe that commitment to research (Table 1.7) is statistically associated with:

- *Gender* (**$p = 0.001$): women tend to engage in research at a higher rate than men. It would be interesting to unravel the reasons that generate this phenomenon, although it is likely that a proportion of men who do not conduct research occupy managerial positions (given that they are overrepresented in that function), precluding their research practice. It may also be a reactive manifestation pushing women toward a greater commitment to research as a condition for the development of their academic career, despite not enjoying the working conditions to do so.
- *Doctoral education* (***$p = 0.000$): holding a doctoral degree almost always involves performing research (96.4% of academics do so). On the other hand, the opposite is not true because only less than two-thirds of those who do not hold a doctorate degree claim to be engaged in research. This is reasonable, since doctoral education allows for this possibility and reveals each academic's interest in research.
- *Preference for research*: the higher the preference for research, the higher the tendency to engage in research. This confirms the weight of both the material and the symbolic aspects of the professional character of academics (Aiello et al., 2016).

Table 1.6 Percentage of researchers without a chosen discipline

	Research		
*$p = 0.01$	Conduct research (%)	Do not conduct research (%)	Total
Hard pure	83.1	16.9	100.0
Hard applied	69.0	31.0	100.0
Soft pure	81.0	19.0	100.0
Soft applied	64.6	35.4	100.0
Total	72.4	27.6	100.0

Source: APIKS Argentina (*$p < 0.05$, **$p < 0.01$, and ***$p < 0.001$)

Table 1.7 Percentage of researchers whose main interest lies in teaching and/or research

	Research		
***$p = 0.000$	Conduct research (%)	Do not conduct research (%)	Total (%)
Primarily in teaching	31.2	68.8	100.0
Both, but leaning toward teaching	75.5	24.5	100.0
Both, but leaning toward research	90.6	9.4	100.0
Primarily in research	96.0	4.0	100.0
Total	72.4	27.7	100.0

Source: APIKS Argentina (*$p < 0.05$, **$p < 0.01$, and ***$p < 0.001$)

(b) *What Type of Research Is Conducted?*

In this section, we examine the academic emphasis on research as a result of the structural and identity characteristics of the academic profession considered thus far. "Emphasis on research" (as per question D2 of the questionnaire) represents the type of research being conducted: either pure, applied, commercially or socially oriented, with an international outreach, or else based on one or multiple disciplines.

There has been no indication in our analysis that such an emphasis is associated with academic position, employment status, or generation of belonging. We have only found specific associations of the examined factors in some of the research orientations—namely:

- *Disciplines*
  - Those who work in pure disciplines are inclined toward theoretical/pure research (**$p = 0.05$) at a moderate level (with a gradient of 1, not at all, up to 5, a lot, with the statistical trend located halfway at 3).
  - However, those working in the hard sciences (***$p = 0.000$) are strongly and mostly inclined toward applied research (trend = 5).
  - Regarding the commercial or social orientation of research, we observe an overwhelming preeminence of the latter (***$p = 0.000$). The general view is that there is no commercial orientation in academic research (trend = 1) in the country; rather, its social orientation is widely generalized (trend = 5).

- *Doctoral education*
  - Holders of doctoral degrees tend to engage in pure (***$p = 0.001$), socially oriented (**$p = 0.01$), and international (***$p = 0.000$) research to a greater extent than those who do not hold such a degree. A possible explanation is that the very low number of Argentine academics holding a doctoral degree is mostly focused on the field of pure sciences.
- *Teaching or research preferences*
  - Academics whose main interest lies in research conduct pure or theoretical research (***$p = 0.000$) at a higher rate than the rest. Those who prefer teaching or both academic activities are mainly engaged in applied research.
  - Internationally oriented research is typical of those academics who prefer research; those who choose teaching do not have that penchant for research (***$p = 0.000$).
  - As for those academics engaged in research at a local level, research seems to be mainly oriented toward a multidisciplinary approach (*$p = 0.049$).
- *Gender*
  - Women perform applied (*$p = 0.014$) and socially oriented research (*$p = 0.023$) at a higher rate than men. Other types of research are not associated with academic gender.

(c) *Which Are the Research Results Gathered?*

Main academic contributions in the last 3 years (Table 1.8) correspond, in the Argentine case, to the presentation of articles at academic events (4.11 on average), publication of articles in academic journals and books (2.61 and 1.11, respectively), and the presentation of papers and reports for funded projects (1.53). The overall figures seem rather low.

An analysis of the relation between professional characteristics and research output does not inform a systematic pattern; rather, research is dependent on the factor being considered and the type of contribution. In this regard, the incidental factors that affect a larger number of production types are:

- Position (senior in contrast to junior academics)
- Discipline (academics working in hard sciences in contrast to those working in soft sciences)
- Holding a doctoral degree
- Preference for research over teaching

When the association between variables is confirmed, the abovementioned academic profiles show a larger number of productions than those who do not have that characteristic. Nevertheless, these factors by themselves fail to explain this production ability (as demonstrated in the Eta coefficient values for each case). Consequently, it could be argued that what influences the type and number of academic contributions in research is the concurrence of a series of academic characteristics.

Table 1.8 Number of academic contributions completed in the last 3 years

	Mean
Paper presented at a scholarly conference	4.11
Articles published in an academic journal	2.61
Discussion paper, report/monograph written for a funded project	1.53
Articles published in an academic book	1.11
Scholarly books you authored or coauthored	0.80
Artistic work performed or exhibited, incl. Video or film produced	0.58
Scholarly books you edited or coedited	0.36
Completed doctoral dissertations you supervised	0.36
Computer program written for public use	0.11
Patent or license secured on a process or invention	0.02

Source: APIKS Argentina

Table 1.9 What percentage of publications over the last 3 years have been…

	Mean (%)
Peer reviewed?	43.55
Coauthored with colleagues located in the country of your current employment?	39.63
Solo authored?	23.73
Published in a foreign country?	20.87
Coauthored with colleagues located in other (foreign) countries?	6.13

Source: APIKS Argentina

When we consider the authorship of these contributions, we observe that, for the most part, they are peer-reviewed productions coauthored with colleagues from the same country of employment (Table 1.9). These double the single-author productions published abroad.

Key factors influencing these types of research results—production of articles, works, and patents—refer to holding a doctoral degree, the disciplinary field of teaching practice (both in its Becherian and STEM categorization), and an inclination toward research.

Conclusions and Discussion

The relationship between *teaching and research* in Argentine academia has specific characteristics because, as opposed to other central countries or global trends, the Argentine academic profession is structured around part-time teaching contracts inherent to a university system that is mainly professional in nature.

Since the last decade, and based on the CAP study and related research supporting it, we have observed the incidence of certain professional factors—either

objective (position, employment status, discipline, generation, gender, etc.) or subjective (preference for research)—on the assessment of this relation between academic teaching and research.

When testing the hypotheses, we observed that:

- *Hypothesis 1: Research*

APIKS shows that most teachers in Argentine state universities are engaged in research. Even with this significant degree of generalization, we found that the development of this type of academic activity is statistically associated with position, employment status, chosen discipline, generation of belonging, gender, holding a doctoral degree, and preference for research.

Thus, academics carrying out a greater amount of research are those who:

– Hold higher teaching positions (senior) in contrast to junior academics
– Dedicate more time (full time) in contrast to part-timers
– Belong to older, and in particular to intermediate, generations, in contrast to junior academics, especially those from intermediate generations
– Work in pure sciences in contrast to those working in applied sciences
– Are women as opposed to men
– Hold a doctorate degree in contrast to those who do not
– Prefer research in contrast to those who prefer teaching

APIKS demonstrates a double shift in this dynamic. There is a sustained growth in the number of hours dedicated to research, even when contracts remain structured around teaching. And there is also a persistence in the statistical association between different factors of the Argentine academic profession and the performance of research activities.

Both patterns, far from being contradictory, could be thought of as part of a common process through time. It is possible that, if pressure for research as a condition for academic development continues, research duties could begin to be implemented as a constitutive element of the professional activity beyond hierarchical position or available employment status (i.e., contract), generation of belonging, chosen discipline, gender, education, or preference for research. So far, more than 7 out of 10 academics engage in research. Consequently, it could be argued that we are heading toward a scenario where teaching and research would effectively become activities with an equal standing in academia, regardless of working conditions. In other words, a generalization of research activity in the teaching collective is beginning to weaken those professional factors that have so far explained its unequal distribution.

An indicator in this sense may be the generational question. The results show that those academics who belong to intermediate generations conduct research at a greater rate than even consolidated academics. Marquina et al. (2017) have observed that, in the analysis of CAP results, the novel generation demonstrates academia's adaptation to the new set of rules for the academic game, promoted by the reforms of the 1990s, in view of their introduction to the academic world under this

framework. That generation is currently represented in APIKS as the intermediate generation, which falls into line with the findings of Marquina et al.

Perhaps the only exceptions to this may (still) be doctoral degrees—probably because they are not yet as widespread among academia (only 13% of academics hold one)—and preference for research. The latter obliges us to focus on symbolic, and not merely material, aspects as conditioning factors in professional practice.

- *Hypothesis 2: Type of Research*

The second hypothesis suggests that the type of research conducted by academics—whether pure, applied, with a commercial or social orientation, with an international outreach, or based on its disciplinary or multidisciplinary character—depends on the structural characteristics of the profession and the remaining characteristics selected, that is, position, dedication, chosen discipline, generation of belonging, preference for research, holding a doctoral degree, and gender.

We should note that only specific factors have been observed, which are associated with certain characteristics that influence research, such as teaching disciplines, holding a doctoral degree, preference for teaching, and gender. In these cases, results point toward a widespread empiric knowledge, whereby:

– Academics working in pure disciplines are inclined toward pure research, whereas those working in the hard sciences tend to engage in applied research.
– Socially oriented research has an overwhelming preeminence over commercial research or research related to technology transfer.
– Those holding a doctoral degree tend to engage in pure research with an international outreach or focus.
– Academics who prefer research conduct pure or theoretical research at a higher rate than the rest, and those who prefer teaching or both academic activities are mainly engaged in applied research.
– Research seems to be mainly multidisciplinary at a local level.
– Women conduct applied and socially oriented research at a higher rate than their male counterparts.

- *Hypothesis 3: Research Results*

This hypothesis argues that the difference in research output of academics is based on the structural characteristics of the profession and the remaining characteristics selected. APIKS demonstrates that research is linked to the academic field of teaching and a preference for teaching and/or research, "socially oriented and intended for the betterment of society." Commercially oriented research is marginal and mainly focused on the local rather than the international arena.

In contrast, APIKS results do not reveal an association between type of research and academics' position, dedication, or generation of belonging, disconfirming the above-stated hypothesis that suggests that better conditions for research (senior, full-time, and consolidated professors) would increase the number of contributions.

The number of contributions does not seem to be associated with a specific determinant factor. Once again, this depends on the aspect considered and the type of contribution. Holding a doctoral degree and having a preference for research are the most determinant factors, as well as position (seniors over juniors) and discipline (hard sciences over soft sciences). Yet none of them have explanatory weight in themselves. Instead, what influences the type and amount of academic research output is the concurrence of a series of academic characteristics.

In practical terms, academics engaged in research seem to have a low level of productivity in relation to the number of academic contributions they effectively make, which refer mainly to the academic circuit that assesses and validates their performance: these are mostly articles presented at academic events (1.4 on a yearly average), publications in academic journals and books (1.2 a year), and reports submitted for funded projects (1 every 2 years). Furthermore, they are peer-reviewed contributions coauthored with colleagues from the same country of employment (in response to demands from the academic system or model of knowledge production evaluation).

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Chapter 3
Canadian Universities and Incentives for Teaching or Research: Institutional Oversight and Supports

Grace Karram Stephenson, Silvia Mirlene Nakano Koga, Alison Elizabeth Jefferson, Olivier Bégin-Caouette, Sébastien Béland, Glen A. Jones, and Amy Scott Metcalfe

Abstract This chapter examines the relationship between teaching and research at Canada's universities via the perceptions of full-time professors. Data from the 2007 Changing Academic Profession (CAP) and the 2018 Academic Profession in the Knowledge-Based Society (APIKS) surveys are analysed to determine how professors perceive their institutions' orientation towards teaching or research, as well as the incentives provided to promote each academic activity. The findings indicate professors are supported to both teach and research, with the majority of indicators increasing in strength since 2007. Medical/doctoral universities are more oriented towards research and provide more incentives than their counterparts at primarily undergraduate universities; however, all types of universities show a balance for both activities. The findings confirm the continued strength of the teaching-research nexus in Canada for full-time professors.

Keywords Teaching-research nexus · Canadian higher education · Knowledge society · Differentiation

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F. Huang et al. (eds.), *Teaching and Research in the Knowledge-Based Society*, The Changing Academy – The Changing Academic Profession in International Comparative Perspective 23, https://doi.org/10.1007/978-3-031-04439-7_3

The pressure to produce research, publish and innovate is felt strongly by professors and institutions of higher education in the twenty-first century. These pressures are a product of the global knowledge economy in which the circulation of knowledge goods such as research, patents or Internet content is the pathway to national economic growth (Rooney et al., 2005). In higher education, these pressures are exacerbated by the presence of global university rankings. Ranking indicators favour research production, and institutions with high publication and research rates tend to be ranked higher than those who focus on teaching. This emphasis on research production has led many governments to increase supports for research-related activities and provide more funding for research-oriented institutions compared with those that have a teaching emphasis (Marginson & van der Wende, 2007).

There is evidence from many jurisdictions that the converse side of these trends is a decrease in supports for academic teaching activities (Altbach, 1996; Coate et al., 2001). When institutions wish to recruit top researchers to produce research and increase their ranking, many simultaneously save money by hiring teaching faculty on short-term teaching contracts. Likewise, processes like tenure review emphasize research production and guide professors' work activities to prioritize research over teaching (Gravestock & Greenleaf, 2008; Gravestock, 2011). Scholars have argued the increasing separation of research and teaching will impact negatively on the quality of higher education globally (Shin & Kim, 2017).

Canada, however, diverges from these trends. The university sector is dominated by large, publicly funded, comprehensive institutions, and this relationship between research and teaching – or the *teaching-research nexus* – while changing and strained, is still intact. Although scholars have argued for years that promotion processes in universities do indeed favour research achievements (Gravestock, 2011), as publications and research funding are weighted highly, the 2018 findings from the Academic Profession in the Knowledge-Based Society (APIKS) study suggest professors in Canada have a strong commitment to both teaching and research in their practice. Furthermore, professors themselves perceive a strong link between the two activities with each area informing the other (Karram Stephenson et al., 2019). In Canada, there is a new trend among universities to create teaching-stream positions for their faculty. These positions are full-time, permanent employment options for professors who specialize in the pedagogy of their discipline rather than research production. Although still a small minority, these positions point to the continued importance of teaching in Canada. These emerging trends in the hiring of professors as well as professors' own perceptions and preferences for both aspects of academic work suggest a strong research-teaching nexus in Canada overall.

The strength of the teaching-research relationship in Canada raises questions about institutional agency amid the pressures of the knowledge economy. Although the global race for rankings and research excellence is a formidable external pressure, institutions still have agency to shape their internal policies and incentives towards desired ends. Although scholarship exists on teaching and research as separate fields, few studies examine the teaching-research nexus in Canada at an institutional level by examining how Canadian institutions are positioned in their teaching or research orientation. Likewise, there is little research examining the incentives or

oversight institutions provide to shape their institutions' orientation. Given the relatively strong relationship between teaching and research in the activities and preferences of Canada's academics, Canada is an ideal site to examine how institutions are contributing to a strong teaching-research oversight or offering incentives to guide their professors' activities. This chapter investigates the teaching-research nexus in Canada using data from two surveys: the 2007 *Changing Academic Profession* (CAP) *survey* and the 2018 APIKS survey. The following question and sub-questions are examined:

- Research Question: How do professors at universities in Canada perceive the orientation or incentives for teaching and research at their institutions?

  Sub-question 1: Has there been change over time in professors' perception of institutional orientation or incentives between 2007 and 2018?
  Sub-question 2: What differences exist in perceptions of institutional orientation or incentives between professors at different categories of universities (primarily undergraduate, comprehensive, medical/doctoral)?

This chapter provides a significant contribution to the scholarship on teaching and research in Canada, concluding with a global comparison and discussion of Canada's distinct teaching-research nexus. Canada's highly decentralized system of higher education has no federal involvement in university teaching activities and only a small involvement in research, related mainly to funding. Furthermore, Canada has relatively low levels of institutional diversity. This sets Canada apart in country comparisons and allows for a unique analytic perspective from which to examine the institution-level incentives to encourage research or teaching orientation. The CAP and APIKS data are particularly suited to Canadian context in this regard since professors are still at the centre of teaching and research nationally and thus their perspectives illuminate the nexus of teaching and research across the country.

Teaching and Research in a Global Context

The teaching-research nexus has been a subject of scholarship for over 30 years. Analyses of data derived from the 1992 Carnegie International Survey on the Academic Profession of 14 countries found that academics had one of three 'orientations' (Arimoto & Ehara, 1996, in Arimoto, 2014, p. 23): research-focused (as seen in Germany, Sweden and Japan, among others), teaching-focused (as seen in Latin American countries such as Argentina, Chile and Brazil) or a preference for a combination of the two. The final option, a preference for both, is often conceptualized in scholarship as the *teaching-research nexus*, a synergy between the two components of academic work with its roots in the Anglo-Saxon model, and often associated with Anglo-American countries such as the UK, USA, Australia and Hong Kong (Arimoto, 2014). By 2008, data from the CAP survey indicated an increase in the number of professors with a solely research-focused approach

(Arimoto, 2014); a research preference was more prevalent than the preference for teaching across all countries (Teichler et al., 2013). Although two countries (Germany and the Netherlands) showed movement towards a teaching-research balance in the 15-year period, other countries which were previously 'balanced' systems, such as the UK and Australia, had moved towards a more research-focused orientation (Teichler et al., 2013).

Data gathered as part of the American sample of the 2018 APIKS survey suggest that preference for teaching or research is based on faculty rank and the type of institution (Jacob, 2020), the same as was reported in the 2007–2008 CAP survey (Teichler et al., 2013). At the same time, a widely held perception that teaching and other student-facing activities detract from research productivity (i.e., publication) is not confirmed in the data. Yet data from the APIKS project from other countries such as Japan, Korea, Hong Kong and China found that academics did not always feel there was a positive association between research and teaching; differences in perceptions of teaching and research were found between academics across the different HE systems, career stages and even between disciplines (Shin & Kim, 2017).

Intellectual challenges to the teaching-research relationship are also visible in scholarship. Braxton has been the most vocal questioning the validity of the supposed nexus (Braxton, 1996; Hattie & Marsh, 1996; Marsh & Hattie, 2002). In support of Braxton, Marsh and Hattie (2002) and more recently McKenzie et al. (2018) concluded the 'complementarity' between teaching and research is a myth. In reality there is little connection between research and teaching in contemporary education and a mistaken belief in the benefits of one on the other. The predilection for rankings and appraisals has led to 'compliance driven behaviour, silo-invoking mentality and academics driven by research and/or teaching performance expectations' (Mckenzie et al., 2018, p. 10). Universities are now simply 'deliverers of labour for an increasingly constricted employment market' (Mckenzie et al., 2018, p. 19). The authors argue the focus on delivering cheap, cost-effective, mass-producible 'flexible learning' at the detriment of deeper thinking and creativity means a teaching-research nexus, in terms of both the academic and the student, is impossible. This debate has also been heard in scholarship on Canadian higher education and academics have called for an increasing research focus on the teaching-research nexus in the Canadian context (Halliwell, 2008).

Higher Education in Canada

Canada is a sizeable country at approximately 9.9 million square kilometres. It is in the North American continent and has historic, colonial ties to France and the UK, although the USA is arguably its closest ally in present times. The majority of Canada's urban centres and 66% of the population are located within 100 km of the USA. This includes the majority of higher education institutions as well. Canada is comprised of ten provinces and three territories, and in this federal system the power

is divided between the national and provincial/territorial governments. Education, including higher education, is the exclusive jurisdiction of the provincial and territorial governments, although the federal government since 1990 has played an increasing role providing research funding directly to universities. All provinces are home to large public universities that offer a comprehensive range of undergraduate programmes. There is significant variation in the graduate-level offerings between institutions, and three categories of institutions have been identified: primarily undergraduate, comprehensive and medical/doctoral. However, these categories, which have emerged through the self-identification of professional organizations and media rankings, are not codified in government policy. Furthermore, these categories are limited in describing the province of Québec which is home to four exclusively graduate-focused institutions or specialized institutions.

Canada's public universities are established by a legal charter that makes them largely autonomous in their governance. Historically much of the power resided with the collegium of professors, reflecting the Anglo-Saxon model (Dobbins et al., 2011; Neave, 2001). However, the past four decades have seen an increase in mid-level management at universities and the creation of new bureaus and departments resulting in a shifting of power across university divisions as well as an increase in power for senior administrators (Jones, 2013).

Another identifying factor for Canadian higher education is the large number of international students who attend colleges and universities. Canada receives the third largest number of international students after Australia and USA (Walbank, 2020) bringing revenue of approximately $17 billion USD into the economy (Coulton, 2020). Tuition fees from these students are a very important source of income and allow many institutions to balance their budgets. This emphasis on student attraction and recruitment to Canada raises questions about classroom experience and what students are receiving for their tuition. This provides a slight counterpressure to the broader trends of research orientation.

Professors at Canadian universities are also well organized in labour relations. Over 80% of faculty belong to unions or faculty associations which represent the collective interests of professors in negotiations with senior administrators. These organizations have a strong pan-Canadian association which has contributed to similar trends in hiring practices across the country. For example, all universities except two hire their full-time professors into tenure-stream positions. More important to this paper, tenure-stream positions have standardized the triadic mandate of teaching, research and service in academic employment (Finkelstein & Jones, 2019).

A final feature of Canadian universities is their strong position as key contributors to research production. In contrast to the USA where 13% of gross domestic expenditure on R&D (GERD) is performed by the higher education sector, this ratio reached 41% in Canada in 2017. These factors provide the present-day context of Canadian higher education. The next sections explain how this current context relates to the historic development of a particularly strong teaching-research relationship.

The Teaching-Research Nexus and Canadian Higher Education

In order to understand the teaching-research nexus within Canada, it is important to understand the historic and heterogeneous influences that shaped the development of Canadian higher education. The earliest universities in colonial Canada were in the Eastern provinces, Upper and Lower Canada, and were replicas of their UK counterparts, educating elite young men for religious or political professions. These institutions were European entities with little concern for the indigenous peoples who resided in Canada at the time. By the 1900s, the influence of the German or Humboldtian model (Tight, 2016) with its focus on research and graduate education was present in Canada as the University of Toronto and McGill University began to offer doctoral programmes (Hattie & Marsh, 1996).

The presence of both research and teaching was solidified as the universities in the Prairie Provinces were established and modelled on the American land-grant design. This model was designed to be comprehensive and often consisted of only one institution in the province (Jones et al., 2014). After World War II, during which several urban universities had increased their research and development orientations, there was huge expansion of universities and colleges (Jones et al., 2014), and Canada developed one of the earliest 'mass' systems of HE (Trow, 1973). Higher education became a national priority as new secular institutions were formed and the government recognized 'university research as an investment in economic and social development' (Jones et al., 2014, p. 340). However, since that time, supporting and strengthening Canada's research output has been a visible priority of the federal government. This has been implemented via policy and the direct funding through national funding councils. However, there have been few initiatives of similar scale directed at the quality of instruction leaving the issue of teaching practice with the institutions at the 'local' level (Jones et al., 2014).

The 2018 Canadian APIKS study (Stephenson et al., 2020) found that the teaching-research balance has remained relatively stable over the past decade with just a 'slight preference for research' (p. 37) reported by university professors. However, faculty members spend more time on teaching and teaching-related activity than all other academic work (Gopaul et al., 2016), with over half of professors at Canadian institutions reporting an institutional culture of support and encouragement for professional development of their teaching activity. Despite the positive response towards teaching, only around a fifth of those faculty surveyed in the Canadian CAP study indicated they favoured teaching alone – the vast majority of faculty surveyed indicated equal interest in both research and teaching or a slightly greater emphasis on the research role (Gopaul et al., 2016). The authors suggested that the separation of academic work into teaching terms and nonteaching terms may play a part in reinforcing the perception of a divide between the two roles at the system level; however, faculty retained a 'strong belief' that their research activity reinforced their teaching practice, indicating a 'balanced' approach to academic activity on the whole.

Two key initiatives around the turn of the century, the *Canada Foundation for Innovation* (CFI) and the *Canada Research Chairs* (CRC) initiative, worked to 'streamline the Canadian academic research enterprise by introducing more specialization, differentiation and hierarchy' (Polster, 2004, p. 184). As part of Canada's 2002 Innovation Strategy, a report entitled *Achieving Excellence* (Industry Canada, 2002) focused on research and innovation at the 'local' institutional level (Metcalfe & Fenwick, 2009) and included reference to the commercialization of academic knowledge through university research (Langford et al., 2006; Polster, 2004, 2007) with the aim of driving university-industry collaboration. The sponsoring of university research chairs at both the provincial and federal levels to facilitate this university-industry link (Langford et al., 2006) placed further pressure on institutions to make adaptations which placed an increased focus on research, leading to a bifurcation of the academic role as universities invest in strategic areas of research and become more specialized and differentiated (Polster, 2004). Although Canadian public universities are largely self-governing and autonomous, legislated as 'not-for-profit' (Boyko & Jones, 2010), this corporatization of universities – which are arguably being increasingly run more as private-sector businesses than public-sector institutions of higher learning – forces faculty to feel 'less as equal members of a self-governing community and more as employees of the institution' (Newson & Polster, 2010, p. 5), decreasing collegiality and increasing competitiveness. Institutions are assessed based on their contribution to local or national economic development and are increasingly subject to governmental accountability measures (Eastman et al., 2018), placing additional pressures and constraints on middle management to increase their entrepreneurship and 'seek out new sources of revenue whilst restraining costs' (Boyko & Jones, 2010, p. 99).

As a result of these pressures and funding programmes such as the *Networks of Centres of Excellence* programme, the *CFI* and the *CRC programme* – which have expanded over the past two decades – workloads for research-intensive faculty now often encompass reduced teaching responsibility (Jones et al., 2014), adding strain to the teaching-research nexus. Not only is an 'elite' tier of academic researcher emerging (Newson & Polster, 2021), but separate teaching-focused positions have also risen. The majority of teaching-only positions are short-term contingent contracts, although some universities have created permanent teaching-stream positions as well (Jones et al., 2014; Rawn & Fox, 2018). The use of precarious labour has increased dramatically in recent decades (Shaker & Shaban, 2018; Stephenson et al., 2020) with these roles now accounting for over half of all university teaching (*Council of Ontario Universities*, 2018; Rose, 2020).

At the same time Canada has seen in recent decades an expansion in academic work (Stephenson et al., 2020) with a vertical fragmentation of academic job roles and the activities (Field & Jones, 2016; Jones, 2013). In what Macfarlane (2011) refers to as 'unbundling', the traditional tripartite role of the academic – teaching, research and service – is disaggregating; the 'holistic' teaching-research nexus is in decline (Shin et al., 2013). Shin and Kim (2017) argue that one reason for the increasing scarcity of this traditional role may be the focus on using knowlege for economic purposes. The emphasis of policy initiatives on applied research in hard

disciplines is seen in many Eastern HE systems. As Tight (2016) points out, although there appears to be continuation of an outward preference for this link between teaching and research globally, much more needs to be done at the 'local' level. Newson and Polster (2021) argue for the recomposition of fragmented academic work back into the traditional, holistic role which would reduce the resources expended on 'elite' researchers and simultaneously enable the reduction in precarious faculty.

Discussions on the teaching-research nexus offer many observations of shifting trends over the past 40 years and the impact of various global forces on universities. Few studies, however, consider what incentives, policies or programmes are occurring at the institutional level to encourage or strengthen professors' focus on teaching or research. This chapter heeds Tight's (2016) advice to examine the local level and uses the data from the CAP and APIKS surveys to examine professor's perceptions of their institution's orientation or oversight related to teaching and research performance. The following sections outline the methodology used to collect data and the analytic framework used to investigate the subject of this paper.

Methods

The data for this chapter were collected for the CAP survey in 2007 and the APIKS survey in 2018. The CAP survey was administered at 12 universities in Canada, for a total of 1152 valid surveys. The APIKS study was a collaborative research project involving more than 20 countries, with each individual country team collecting data in their own context. The Canadian team distributed the 51-item survey between October 2017 and June 2018 at 64 publicly funded universities in all ten Canadian provinces. The survey was distributed directly to full-time professors via their email address. The sample of full-time professors included assistant professors (pre-tenure), associate professors (tenured) and full-time professors (top promotion). In most cases (49 universities), the office of the Vice-President Academic distributed the survey. Professors at an additional 15 institutions received the invitation directly from the research team. Survey invitations in Canada's two official languages, English and French, were sent to 31,728 valid email addresses. The valid response rate for the Canadian survey was 9.35% with 2968 completed surveys. A chi-square goodness-of-fit test was conducted to test the representation of the data with the larger population of Canadian professors. The data were representative for age, academic discipline and rank. Two per cent more female than male professors completed the survey than their ratio in the broader population.

This chapter tests the relative strength of teaching or research oversight across sample institutions in Canada. This study also aims to examine if there are significant differences between professors' perception of institutional oversight in relation to their teaching and research between 2007 and 2018. To do so, we merged the CAP and APIKS databases (n = 4 081).

The following eight survey items were merged as dependent variables (DVs):

For teaching, these include:

DV1: You are encouraged to improve your instructional skills in response to teaching evaluations.
DV2: At your institution, there are adequate training courses for enhancing teaching quality.
DV3: Teaching is regularly evaluated by senior administrative staff.
DV4: Your institution considers teaching quality when making personnel decisions.

For research, these include:

DV5: Your institution sets regulatory load expectations for the number of doctoral students for supervision.
DV6: Expected to raise substantial amounts of external funds.
DV7: Research is regularly evaluated by senior administrative staff.
DV8: Your institution considers the research quality when making personnel (faculty firing/promotion) decisions.

Two further items, only asked on the 2018 survey, are also considered:

DV0: A strong research performance orientation
DV01: A strong research performance orientation

Findings

Teaching and Research: Change Between 2007 and 2018

Table 3.1 shows that the mean scores for six of the eight DVs increased between 2007 and 2018. Compared to participants in 2007, participants in 2018 are more likely to report having to improve their teaching skills, having to respond to teaching evaluations, having access to training courses to enhance teaching quality and having their research and teaching activities evaluated by senior administrative staff. Furthermore, they are more likely to agree with statements regarding their institution emphasizing the quality of research and teaching when making personnel decisions. Interestingly, fewer professors reported quantitative load targets for doctoral student supervision and feeling a stronger institutional pressure to raise external research funds than when they were first appointed.

To examine if variations were statistically significant, we proceeded to a between-subject one-way MANOVA (Wilks' lambda) on the eight DVs and for which the year of the survey was the IV. The findings suggest that the means of the scores attributed by participants to the eight variables taken together in 2018 is

Table 3.1 Mean scores and standard deviations of DVs in 2007 and 2018

Variables	Year	N	Mean	Sd
DV.1 Encouraged to improve skills for teaching evaluations	2007 2018	929 2443	2.56 3.03	1.19 1.24
DV.2 Adequate training courses for enhancing teaching quality	2007 2018	929 2443	3.48 3.66	1.13 1.18
DV.3 Senior administrative staff regularly evaluates your teaching	2007 2018	929 2243	0.32 0.35	0.47 0.48
DV.4 Consider the teaching quality when making personnel decisions	2007 2018	929 2243	2.98 3.28	1.1 1.12
DV.5 Number of doctoral students for supervision	2007 2018	929 2443	0.13 0.09	0.33 0.29
DV.6 Senior administrative staff regularly evaluates your research	2007 2018	929 2243	0.34 0.39	0.48 0.49
DV.7 Expect to raise substantial amounts of external funds	2007 2018	929 2443	4.09 3.51	1.12 1.31
DV.8 Consider the research quality when making personnel decisions	2007 2018	929 2243	3.32 3.8	1.22 1.13

Mean scores, standard deviations, skewness and kurtosis of two variables in 2018

Variables	N	Mean	Sd	s	k
DV0: At your institution, there is a strong teaching performance	2761	3.14	1.16	−.14	−.74
DV01: At your institution, there is a strong research performance	2753	3.53	1.19	−.50	−.63

significantly different than the mean of the scores attributed by participants in 2007, Wilks' lambda = 0.889, $F(8.3363) = 52.516$, $p = 0.000$ and partial eta-squared $\eta^2 = 0.11$ (small size of the amplitude effect of the difference between the means).

Post Hoc Student's T-Tests

Table 3.2 presents post hoc t-tests carried out for the six DVs in which data follow normal distribution. Findings suggest differences between 2007 and 2018 are statistically significant ($p < 0{,}05$), although tests indicated that the size effect of those significant differences is small ($\eta^2 \leq 0.1$). Taken together, the variables suggest that faculty members participating in the 2018 survey reported more institutional oversight to their teaching and their research than participants reported in the 2007 survey.

Since DV5 did not follow a normal distribution, we performed a Mann-Whitney nonparametric test and found the difference between participants' response in 2007 and 2018 was significant ($p < 0.05$) but that this difference was of small magnitude ($\eta^2 = 0.08$). These findings suggest that participants to the 2018 study reported feeling less pressured to maintain a particular quota of doctoral supervisions than faculty in 2007, but the difference is only 4%.

Table 3.2 Independent group t-test results comparing participants' responses to four variables in 2007 and 2018

Variables	T	Df	Sig. (2-tailed)	Mean Difference	95% confidence interval of the difference	
					Lower	Upper
DV.1 Improve skills for teaching evaluations	−11.682	2170	.000	−.500	−.58	−.41
DV.2 Training for enhancing teaching quality	−3.573	2180	.000	−.145	−.23	−.07
DV.7 Raise amounts of external funds	11.998	3650	.000	.557	.47	.65
DV.5 Senior administrative staff evaluates teaching	30.72	4079	.000	.25	.24	.27
DV.6 Senior administrative staff evaluates research	31.99	4079	.000	.27	.25	.28
DV.8 Research quality considered in personnel decisions	−11.48	3724	.000	−.49	−.57	−.41
DV.4 Teaching quality considered in personnel decisions	−7.11	3727	.000	−.30	−.38	−.21

Research and Teaching by Institutional Type

The second aim of this paper is to examine how professors at different types of universities in Canada perceive their institutions' orientation towards, and incentives to promote, teaching or research. The 2018 data were cross-tabulated by institutional types, including primarily undergraduate, comprehensive and medical/doctoral universities. The validity of these categories is confirmed in related research. The following tables indicate significant variation between primarily undergraduate and medical/doctoral universities in how professors perceive the strength of their institutions' teaching and/or research orientation. Table X indicates professors at primarily undergraduate universities perceive a stronger teaching orientation than their counterparts at comprehensive or medical/doctoral universities. More professors at primarily undergraduate universities suggest their teaching is evaluated by senior administrators, although they are more likely to perceive limits to the instructional supports to improve their teaching (DV2). In terms of research, those at primarily undergraduate institutions are significantly less likely to feel pressure to raise external funds or consider their institutions to have a research orientation (Table 3.3).

For question three Fisher's exact tests with multiple comparisons were used to locate differences between discrete variables, and the Cramer V was used to quantify the effect size. As shown in the second and third columns of Table X, Fisher's exact test is significant for 9 of the 10 selected variables at $\alpha = .05$. The only variable that does not explain group differences is DV 1. The Cramer V allows to examine

Table 3.3 Descriptive statistics teaching and research oversight

Teaching	DV1: You are encouraged to improve your instructional skills in response to teaching evaluations[a]	DV2: At your institution, there are adequate training courses for enhancing teaching quality[a]	DV3: Teaching is regularly evaluated by senior administrators[b]	DV0: At your institutions, there is a strong teaching performance orientation[a]	DV4: To what extent does your institution consider teaching quality when making personnel decisions?[a]
Comprehensive	2.96	3.86	33.50%	3.14	3.26
Primarily undergraduate	2.99	3.04	45.30%	3.46	3.58
Medical/ doctoral	3.1	3.79	29.80%	3	3.15
Total	3.04	3.63	33.08%	3.13	3.26

Research	DV5: Does your institution set quantitative load targets for the number of doctoral students for supervision?[b]	DV6: To what extent are you expected to raise substantial amount of external funds?[a]	DV7: Are your research activities regularly evaluated by senior administrators?[b]	DV01: At your institution, there is a strong research performance orientation[a]	DV8: To what extent does your institution consider the research quality when making personnel decisions?[a]
Comprehensive	5.80%	3.45	39.40%	3.39	3.76
Primarily undergraduate	1.30%	2.81	46.40%	2.82	3.36
Medical/ doctoral	13.20%	3.81	32.80%	3.91	4
Total	8.80%	3.52	37.40%	3.55	3.8

[a]Mean response on 5-point Likert scale
[b] % of professors who answered 'yes'

the level of association between groups and oversight variables. The level of association between groups and the variables DV 01, DV 2 and DV 61 is moderate, while the level of association between groups and the six other DVs is weak. It is interesting to note that the level of association is stronger when we compare primarily undergraduate institutions with comprehensive or medical/doctoral institutions, especially when considering variables DV 01, DV 2 and DV 6. Differences between comprehensive and medical/doctoral institutions however appear smaller.

In sum, faculty's perception of institutional oversight varies significantly depending on the type of institution for which they work and even more when primarily undergraduate universities are compared to medical/doctoral universities (Table 3.4).

Table 3.4 Comparison of institutional oversight in different institutional types

Variables	Overall		Post hoc					
			Comprehensive vs. primarily undergraduate		Comprehensive vs. medical/ doctoral		Primarily undergraduate vs. medical/ doctoral	
	p	C.V.	p	C.V.	p	C.V.	p	C.V.
DV1: You are encouraged to improve your instructional skills in response to teaching evaluations	n.s	.040	n.s.	.062	n.s.	.025	n.s.	.063
DV2: At your institution, there are adequate training courses for enhancing teaching quality	≤.001	.230	≤.001	.366	≤.001	.121	≤.001	.308
DV4: To what extent does your institution consider teaching quality when making personnel decisions	≤.001	.136	≤.001	.17	.006	.082	≤.001	.225
DV0: At your institutions, there is a strong teaching performance orientation*	≤.001	.144	≤.001	.174	.002	.092	≤.001	.241
DV3: Teaching is regularly evaluated by senior administrators	≤.001	.131	≤.001	.131	≤.001	.034	≤.001	.157
DV6: To what extent are you expected to raise substantial amount of external funds?	≤.001	.228	≤.001	.306	≤.001	.119	≤.001	.384
DV5: Does your institution set quantitative load targets for the number of doctoral students for supervision?	.03	.057	n.s	.038	.041	.075	n.s.	.073
DV01: At your institution, there is a strong research performance orientation	≤.001	.253	≤.001	.309	≤.001	.169	≤.001	.409
DV7: Are your research activities regularly evaluated by senior administrators?	≤.001	.107	≤.001	.089	.025	.048	≤.001	.130

(continued)

Table 3.4 (continued)

Variables	Overall		Post hoc					
			Comprehensive vs. primarily undergraduate		Comprehensive vs. medical/ doctoral		Primarily undergraduate vs. medical/ doctoral	
DV8: To what extent does your institution consider the research quality when making personnel decisions?*	≤.001	.157	≤.001	.216	.013	.074	≤.001	.270

C.V.: Cramer V value (0 ≤ X < .10 = very weak; .10 ≤ X < .20 = weak; .20 ≤ X < .30 = moderate; X ≥ .30 = strong)
p: adjusted p-values of a Fisher's exact test based on 2000 replications
n.s.: nonsignificant adjusted p-value at α = .05

Summary of Findings

Between 2007 and 2018, there was a significant change in professor's perceptions related to teaching and research on three important items. First, the number of professors who felt pressure to improve their teaching based on evaluations increased significantly. Next, the 2018 respondents were significantly more likely to indicate their institution had a strong focus on research when hiring professors compared with those who participated in the 2007 study. Lastly, professors feel significantly less pressure to secure external funds in 2018 when compared with 2007.

Furthermore, significant variation exists in the way professors at different types of Canadian universities perceive their institutions' teaching-research orientation and incentive policies. The strongest differences are visible between medical/doctoral institutions and primarily undergraduate institutions. Professors at primarily undergraduate institutions are more likely to have their teaching evaluated by senior administration and feel their institution has a strong teaching orientation. However, fewer professors at primarily undergraduate institutions perceive that their institutions have adequate supports to improve their teaching compared with other institutional types. In terms of research, professors at medical/doctoral universities are more likely to perceive their institutions as having a stronger research orientation than those at comprehensive or primarily undergraduate institutions.

Discussion

The key finding of this chapter is that, when taken together, the variables suggest that professors in Canada, in 2018, perceive a greater institutional oversight of teaching and research than in 2007. While several factors contribute to this increase, our findings suggest that 11% of this reported perception is indeed explained by the year the survey was administered. These findings suggest Canada has been impacted

by the wider global trends in which accountability measures and pressures to improve performance outcomes are increasing (Eastman et al., 2018; Kouritzin, 2019). While the literature on the global knowledge economy, with its pressures to produce research and climb rankings, often suggests teaching orientation is decreasing in comparison to research, Canadian professors perceive both teaching and research oversight are increasing. This suggests the growing trend of accountability is impacting both sectors simultaneously.

There is, of course, nuance to these findings. The 2018 data suggest the level of institutional oversight varies by working environment. When comparing responses from faculty in primarily undergraduate, comprehensive and medical/doctoral universities, Fisher's exact test revealed significant difference for 9 out of 10 variables. Professors at medical/doctoral universities perceive more oversight than those in other institutions, related to their research activities, especially in terms of raising external funds and the extent to which research quality is considered when personnel decisions are made. On the other hand, although levels of association are smaller, faculty members in primarily undergraduate institutions report, in greater proportions, that their teaching is evaluated by senior administrators and that teaching quality is considered when making personnel decisions. These differences in findings by institutional type are important markers for longitudinal research. Is institutional differentiation altering the nature of the public university system in Canada as universities begin to focus more heavily on teaching or research? Are professors' perceptions reflective of institutional practice or policy?

International Comparison

International research suggests the relative centrality of research is a key factor in the comparative analysis of the academic profession within higher education systems (Finkelstein & Jones, 2019). Canada is unlike many other systems where the valorization of research functions within university academic work is a relatively new phenomenon, such as Russia. Likewise, Canada does not mirror systems in which research is primarily associated with an elite university sector, such as in Brazil (Balbachevsky, 2019) or China (Finkelstein & Jones, 2019). Rather research has long been regarded as a key function of all Canadian universities. Perhaps even more noteworthy is the expectations placed on tenure-stream faculty at Canadian universities which include both research and teaching as key functions, unlike systems where these functions have been splintered in order to create teaching-focused or research-focused academic career pathways, such as in the UK (Scott, 2019). In short, full-time, tenure-stream faculty continue to have relatively 'balanced' roles where both teaching and research are valued. While the pressure to produce research is felt in Canada as it is elsewhere, our findings illuminate a slow movement towards an increasing interest in research over teaching on the part of faculty. At the same time, respondents noted a greater accountability of the quality of teaching, reinforcing the increasing importance that academics continue to place on their teaching role.

As we noted earlier in the chapter, Canada is one of several countries deriving from the Anglo-Saxon notion of a balanced emphasis on faculty engagement in both teaching and research, though comparative analysis suggests that this approach is becoming increasingly unique. The UK has moved towards a split between teaching-focused and research-focused positions (Scott, 2019). Tenure-stream positions in the USA continue to focus on teaching and research, but the restructuring of higher education, especially within the public systems, has led to a gradual but dramatic shift in favour of more precarious employment, largely towards teaching-focused contract positions. Tenure-stream faculty positions continue to be commonplace within the elite research sector, but they become increasingly less common as one moves down the status hierarchy. In contrast, tenure-stream positions balancing teaching and research continue to play a core role in almost all Canadian universities. The vertical fragmentation that we described early in the paper has created new forms of academic positions and appointments, but these primarily teaching-focused positions have been added to the overall complement, largely a response to increasing teaching needs while institutions have attempted to retain core tenure-stream positions. To return to Macfarlane's notion, there is an unbundling within the system with an expansion of teaching-focused academic positions, but Canadian universities have retained a core of 'bundled', balanced tenure-stream positions (Macfarlane, 2011).

Why have Canadian universities not moved in the same direction as many of their American, Australian or British peers? There may be many contributing factors, but we would suggest the existence of powerful institution-based faculty unions has played a large role in both protecting the core tenure-stream professoriate and ensuring that the tradition of 'balanced' appointments has been maintained (Horn, 1994). As Finkelstein and Jones (2019) have noted, faculty unionization appears to be a distinctive characteristic of the Canadian system, and collective bargaining has served to both define and reinforce the balanced nature of academic work among tenure-stream faculty, as well as limit the discretion of the university administration in terms of wholesale reforms to the academic profession.

Conclusion

This chapter has examined the teaching-research nexus in Canada through an analysis of professor's perceptions of their institutions' orientation towards teaching or research as well as the incentives institutions provide to advance each academic activity. The data indicate significant increases in professors' perceptions of teaching and research between 2007 and 2018. The data also raise some important questions for further research. First, this research focuses on professors' perceptions. A complementary study of institutional programmes and policies related to research or teaching oversight would deepen this knowledge area and investigate whether professors' perceptions are mirrored in institutional practice. Second, policies need

to be compared across institutions with different mandates to confirm whether professors in primarily undergraduate institutions actually have less access to teaching supports or whether they have a heightened expectation of teaching supports that is not being met, perhaps related to their institution's mandate for undergraduate instruction. Third, these findings should be compared with others in this volume to situate Canada's teaching-research nexus in a global, comparative context. Lastly, the Canadian context should be monitored to see if the significant changes by institutional mandate result in further stratification of institutional types in Canada.

Acknowledgements The authors acknowledge the financial support provided by the Ontario Human Capital Research and Innovation Fund (OHCRIF), administered by the Ontario Ministry of Training, Colleges and Universities, to develop this publication. The views expressed in this publication are the views of the authors and do not necessarily reflect those of the Government of Ontario. The writing of this chapter was supported by the Social Sciences and Humanities Research Council of Canada, but the views expressed in this publication are the views of the authors and not SSHRC.

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Chapter 4
Metrical Valorization of Performance (MeVoP): The Funding-Induced Vertical Stratification and the Construction of Post-Humboldtian Research-Teaching Nexus in German Higher Education Institutions

Nicolai Götze and Christian Schneijderberg

Abstract In the German higher education (HE) sector, third-party funding plays a prominent role in the valorization of performance of academics and universities. In the last three decades, policies that centered around competitive third-party funding have led to a significant vertical stratification of higher education institutions (HEIs). This paper analyzes the relationship between funding-induced vertical stratification and the evolution toward a post-Humboldtian organization that favors research over teaching. Conceptually, the UK is used as a reference country for analyzing the more recent developments in Germany. Based on data from three successive surveys (Carnegie-1992, CAP-2007, and APIKS-2018), a continuous evolution toward prioritizing research over teaching and a higher administrative workload for German academics over time is observed. We associate this trend with a funding-related dissolution of research and teaching at the individual and organizational level in a methodic toppled T multilevel research design. The analysis shows a clear differentiation between research-oriented, well-funded German HEIs (universities and universities of applied sciences, UAS) at the top of the status hierarchy and more teaching-focused HEIs at the bottom. We also indicate that the higher research preference of academics in high-status HEIs is accompanied by a higher administrative workload but not by more time for research.

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F. Huang et al. (eds.), *Teaching and Research in the Knowledge-Based Society*, The Changing Academy – The Changing Academic Profession in International Comparative Perspective 23, https://doi.org/10.1007/978-3-031-04439-7_4

Keywords Vertical stratification · Valorization of performance · Third-party funding · Research-teaching nexus · (Post-)Humboldtian system · Higher education

Introduction

Literature on higher education (HE) and science governance seems to agree on the development of academic capitalism (e.g., Münch, 2014; Slaughter & Leslie, 1997) and managerialism (e.g., Gläser, 2019; Marginson & Considine, 2000) funneled into a metrics-based valorization of organizational competition for status and resources. In Germany, HE policy has underscored these international developments by reducing lump-sum budgets for public higher education institutions (HEIs) and has distributed an increasing proportion of funding through competitive "funding arrangements" (Gläser & Velarde, 2018, p. 1) and by constructing an accountability-driven "socio-calculative environment" (Vormbusch, 2012, p. 206; authors' translation). Furthermore, the metrical valorization of performance (MeVoP) in Germany, for example, in agreements on objectives between HEI and individual academics or in performance-based funding of HEIs and the HEI-internal allocation of funding, emphasizes the money-metric input such as third-party funding by national research councils or government bodies and publication outputs (Gerhards, 2014; Gläser & Laudel, 2019; Huber & Hillebrandt, 2019; Janßen & Sondermann, 2016; Schubert et al., 2017; Winterhager, 2015). Vatin (2013, p. 33) defines valorization as "to valorize, to give worth to," which is a circular process including evaluation as "assessment of [specified] value" (Vatin, 2013, p. 31), for example, value expressed by (metrified) indicators such as third-party funding.

The German shift from "block funding" to competitive third-party funding, linked with the new public management (NPM) ideology, started in the 1990s and was supplemented by the Excellence Initiative (now Excellence Strategy) introduced in 2006 (German Research Foundation, 2013; Hartmann, 2010; Mergele & Winkelmayer, 2021; Winterhager, 2015). As in Anglo-Saxon HE systems, in Germany, the functional horizontally differentiated HE system (e.g., strong teaching orientation and focus on applied research in universities of applied sciences, UAS) is being replaced by an increasing transversal vertical stratification of HEIs (Enders, 2019; Götze et al., 2021). As a result, a few HEIs at the top of the status hierarchy are increasingly gaining financial resources, boosting their reputation, and strengthening their position over other less well-equipped HEIs (Münch & Baier, 2012, Schneijderberg et al., 2021). These developments have profound implications for the research-teaching nexus in terms of the differentiation of research and teaching functions in the overall system as well as the organization and individual division of research and teaching. Drawing on Blau (1994), Larson (1977), and Mintzberg (1983), Müller and Schneijderberg (2020) theorize that both HEIs and the academic profession are organized bureaucracies that merge under pressure from competitive research funding, academic capitalism, and public management of

HEIs to an organizationally differentiated academic profession. Despite the relatively insignificant MeVoP for professors' salaries (Klenke, 2012; introduced in 2005), when agreeing objectives, the organizationally differentiated academic profession (in)voluntarily levers out the constitutionally guaranteed academic freedom by agreeing to contribute to the organization's goal definitions (Janßen & Sondermann, 2016). Thus, the organizationally differentiated academic profession slowly but steadily performs a morphing of either research and teaching or a morphing of both functions. The voluntary German research governance MeVoP style of morphing is designed as a bonus and an incentive system and not as a control system (Gläser, 2019; Frølich, 2008).

Considering these transformations, this paper analyzes how the growing emphasis (e.g., funding and reputation) on research over teaching over the past three decades has subverted the Humboldtian tradition and its effects on the teaching-research nexus in Germany. In particular, we answer the question as to whether the funding-induced vertical stratification of HE is correlated to a "post-Humboldtian" (Schimank & Winnes, 2000) organization of the research and teaching functions. To answer this question, we study the time dimension of the funding-induced strengthening of research focus in the German HE system. Based on data from three surveys from the past three decades, we examine the development of the research-teaching nexus in an environment of changing valorization of performance (VoP) in universities and UAS. Furthermore, we observe that third-party funding as a core element of the German MeVoP-regime can plausibly be seen as a driver of the development toward a post-Humboldtian organization of research and teaching.

The paper starts by conceptualizing the development of the research-teaching nexus under conditions of (Me)VoP policies that impel a funding-induced vertical stratification of HE and discusses both the assumptions about the development of the overall balance of the research-teaching nexus in German HE and the link between third-party funding and a (post-)Humboldtian organization of the research-teaching nexus. In addition, this discussion also takes into account developments in other countries such as the UK. The following section specifies the data and methods. Then the results of the research-teaching nexus evolution and the connection between post-Humboldtian organization of research and teaching and the funding-induced vertical stratification are presented. The last section summarizes and discusses the results.

Funding-Induced Vertical Stratification and the Dissolution of the Research-Teaching Nexus in Germany

To investigate whether a funding-induced trend toward a dissolution of the research and teaching functions in German HEIs takes place, we connect two fundamental perspectives for international comparative research on the research-teaching nexus. First, we examine the question of an overall balance between research and teaching. The NPM-based strengthening of competition for status and the introduction of new

competitive schemes (such as third-party funding, policies for excellence, and performance-based allocation of funding), which are primarily based on the valorization of research performance (Musselin, 2018), lead us to assume a shift in the balance toward a stronger research orientation. The traditional competition for reputation (Merton, 1968) is being transformed through the financial strengthening of academic funding organizations such as the German Research Foundation (DFG) and the increasing competitive pressure in accumulating research resources for both academics and universities. The policy focus on third-party funding and the introduction of performance-based allocation of funding – both of which favor research performance – have strengthened a research imperative in the German academic profession (Jansen et al., 2007, Janßen & Sondermann, 2016; Winterhager, 2015). Empirical research shows that, in 1992 and 2007, the German academic profession was already more research-oriented when compared to reference countries such as the UK and the USA (Arimoto, 2014). In 2007, compared to the UK and the USA, the German academic profession spent less weekly working time on teaching and more working time per week on research (Teichler, 2014, Arimoto, 2014). Indeed, for the university sector in particular, the research preference was very high (Arimoto, 2014). Thus, in the CAP-2007 data-based typology developed by Shin and Cummings (2014), the German HE system is characterized as a research-focused system, the US HE system as a teaching-focused system, and the UK HE system as a balanced system. The importance of research for status competition was strengthened even more by the Excellence Initiative, which aimed to strengthen top-level university research (Hartmann, 2010). In the context of excellence clusters, for example, the reduction of a professor's teaching load to ensure competitiveness in research is a common practice (Gerhards, 2010). Therefore, we assume that the research orientation in universities has continued to increase between 2007 and 2018.

However, the literature on "academic drift" (Neave, 1979; Lepori & Kyvik, 2010) points to the growing emphasis on research not only affecting universities but UAS too. Historically, UAS in Germany have been institutionalized as *teaching-only organizations* to supplement academic education at universities with HEIs being more practice- and career-oriented (Kulicke & Stahlecker, 2010; Klumpp & Teichler, 2008). In line with this, we observed a smaller research focus at nonuniversity HEIs when compared to other developed countries, such as the UK (Arimoto, 2014). However, there is an incremental trend toward research in German UAS, which is described is an "outcome of a long process" (Lepori & Kyvik, 2010, p. 299). In legal terms, research was first mentioned as a role to be carried out by UAS in the Framework Act for Higher Education (HRG) 1985 (Kulicke & Stahlecker, 2010). From this point on, the research mission of UAS is much more influenced by government policy (Enders, 2019) with state legislators making it a legal requirement that practice-oriented R&D be compulsory for UAS (German Association of University Professors and Lecturers, 2019).

Refining and widening the results of Müller and Schneijderberg (2020), we analyze whether the shift to a research orientation and the decrease in a teaching orientation of the academic profession in the last three decades holds true when we also consider academics in UAS. We also control for core variables such as disciplinary affiliation, gender and rank, and academic age (measured as time employed in HEIs).

H1: In the APIKS study (2018), German academics in UAS and universities are more research-oriented (H1a), devote more time to administrative activities (H1b), and are less teaching-oriented (H1c) compared to 2007 and 1992, when controlling for disciplinary affiliation, gender and rank, and academic age.

Connected to the first question of the overall balance between research and teaching, the second question of the individual and organizational division of research and teaching posits several developments toward (post-)Humboldtian HE systems. Schimank and Winnes (2000) typologically differentiate three models (the pre-Humboldtian pattern, the Humboldtian pattern, and the post-Humboldtian pattern), which empirically and analytically take the degree of structural differentiation of research and teaching into account. Three main factors serve as criteria to analyze the degree of differentiation between research and teaching: the "differentiation of roles [1] and/or organizations [2] and/or resources [3] for teaching and research" (Schimank & Winnes, 2000, p. 398). In the pre-Humboldtian model, research and teaching are organizationally differentiated. In the *Humboldtian model*, there is a unity of research and teaching. "In the traditional Humboldtian pattern most university roles are not differentiated as to teaching or research, most financial resources area common pool for both tasks and most HE organizations are universities with the dual mission of teaching and research" (Schimank & Winnes, 2000, p. 401). Contrasting with this unity of research and teaching, the *post-Humboldtian model* establishes a differentiation between research and teaching at the level of individual academics' roles (differentiation of personnel specialized in research or teaching), resources (different funding sources for research and teaching), or at the level of organizations (specialization of organizations on research and teaching).

Historically, the German HE system has been seen as an ideal type example of a Humboldtian model. Until 1970, only a situational differentiation between research and teaching exists. Through providing block grants for "floor funding" (*Grundausstattung*) to universities, a common pool of financial resources for research and teaching predominated. Research and teaching were integrated within the professor's role (and that of most other scientific staff at universities) and were integrated at the organizational level. The university served as the organizational context for professors representing the unity of research and teaching.

In contrast to Germany representing the Humboldtian pattern, Schimank and Winnes (2000) identify a trend toward a post-Humboldtian pattern in some countries, such as the UK, Sweden, Norway, or the Netherlands. In this post-Humboldtian pattern, an increasing differentiation between teaching and research "at the level of roles, at the level of resources, or at the level of organisations" (Schimank & Winnes, 2000, p. 401) occurs. The clearest example of the development toward the post-Humboldtian model is in the UK, which we use as conceptual reference for analyzing the evolution in Germany. In the mid-1980s, a new model of resource allocation was introduced in the UK that separated expenditures for teaching from those for research (Williams, 1997). While the basic budget was calculated mainly based on the number of students, a system of budgeting based on output evaluation was introduced for research resource allocation. Every third or fourth year, the Research

Assessment Exercise (RAE), now known as the Research Excellence Framework (REF), has been conducted (Martin, 2011; Sousa & Brennan, 2014). Results from the RAE/REF have been used to allocate funds based on rankings. This funding regime has led to a clear differentiation of research- and teaching-oriented academics and laid the foundation for an interorganizational differentiation of research universities and teaching universities (Schimank & Winnes, 2000; Leisyte et al., 2009, p. 619). Empirically and conceptually, it seems plausible that German HEI policies aim for a post-Humboldtian (metrical) valorization of performance of academics and universities, in particular:

1. The change in funding arrangements from lump-sum funding to competitive research funding (Mergele & Winkelmayer, 2021)
2. The Excellence Strategy (Hartmann, 2010)
3. The introduction of performance-related remuneration based on performance-based measures (the so-called W-remuneration scheme introduced by the *Professorenbesoldungsgesetz*; see Klenke, 2012)

All three instruments for MeVoP (re)construct and portray a status stratification of universities and academics, which is mainly based on the valorization of research performance and (re-)construct research inputs and outputs as the core status signal. With the term "funding-induced vertical stratification," we emphasize that third-party funding can be seen as a core indicator for the hierarchical status stratification of HEIs and academics. The central position of third-party funding for the hierarchical order in academia is due to it playing a key role in different VoP-policies and individual and organizational status seeking in Germany:

1. Third-party funding itself is regarded as a "positional good" of academics and organizations. Münch and Baier (2012) and Münch (2010) emphasize that third-party funding, and especially third-party funding from research councils such as the DFG and the European Research Council (ERC), generates not only material but also symbolic status gains for academics and organizations, as it is seen as an impersonal indicator of academic quality. In line with the suggested impersonality of these indicators, Musselin (2018) states that "having one's name associated with a high-status grant [...] increases one's status as well as the status of one's institution" (p. 672). This function as a "positional good" becomes even more pronounced, the more power such science funding agencies can concentrate on themselves (Musselin, 2018).
2. Third-party funding is the most salient research indicator in public performance-based funding of HEIs and the HEI-internal allocation of funding (e.g., Janßen & Sondermann, 2016). Thus, the monetary valorization of individual and organizational performance constructs a self-referential loop by introducing new performance-based funding mechanisms: Academics, departments, and HEIs additionally gain more performance-based funding when they have attracted more third-party funding.
3. An HEI's amount of third-party funding also reflects success in the competition for academic excellence. The funds for what is known as excellence clusters,

excellent graduate schools, and future concepts (universities of excellence) allocated by the DFG in the context of the Excellence Strategy are statistically assigned to third-party funds. As Mergele and Winkelmayer (2021) show, these resources reinforce the differences in third-party funding of universities in general.

This funding-induced vertical differentiation has key implications for the research-teaching nexus at the individual and organizational level. The competitive allocation of third-party funding establishes a differentiation of funding sources for research and teaching, which is core characteristic for the post-Humboldtian organization of research and teaching. Due to increasing student numbers, basic funding is increasingly used for teaching. Resources for research are distributed primarily through third-party funds. Attributing the individual level of a post-Humboldtian differentiation according to academic roles, Schimank and Winnes (2000) state:

> On the one hand, a majority of professors would mainly have to work in undergraduate and vocationally oriented teaching and dispose only of a minimum level of research infrastructure, funds and staff. On the other hand, a minority of professors, enjoying reduced teaching duties and privileged funding, would be able to focus on graduate and postgraduate training and research. (p. 400)

In addition to the differentiation between research and teaching, the increasing financing of research through third-party funding also leads to a stronger organizationally bound academic profession. Organizationally bound means that an increasing share of academics' working time (research-active) is allocated to administrative or management and accountability activities connected to third-party funding (e.g., report writing) as well as writing applications for third-party funding. Summarizing these aspects, we assume that academics, who receive third-party funding (e.g., from the DFG, ministries, business, or international science funding agencies), are more likely to be (a) more research-oriented (higher teaching preference and higher teaching workload), (b) devote more time to administrative activities, (c) devote more time to graduate and postgraduate training, and (d) are less likely to be teaching-oriented (no teaching preference and lesser teaching workload and a higher share of undergraduate training).

H2: A higher proportion of an academic's third-party funding is positively correlated to an academic's research orientation (H2a), more time allocated for administrative activities (H2b), and a higher proportion of graduate and postgraduate training (H2c) and is negatively correlated to a teaching orientation (H2d), when controlling for disciplinary affiliation, gender and rank and academic age, and organizational third-party funding.

At the organizational level, we assume that the funding-induced vertical stratification of HEIs is connected to the interorganizational differentiation of research and teaching in the German academic profession (which is the organizational-level key element of a post-Humboldtian organization). Müller and Schneijderberg (2020) show, based on APIKS-2018 data, that marked organizational differences of the research-teaching nexus and third-party funding exist between different types of

universities (excellence universities, technical universities, and other universities) as well as between different HE sizes. Müller and Schneijderberg's (2020) results indicate a loosening of the research-teaching nexus and an increase in academics' preference for research and decrease in teaching preferences, especially at excellence universities. In addition to the temporarily awarded status of excellence university, academics at large universities tend to be more research-oriented than academics at medium-sized and small universities. Combining these results and trends toward a third-party-funding-related MeVoP regime leads us to the assumption that organizational disentanglement of a balanced research-teaching nexus is funding-induced. Thus, parallel to the individual level, we assume that academics in universities, which receive third-party funding, are more likely to be (a) more research-oriented (higher teaching preference and higher teaching workload), (b) devote more time to administrative activities, (c) devote more time to graduate and postgraduate training, and (d) are less likely to be teaching-oriented (no teaching preference and lesser teaching workload and a higher share of undergraduate training), even when controlling for individual differences (and disciplinary affiliation, academic age, gender, and rank).

H3: Higher amounts of third-party funding of universities and UAS are positively correlated to a research orientation of academics (H3a), more time for administrative activities (H3b), and a higher proportion of graduate and postgraduate training (H3c) and are negatively correlated to a teaching orientation (H3d) when controlling for disciplinary affiliation, gender, rank, academic age, and individual third-party funding.

To account for the institutionalized horizontal differences in universities and UAS (Enders, 2019; Götze et al., 2021), we test the funding-related disentanglement of research and teaching at the individual- and organizational-level by applying difference-in-difference models. These models account for the (cross-level) interaction between HEI type (universities and UAS) and individual and organizational funding (Fig. 4.1).

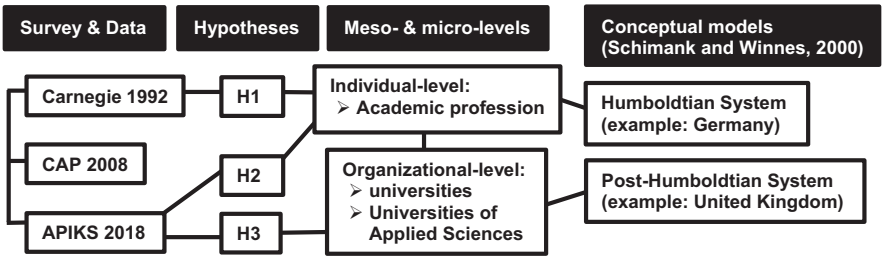

Fig. 4.1 Analytical framework for the multilevel study of the funding-induced evolution of research and teaching in German HEIs

Data and Methods

Data

To answer H1, which proposes a trend toward a stronger research focus in the German higher system in the last 30 years, we use German data from three international surveys: the Carnegie Foundation study (Carnegie-1992), the Changing Academic Profession (CAP-2007) study, and the Academic Profession in Knowledge Societies (APIKS-2018) study. The target group of the studies included all academics who were employed more than 50 percent of a full-time equivalent (CAP-2007 and APIKS 2018). Carnegie-1992 has included senior academics (full professors) only. Gender distribution, the organizational types included (university and UAS), and the disciplines analyzed were nearly representative in all three surveys (Schneijderberg et al., 2020).[1] Response rates were quite similar in each study with Carnegie-1992, 28%; CAP-2007, 32%; and APIKS-2018, 28% (Enders & Teichler, 1995a, b; Schneijderberg & Götze, 2020; Teichler et al., 2013).

We only use data from the APIKS-2018 survey to analyze H2 and H3 as regards the research-teaching nexus in relation to individual and organizational third-party funding. Only data from APIKS-2018 enables a multilevel analysis of the correlation of variables on different levels (identification of universities in the sample, sample size). For the APIKS-2018 survey, a two-stage random stratified sample was selected. German federal states were grouped in four regions (east, north, south, and west), and three universities and three UAS were included from each region (Enders, 2019). To assure their representation in the sample, two excellence universities and two technical universities were selected randomly at the outset. The representative German sample captures 17% of academic staff and 9% of public HEIs in Germany.

Methods and Variables

The specificities of the three surveys described in the data section can be considered to construct a methodological approach, which we term the *toppled T* (Fig. 4.2). To identify the evolution over time as a common horizontal evolution, we topple the T in Fig. 4.2. The T shape was selected because of its association to "T" as a timeline signifier. The T shape was also selected because if we had selected the Y shape instead, it would indicate a bifurcation rather than a differentiation of results at the

[1] In Carnegie-1992, the disciplines in the final sample are not completely distributed in the same way as in the population, especially medicine is too low (Enders & Teichler, 1995b). However, medicine is not used for our analysis, and for other disciplines, we either run separate analyses or use discipline as a control. In CAP 2007, there is a nearly representative distribution of organizational types (university and universities of applied sciences), disciplines, and gender (Bracht, 2008). In APIKS 2018, the discipline of the residual category "other" (such as sports) is slightly underrepresented.

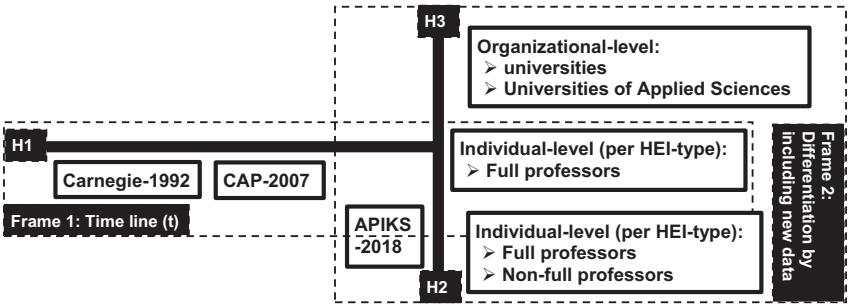

Fig. 4.2 Toppled T approach for the multilevel study of funding-induced evolution of research and teaching in German HEIs

temporary terminal point of data availability. The methodological core ideas of the toppled T approach are threefold:

1. It involves applying at least two or better three or more cross-sectional surveys to analyze a longitudinal trend. The terminal survey enables either a primary or secondary data analysis, while the prior surveys are *per se* allowing only secondary data analysis.
2. The conceptually led extension of contemporary epistemological interest expressed in the research question(s), which explains the analyzed evolution through at least one key characteristic of the social phenomenon under scrutiny.
3. The widening of perspective established by the scope of the temporarily terminal survey constructs a differentiated analytical view of the social phenomenon under scrutiny. The widening perspective, for example, expressed by hypotheses produces three results:

   (a) Result 1: Trend over time of the social phenomenon under scrutiny (represented by the trunk of the toppled T)
   (b) Result 2: Differentiated analytic information for understanding the evolution over time of the social phenomenon in its contemporary state (represented by one end of the girt of the toppled T)
   (c) Result 3: Correlation and/or dependence of the social phenomenon under scrutiny with one (environmental) element, for example, the correlation of the micro-, meso-, and/or macro-levels (represented by the other end of the girt of the toppled T)

In the presented example, the trend tested according to H1 is differentiated at the individual level (H2) under consideration of the effects of additional data captured by H3 (organizational level). The limitations of the secondary data analysis of Carnegie-1992 and CAP-2008 data allow for individual-level analysis over time until the recently collected APIKS-2018 data. The trunk of the T symbolizes this evolution normally identified by lower case "t" (Analytical Frame 1, Fig. 4.2). Frame 1 and H1 aim to study the evolution of the funding-induced intra-professional shifts in research and teaching among German full professors. The additional

primary information collected in the APIKS-2018 survey allows for an analysis of the organizational-level differentiation within the university sector (vertical stratification) as well as between universities and UAS (horizontal differentiation). This also considers the individual-level of academics and is represented by the widening girt of the capital T (Analytical Frame 2, Fig. 4.2). The differentiated analysis according to H2 (individual level) and H3 (organizational level) is captured by Frame 2. Accordingly, the toppled T-shaped methodological approach is applicable for any research, which adds new data relevant when studying evolution over time of a social phenomenon under study and/or additional research interests.

The individual-level dependent variables for the regression models are the variables operationalizing the research or teaching focus of academics (research preference, workload, and share of teaching in bachelor, master, and PhD classes). The research preference was operationalized through the following question measured on a 4-point scale: "Regarding your own preferences, do your interests lie primarily in teaching or research?" In the multivariate analysis, it is compressed to a binary variable (0 = teaching orientation, 1 = research orientation). Workload is based on self-reports from the questionnaire. We use the workload for teaching, research, and administration for a typical week when classes are in session ("Considering all your professional work, how many hours do you spend in a typical week on each of the following activities?"). Share of teaching in bachelor, master, or PhD classes is measured as the proportion (in percentage) of time spent on these types of courses ("Please indicate the proportion of your teaching-related activities [preparation of instructional materials and lesson plans, classroom instruction, advising students, reading and evaluating student work, curriculum development, etc.]").

The three surveys (Carnegie-1992, CAP-2007, and APIKS-2018) provide an opportunity to observe changes in teaching-research nexus over time. For time analysis (H1), we only apply research preference and workload indicators. In H1, our main independent variable is the survey year: Carnegie-1992, CAP-2007, and APIKS-2018. These three points in time correspond well with changes in the funding-induced vertical stratification of the German HE system. In the early 1990s, as the NPM was introduced, a shift toward the allocation of competitive third-party funding at the expense of block grants was initiated (Hornbostel, 2001). In 2006, the Excellence Initiative was launched, which has led to even greater vertical stratification and a shift to competitive third-party funding (Hartmann, 2010; Mergele & Winkelmayer, 2021). For the time analysis, we transform the workload variables into shares (e.g., share of weekly teaching hours of total working time [as a sum of weekly working time for research teaching, administration service, and other activities]). This was done to ensure that the results were not due to changes in total working hours (Schneijderberg & Götze, 2020). Since there are no research assistants/junior academics in the Carnegie-1992 sample and a disproportionately small number at CAP-2007, the time analysis was performed only for senior academics/full professors.

We use multiple regression models to analyze the transformation of the research-teaching nexus over time (H1). The outcome variable teaching/research preference is calculated with a logistic regression. Fractional response regression models are

used for all other outcome variables. Fractional responses are adequate, since they are used outcomes measured in fractions, which are bounded between 0 and 1 (Papke & Wooldridge, 1996) such as our workload variables (research workload, teaching workload, administrative workload) and the fraction of time spent for bachelor, master, and PhD classes.

To analyze the funding-induced move to a post-Humboldtian pattern of the research-teaching nexus (Schimank and Winnes, 2000) in Germany, we use third-party funding on the individual (H2) and organizational level (H3) as main independent variables. To operationalize the funding-induced vertical differences of universities (H3), third-party funding was used and aggregated for the organizational level. Third-party research funding was measured through the ratio of total third-party research funding of each HEI divided by the number of professors of each HEI. The different funding sources were summed up: funding from DFG, ESF, government bodies, industry, and not-for-profit organizations. For this analysis, the number of professors and the funding per HEI were obtained from the German Federal Statistical Office (2016). To capture the funding-induced differentiation of research and teaching at the individual level (H2), the third-party funding of academics (individual-level academic funding) is added as an explanatory variable. At the individual level, third-party funding is measured as the sum (in percentage) of different types of third-party funding ("In the current [or previous] academic year, which percentage of the funding for your research came from…?") including funding from national and international science foundations, government funding, funding from business, and not-for profit organizations. To show the between effect of individual status of academics and university status (Bell et al., 2018), we have centered the individual funding variable on the HEI mean.

We conducted multilevel analyses using STATA to account for the nested structure between individual academics and universities. Multilevel models are appropriate because our research question aims to investigate differences in the teaching-research nexus based on individual and organizational factors. Multilevel models take into account that processes operate "at different levels, for instance, people's characteristics interaction with institutional characteristics" (Rabe-Hesketh & Skrondal, 2012, p. xxv). For the workload variable, we used a multilevel negative binominal regression, which is appropriate for count variables such as weekly working hours. For research preference, we applied a multilevel logistic regression. For the shares of bachelor, master, and doctoral courses, we used multilevel generalized linear models with a binomial distribution and a logit link. With this specification, we can adapt the fractional model for multilevel use (Hardin & Hilbe, 2012).

The research-teaching nexus differs significantly between German universities and UAS due to institutionalized differences. UAS are traditionally teaching-only institutions with the research mission of UAS relatively new. As UAS have fewer research resources and less developed research infrastructure, a much stronger dependence on third-party research funding for UAS academics' research involvement can be assumed when compared to university academics. Therefore, a stronger relationship between a research focus and organizational and individual third-party funding in UAS compared to universities is also to be expected. Because of these

institutional differences, difference-in-difference models were tested, in which interaction terms between UAS or university affiliation and third-party research funding on the organizational were included. In all models testing H1 to H3, we control for the HEI type, disciplinary affiliation, sex, and academic age (years employed in HEIs). In the models testing H2 and H3, junior researchers (non-full professors) were included additionally to senior researchers (full professors). Thus, we additionally control for academic rank (senior/junior).

Results

Shifts in the Balance of Research and Teaching in Germany (Analytical Frame 1, Fig. 4.2)

According to H1, we expect that the teaching focus of the German academic profession decreased over the past three decades. The multivariate regressions in Table 4.1 show clearly that this is the case when controlled for the HEI type, disciplinary affiliation, sex, and academic age.

The share of weekly working hours devoted to teaching in relation to the total weekly working hours has clearly decreased from Carnegie-1992 to CAP-2007. From CAP-2007 to APIKS-2018, only a slight decrease of the share of teaching takes place. For UAS, this trend is not significantly different from the trend in universities. The negative value of the interaction term CAP-2007*UAS shows that the decrease in the share of teaching time is even more pronounced in UAS than in universities (−0.30 [main effect] −0.14 [interaction effect] = −0.46) and then increases slightly (−0.36 [main effect] + 0.03 = −0.33). Thus, the decrease in the share of time spent for teaching in UAS was stronger between Carnegie-1992 and CAP-2007 and then increased again slightly in APIKS-2018. However, these insignificant deviations do not change the general trend toward a lower share of teaching. Interestingly, the share of research hours in relation to the total weekly working hours only increases in UAS over three decades. In UAS, the working time devoted to research increases significantly from Carnegie-1992 to CAP-2007. Then the share of research time for UAS academics decreases again slightly from Carnegie-2007 to CAP-2018 but is still at a significantly higher level than Carnegie-1992. This decrease in research time can be seen in the context of a general increase of time for administration and self-governance, which took place between Carnegie-2007 and APIKS-2018 in UAS and universities. In universities, the decrease in the share of teaching was only substituted by this increase in the share of working time for administration and self-governance.

Even more clear is the trend concerning the individual preferences for teaching or research. Over time, academics in UAS and universities prefer less teaching and tend more to prefer research. The positive values for the interaction term UAS*CAP-2007 and UAS*APIKS-2018 show that the trend is slightly less

Table 4.1 Regression models on the development of research-teaching balance over time

	Teaching workload[a]	Research workload[a]	Administration workload[a]	Teaching preference[b]
UAS	1.01***	−1.15***	−0.21*	2.12***
Time of survey *(Ref.-cat. Carnegie-1992)*				
CAP-2007	−0.30***	0.09	0.03	−0.43*
APIKS-2018	−0.36***	0.05	0.20***	−0.70***
UAS*Time of survey *(Ref.-cat. UAS*Carnegie-1992)*				
UAS*CAP-2007	−0.14	0.46***	−0.08	0.16
UAS*APIKS-2018	0.03	0.23*	−0.09	0.39
Discipline *(Ref.-Cat.: Natural Sciences)*				
Engineering	−0.02	−0.10	−0.12*	0.22
Social Sciences	0.02	−0.07	−0.02	0.39**
Humanities	0.27***	−0.23***	−0.09	0.46***
Other discipline	−0.23**	0.20*	−0.09	0.21
Female	0.18***	−0.15**	−0.02	0.04
Academic age	−0.00**	0.00	0.01**	0.01
Constant	*−0.18***	*−0.86****	*−1.77****	*−1.06****
N	*2548*	*2548*	*2548*	*2652*

Sources: Carnegie-1992; CAP-2007; APIKS-2018

***$p < .001$, **$p < .01$, *$p < .05$; only senior positions (full professors) included

[a]Fractional logit models; dependent variables: weekly working time for research, teaching, and administration as a share of total the working time when classes are in session as dependent variable (ranging from 0 to 1). Question: "Considering all your professional work, how many hours do you spend in a typical week on each of the following activities?" (Answers provided in hours)

[b]Logistic regression, dependent variable: "Regarding your own preferences, do your interests lie primarily in teaching or research?" Answers provided as single choice; originally 4-point scale recoded into binary variable

pronounced in UAS. However, the insignificance of this interaction shows that these institutional differences between UAS and universities are non-substantial. Thus, we can observe a general VoP trend toward a stronger research preference and a lower teaching preference.

Summarizing the results, one can assume that the introduction of the neoliberal MeVoP regulatory regime in 1990, which increasingly substituted block grants by third-party funding of HEIs, is accompanied by an ongoing weakening of the teaching focus of the German academic profession. This trend was further intensified when the Excellence Initiative was introduced in 2006, whereby the transformation since CAP-2007 is mainly due to a stronger research preference and a larger share of the workload for administrative activities and self-governance. The latter are plausible consequences of competitive organizing of research funding in MeVoP-regimes, which seem to be well accepted by HE and science ministries, HEIs, and the academic profession.

A Funding-Induced Move to the Post-Humboldtian Model (Analytical Frame 2, Fig. 4.2)?

Table 4.2, focusing on APIKS-2018, presents the results of the relationship between organizational and individual funding and core indicators for the research-teaching nexus. Additionally to the workload variables and the teaching/research preference, we present data on the share of graduate (bachelor courses) and postgraduate training (master courses, doctoral training). First, we describe the results starting with the individual-level differences followed by the results on the organizational level.

Funding-Induced Differentiation on the Individual Level (H2)

On the individual level, the relation between third-party funding and all indicators for the assessment of the research and teaching nexus points in the same direction. The share of third-party research of the total research funding is negatively correlated across all indicators to a teaching focus and mostly positively correlated to a research focus. Academics with a higher proportion of third-party research funding spend significantly less weekly working time for teaching, are significantly less likely to have a teaching preference, and teach to a significantly higher share in undergraduate courses. The other side of the coin is that third-party-funded academics spend more weekly working time for research and administration, are more likely to prefer research over teaching, and teach more in doctoral education. These results hold true for universities as well as UAS.

In the case of UAS, the influence of the individual share of third-party funding on the research orientation of academics is even greater than in universities. For example, the influence of individual funding among UAS academics is much more strongly correlated (almost four times as strong) with the weekly working hours devoted to research than among university academics. Additionally, the proportion of third-party funding is, in the case of UAS academics, significantly correlated to graduate training. The influence of third-party funding on the share of master courses is significant only at UAS academics. The influence of funding on the share of teaching for doctoral training is more than twice as pronounced as for university academics.

Summing this up, the analysis reveals a marked differentiation between non-third-party-funded more teaching-focused academics and third-party-funded more research-focused academics, which holds true for both HE types but is even more pronounced in UAS.

Funding-Induced Differentiation on the Organizational Level (H3)

In addition, on the organizational level, significant differences in the research-teaching nexus are also evident. The individual workload for teaching is clearly dependent on the organizational amount of third-party funding, independent of the

Table 4.2 Multilevel regressions for evaluating the correlation between research-teaching balance and individual and organizational funding

	Teaching workload[a]	Research workload[a]	Administration workload[a]	Teaching preference[b]	Bachelor courses[c]	Master courses[c]	Doctoral training[c]
UAS	0.37***	−0.70***	0.12	1.72***	1.98**	−1.89***	−3.43***
Organizational funding	−0.04***	0.02	0.08**	−0.10*	−0.09**	−0.00	0.04
UAS*Organizational funding	−0.51*	0.20	−0.05	−0.82	−2.34	1.59*	1.48
Individual funding	−0.08***	0.02***	0.04***	−0.11***	−0.07***	0.01	0.06***
UAS*individual funding	0.03***	0.05***	0.03	−0.01	0.01	0.06*	0.08*
Discipline *(Ref.-Cat.: Natural Sciences)*							
Engineering	0.08	−0.17***	0.65***	0.46***	0.02	0.49***	−0.79***
Social sciences	0.14***	−0.17***	0.34***	0.49***	0.01	−0.55***	−0.97***
Humanities	0.21***	−0.21***	0.25*	0.75***	0.83***	−0.67***	−1.04***
Other discipline	−0.11	−0.18*	0.27	0.52**	0.02	0.16	0.22
Female	0.07*	0.16***	0.17*	−0.05	0.06	0.06	0.19*
Academic age	0.02***	−0.01***	0.00	0.03***	0.02**	0.05***	0.07***
Senior (full professor)	0.60***	−0.15**	0.29**	−0.07	0.72***	1.27***	2.21***
Constant	*2.01***	*2.90***	*0.03*	*−1.53***	*1.78***	*1.29***	*−1.62***
N	*4740*	*4740*	*4740*	*4750*	*3991*	*3991*	*3991*

Source: APIKS-2018

***$p < .001$, **$p < .01$, *$p < .05$; senior positions (full professors) and junior positions included

[a]Multilevel negative binominal regression models; dependent variables: weekly working time for research, teaching, and administration when classes are in session. Question: "Considering all your professional work, how many hours do you spend in a typical week on each of the following activities?" (Answers provided in hours)

[b]Multilevel logistic regression, dependent variable: "Regarding your own preferences, do your interests lie primarily in teaching or research?" Answers provided as single choice; originally 4-point scale recoded into binary variable

[c]Multilevel generalized linear models with a binomial distribution and a logit link

individual proportion of third-party-funded research. The more third-party funding an HEI accumulates, the less the affiliated academics spend time for teaching, when controlling for individual funding, disciplinary affiliation, HEI type, sex, academic age, and rank. In UAS, this negative correlation between organizational third-party funding and teaching is even significantly stronger. The individual teaching preference of academics is also significantly dependent on the organizational amount of third-party funding. The more universities and UAS accumulate third-party funding, the more the affiliated academics prefer research over teaching. This association is also slightly but not significantly more pronounced in UAS than in universities. The differentiation along undergraduate and graduate training also reveals interesting results. The proportion of undergraduate training of academics is significantly lesser in HEIs with more third-party funding, compared to HEIs with less third-party funding. This association is also more (but not significantly more) pronounced in UAS. In the case of UAS, higher organizational third-party funding is positively associated with the share of teaching in master courses. Thus, academics in UAS with more third-party funding spend a bigger proportion of time teaching master students, an association we did not find in the university sector.

Interestingly, the negative correlation between organizational third-party funding and the teaching focus is not reflected in a significantly positive relationship between the individual research workload and organizational third-party funding, neither in the case of UAS nor in the case of universities. Rather, as at the individual level, it appears that academics in HEIs (UAS as well as universities) with more third-party funding spend significantly more time for administrative activities and academic self-governance.

Discussion of Results and Conclusions

As assumed in the conceptual part, it seems quite plausible that the increasing dissolution of the research-teaching nexus is driven by the increasing emphasis on steering HE and science through competitive third-party funds. The Carnegie-1992 to CAP-2007 to APIKS-2018 analysis in Table 4.1 makes evident a parallel substantial trend toward a decreasing emphasis on teaching, an increasing research preference, and an increasing administrative workload of academics in the last three decades. This trend runs in parallel with the increasing proportion of third-party funds among total HEI funding.

Differentiating the evolution over time based on organizational data only available for APIKS-2018 (girt of the toppled T-shaped methodological approach, Fig. 4.2), Table 4.2 clearly shows that a strong correlation exists between the research focus and individual or organizational third-party funding in Germany. In line with other research (e.g., Münch, 2014), this trend can be explained by an overall shift in the normative structure of science. Moreover, MeVoP-policy instruments, such as third-party funding, the Excellence Strategy, and performance-related allocation of funding – which in Germany are all tightly correlated to third-party

funding – create a socio-calculative environment (Vormbusch, 2012). In the HE socio-calculative environment, metrically valorized and visible research performance indicators, also defined as impersonal assessment references (Musselin, 2018, p. 668), then socially construct core positional goods in the highly stratified competitive arena of science (Bol et al., 2018; Bourdieu, 1975; Cole & Cole, 1973; Merton, 1968). The Excellence Initiative introduced in 2006 has enforced the evolution initiated by the introduction of competitive third-party funding in the 1990s. Between 2007 and 2018, there was a further significant increase in the research preference of German university professors. However, the time budgets for research and teaching did not change significantly during this period.

Accordingly, Schimank and Winnes' (2000) conceptual characteristics for the post-Humboldtian model (described for the UK case; see also Fig. 4.1) are increasingly true for the current German HE system. As in the UK, the change in the research-teaching nexus in Germany seems to be related to a change in funding arrangements and the resulting status stratification of HEIs. In the above, we observe an increasing differentiation between research and teaching staff on the individual level and an increasing differentiation between research-oriented HEIs at the top of the status hierarchy and more teaching-focused HEIs at the bottom. Hence, a division is established via funding between the winners and the losers of the status competition (including those who try to avoid or stay out of the MeVoP competition). Furthermore, the gain of resources for research via third-party funds can reduce professors' teaching loads (Gerhards, 2010) and enable focus more on managing (large) research projects and teaching more (post-)graduate students. In comparison, the losers and avoiders of the MeVoP status competition, who do not acquire third-party research funding and "dispose only of a minimum level of research infrastructure, funds and staff" (Schimank & Winnes, 2000, p. 400), must focus more on teaching, especially undergraduate teaching. A robustness check shows that the negative correlation between teaching workload and organizational and individual funding is not significantly moderated by disciplinary affiliation. The same is true for the teaching/research preference. Thus, the funding-induced organizational dissolution of research and teaching transcends the classical discipline-oriented and profession-based organization of science and result in the, at least, partial dissolution of the research-teaching nexus.

Taking the relational character of a status system into account, the research imperative pushed by high-status researchers and HEIs can be conceptualized as a driving force for the overall trend toward a general research imperative in the academic profession (Bourdieu, 1996; Aspers, 2009; Sauder et al., 2012). Those organizations or individuals at the top of a status hierarchy dominate the field by asserting normative reference points for the entire academic field in coalition with the core funding and self-governing organizations, such as the DFG and the German Sciences Council (Musselin, 2018). In conclusion, this suggests that the MeVoP-driven

research imperative of high-status academics and HEIs is steadily moving the entire German HE system in the direction of prioritizing research over teaching. Unlike in the UK, where vertical stratification and the evolution to the post-Humboldtian model preserves the overall balance between research and teaching (Schimank & Winnes, 2000; Shin & Cummings, 2014), in Germany, this evolution leads to an ever-increasing research imperative, which has already been identified by Arimoto (2014). The initially purely teaching-oriented UAS are moving in the direction of research, and even the universities and academics with little third-party funding (and lesser research focus compared to the status-high research universities) are quite research-oriented in comparison to universities in the UK or the USA with little third-party research funding.

A social reality difference to the UK is that the institutionalization of the post-Humboldtian organization of research and teaching and the growing priority on research at the expense of teaching is not solely a result of an intervention by the state. In Germany, the institutionalization of a post-Humboldtian system is driven by both the NPM governance of the federal states and the academic oligarchy,[2] which pushes MeVoP on different levels. Brennan (2010) and Pusser (2008) differentiate the disciplinary and the institutional oligarchy, which can coincide as in, for example, distributing competitive research founding via the DFG. However, in the German social partnership (*Sozialpartnerschaft*) between the state and the academic profession (Schimank, 2005), the institutional academic oligarchy on the national level is represented by the DFG and the Sciences Council, which control the Excellence Strategy MeVoP. On the HEI level, the institutional academic oligarchy claims the majority of positions[3] in HEI leadership and academic senates, which define whether HEIs as organizations apply MeVoP, just VoP, or neither.

Remarkably, the association between the funding-induced vertical stratification and the organizational differentiation in the research focus is even greater in UAS than in universities. These results reveal interesting insights into future scenarios in the case of increasing funding-induced vertical stratification of the academic profession. A crystal ball seems unnecessary to plausibly predict that the existing horizontal stratification along different types of HEIs with different areas of responsibility will dissolve into a vertical status hierarchy between highly prestigious research-oriented HEIs and less reputable teaching-oriented HEIs. Although the differences between UAS and universities are still marked, an ongoing funding-related academic drift of UAS and the degradation of less well-funded universities suggest the institutionalization of a transgressive vertical stratification. Accordingly, the transgressive vertical stratification could eliminate the functional horizontal differentiation between teaching-oriented UAS and more research-oriented universities.

[2] In the structures of academic knowledge, beliefs, and authority, the academic oligarchy refers to "the imperialistic thrust of modes of authority […] in the way that personal and collegial forms, rooted in the disciplinary bottom of a system, work their way upward to have an important effect on enterprise and then finally system levels" (Clark, 1983, p. 122).

[3] By law, full professors hold the majority of seats in any committee deciding on academic issues concerning research (Bundesverfassungsgericht, 1973).

In conclusion, we interpret the above results as follows:

1. As the CAP-2007 and APIKS-2018 surveys show, for more than two decades now, academics in Germen HEIs have a considerable preference for research over teaching.
2. The joint establishment of MeVoP by the German states and the academic oligarchy is a coherent expression of the strong research orientation of academics.
3. However, only the combination of 1 and 2 has resulted in a vertical stratification both in the intra- and interorganizational level of German HEIs. This vertical stratification results in the post-Humboldtian organizational dissolution of the research-teaching nexus. Previous to this was the Humboldtian model embodied by the individual academic, especially in the rank of full professor.

These interpretations support the observations by Müller and Schneijderberg (2020) that the German academic profession is becoming an organization-bound profession. Adding to the findings by Müller and Schneijderberg (2020), the observable research funding and MeVoP-induced organizational dependence of the individual academic professional are supported by results on status differences in the organization and managerialization of HE and science. The result that organizational and individual funding is positively associated with an increasing workload in administration, management, and self-governance shows that grant applications and managing of project-based funds are clearly associated with bureaucratization and MeVoP accountability in HE. In contrast to the decrease in teaching workload, which was more pronounced between 1992 and 2007, the increase in administration workload is much stronger between 2007 and 2018. Thus, the overall increase of administration workload can be attributed to the increasing competitive pressures to accumulate third-party funds and the proliferation of the vertical stratification of HEIs, which are both connected to the German Excellence Strategy. As a result, academics must invest more time and energy in writing and filling in standardized templates for grant applications and reports for funding bodies as well as in the accumulation and processing of MeVoP relevant information. In the data, we can observe a significant effect of the organizational amount of funding on administrative workload, even when controlling for individual third-party funding. These empirical findings show that academics in high-status institutions must allocate more time to bureaucratization and management, independent of whether the affiliated academics are involved in third-party-funded projects or not. We interpret this observation as a sign for the institutionalization of (strong) grant pressures, i.e., pressures to gain third-party funding for research, and the associated (strong) MeVoP reporting and accountability culture. Accordingly, the more academics and HEIs invest in third-party-funded research, the higher are administrative and management workloads in these HEIs – while time for actual research does not increase.

More generally, the slow but steady MeVoP trend within the German academic profession can be interpreted as a corporate, socio-calculative adjustment to competitive and funding-induced, i.e., post-Humboldtian execution of research and teaching as more separate, possibly more loosely connected functions. The formal "interlocking" (Vormbusch, 2012, p. 167) of corporate and individual MeVoP

activities (e.g., third-party-funded research) triggers the dissolution of the teaching-research nexus in Germany. The post-Humboldtian interlocking of individual and corporate socio-calculative behavior constructs an ever-increasing emphasis on research, which adds to the traditionally strong emphasis on research, which was already observed in the Carnegie-1992 study (Arimoto, 2014, Enders & Teichler, 1995a). This goodbye to Humboldtian ideals (unity of research and teaching, research and teaching in solitude and freedom, and the university as the community of teachers and learners) and funding-induced welcoming of a post-Humboldtian organizing seem to impose a new authority structure in the HE and science field.

More significantly, cutting the "e" and the "o" from MeVoP fosters the identification of most valuable players (MVPs), both on the organizational level and individual level. On the organizational level, MVPs are displayed in the innumerous national and so-called World University Rankings (e.g., Kauppi, 2018). Individual MVPs, such as Nobel laureates and highly cited researchers, have become "trophy professors" (Xin, 2006), for which HEI management in countries such as China and Saudi Arabia offers well-paid part-time positions (Bhattacharjee, 2011). MVP metrics are purely a numerical expression of reputation and status, which are the key currencies of the academic profession (e.g., Münch, 2010, 2014). In addition, they are the global positioning systems of individual and organizational MVPs that are status-interlinked by World University Rankings and other displays of academic research excellence but are ignorant of the teaching function of HEIs.

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Chapter 5
The Teaching and Research Nexus in Japan: A Historical and Comparative Perspective

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Abstract This chapter analyzes changes in Japanese academics' views and activities in the areas of teaching, research, and their relationships, as well as compares those to German academics by using the two international surveys of the academic profession undertaken in 2007 and 2017. Main findings include time spent on research by academics in Japan increased substantially, a decreased time spent on teaching, and a decline in their academic productivity during this period. In contrast, the Japanese academics' statements about their preferences as regards teaching and research and the proportion of those considering teaching and research as being hardly compatible did not change substantially. Neither did the gender, disciplinary, and institutional differences in teaching and research activities become smaller over time. In addition, compared to German academics, Japanese academics were engaged in somewhat more teaching activities, considered teaching and research as hardly compatible more often. Further, they differ strikingly in all aspects of teaching, research, and their relationships as regards generation or age and most of these aspects as regards other institutions of higher education from German academics in 2017.

Keywords Academic profession · Teaching and research · Comparative study · Japan · Germany

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F. Huang et al. (eds.), *Teaching and Research in the Knowledge-Based Society*, The Changing Academy – The Changing Academic Profession in International Comparative Perspective 23, https://doi.org/10.1007/978-3-031-04439-7_5

Introduction

In looking both at the academic literature and the public discourses on higher education, we note at first glance a consensus that both teaching and research are the core functions of the modern university and that they are the key tasks of the academic profession – the highly qualified persons working in higher education institutions. At a closer look, however, regulations and practices turn out to be enormously varied across countries as regards the allocation of the teaching and research tasks within the overall higher education and research system. Moreover, views vary in terms of the desirability of a close nexus between teaching and research and the real situation of the individual academics in these respects: how far teaching and research are linked in the academics' attitudes and activities, to what extent this linkage turns out to be intellectually creative or organizationally as a burden, and to what extent different concepts of the relationships between teaching and research have been pursued in different countries.

Obviously, the institutional differentiation existing in many countries varies substantially between countries (Ben-David, 1977; Clark, 1994). Some higher education institutions are considered to be equally in charge of teaching and research, whereas research is expected to play a limited role or no role at all in other institutions. In some countries, large sectors of public research institutes exist outside higher education, while these research tasks are located within universities in other countries. In some countries, individual professorships are established for research only or also for teaching only, whereas in other countries all professors at research-oriented higher education institutions as a rule are responsible for both teaching and research. In some countries, junior staff are likely to have more research than teaching duties, whereas the reverse is true in other countries.

As regards the links between teaching and research, it is noted that there are both variations as regards the discourse about the desirability of a close nexus and as regards observations of the actual situation. In many analyses of the history of higher education, Wilhelm von Humboldt's "idea" of the "unity of research and teaching" underlying the foundation of the University of Berlin in the early years of the nineteenth century is named as the most influential concept for the modern university worldwide. This tends to be underscored, even though various analyses point out that university concepts, which had emerged in Britain, France, and somewhat later in the United States, continued to be influential with somewhat different notions about the teaching-research nexus than those advocated in the Humboldtian concept and underscored in the subsequent development in Germany (Arimoto, 1994; Light, 1974; Shinbori, 1985).

The links between teaching and research are underscored in analyses addressing the basic contributions of these two activities to the generation and dissemination of systematic knowledge. For example, according to Clark (1983), the basic work of academics concerns the "manipulation of knowledge" related to "the efforts to discover, conserve, refine, transmit, and apply it." Also, as mentioned in the Introduction chapter, Boyer (1990) suggested four general dimensions of "scholarship": discovery, integration, application, and teaching. Some scholars pay attention to the extent

to which teaching and research are linked within the academics' activities. In some analyses, a close link of these activities is emphasized (e.g., Braxton, 1996; Ramsden & Moses, 1992). Others argue that teaching and research are separate activities (e.g., Barnett, 1992; Hattie & Marsh, 1996; Marsh & Hattie, 2002). Various analyses of the academic profession focus on differences of involvement in teaching and research and on differences in the actual linkage of these tasks in terms of the academics' socio-biographic background and stages of their career paths (Daumiller & Dresel, 2020; Macheridis et al., 2020). Some scholars pay attention to the modes of teaching and research and to the related directions of influence (e.g., Robertson, 2007). It is generally assumed that research is likely to have an impact on teaching (cf. Smeby, 1998), and research-linked teaching modes are often referred to; also, some authors claim that "good teaching causes good research" (Elton, 2001).

Finally, many analyses indicate that the relative roles of teaching and research as well as the relationships between teaching and research have changed over time. It is often argued that the role of teaching in higher education has gained momentum in quite a number of economically advanced countries during the 1960s and 1970s. In response to the rising number of students, institutions with prime teaching functions were often established or extended to accommodate "mass higher education" along with the traditional "elite" sector (see the conceptual underpinning in Trow, 1974). Moreover, efforts to improve the quality of teaching and the academics' teaching competencies gained momentum during these years.

Most observers, however, argue that the research function of higher education is more strongly advocated and more directly in the center of higher education since the 1980s and 1990s. In some analyses, a multitude of factors explaining this shift is named (e.g., Valimaa, 2001), but two developments are underscored most frequently in this respect. First, higher education is increasingly viewed as being influenced by a newly emerging environment characterized as "knowledge society" and thus by a growing demand for research visibly relevant for technology, economy, and society (see Gibbons et al., 1994) as well as by an increasing readiness of higher education to take care of a "third function" of higher education, i.e., by efforts within higher education to be directly active in shaping societal changes (see Culum et al., 2013). Second, the enormous public attention paid to "rankings" of "world-class universities" since the beginning of the twenty-first century is widely interpreted as the most visible sign of a worldwide competition between national higher education and research systems for leading roles in innovation and progress. Many observers have argued that not only the relative weight of research has been underscored in recent decades but that also signs have grown of fragmentation between teaching and research (Enders & Musselin, 2008).

Obviously, a look at the academic literature and at the public discourses on higher education suggests that teaching and research are dominating the self-understanding and the activities of scholars, whereby the interrelationships between teaching and research are seen as a key issue. Therefore, the international comparative research on the views and activities of the academic profession, from which the subsequent analysis draws, is bound to put emphasis on the concepts and actual modes of teaching and research as well as on the extent the way these two functions of higher education are intertwined.

Efforts of Shaping Teaching and Research Strategically: The Case of Japan

In comparative analyses of higher education policies and of the actual development of higher education, Japan tends to be viewed as a very interesting case. This is because efforts have been made repeatedly in Japan since the late nineteenth century to shape higher education strategically based on careful analyses of trends in many Western countries and that this policy is widely viewed as having been successful.

Analyses of the early years of building up a modern higher education in Japan in the late nineteenth century describe the relative roles of teaching and research in an ambivalent way. On the one hand, a strong emphasis was placed on extending teaching activities and increasing the quality of teaching rapidly in order to build up a highly qualified labor force. On the other hand, at least some leading universities were expected to carry out in-depth research rapidly in order to meet the assumed needs of the nation (MOE, 1980). It is often pointed out that the leading national universities in Japan were modeled on the research-oriented Humboldtian approach from Germany and this has remained to be the leading notion in Japanese universities today. As will be discussed below, the German model was interpreted in Japan not so much as Humboldt's "unity of teaching and research" but rather as academics' high preference in research (Gottlieb & Keith, 1997; Shin et al., 2014).

Historical analyses of higher education in Japan point out that many foreigners were appointed as professors in the early years of modernization (Amano, 1977). As they were recruited from different countries, emerging concepts of teaching and research took note of the thrusts in various countries. Soon after the University of Tokyo was founded and steps were taken to establish various "imperial universities" (Teikoku Daigaku) in the 1880s, policies gained momentum of underscoring German higher education as a model in various respects. For example, a "chair system" was established at national universities resembling somewhat the German chair system in contrast to a "department system" (Iwata, 2011). However, ideas emerging in Japan about the exploration of knowledge, scientists' originality, and the internationalization of higher education drew from various countries.

Thus, higher education in Japan became more highly diversified during the early years of modernization than higher education in Germany, Britain, or France. Diversity was formally most visible through the differences between national, local public, and private universities. The roles of research-intensive universities seemed to differ strikingly from those of teaching-centered universities.

Yet, somewhat of an overarching philosophy developed among Japanese academics over time that was characterized by a strong preference for research – actually far away from the Humboldtian ideal of a close research-teaching nexus (Meyer, 2017). Surprisingly, the academic profession in Japan – a country in which higher education policy aimed strongly to reflect the developments in other countries and to opt for superior solutions based on such insight – turns out to be relatively exceptional in placing a very high emphasis on research, i.e., just on one of the two core functions.

The first major comparative survey of the academic profession, undertaken in the early 1990s, confirmed this strong research orientation in Japan (Boyer et al., 1994). Japan was among the two countries in which more than three quarters of the academics reported that their interests lie exclusively or primarily in research. In Japan, such a strong research orientation even was higher than in the other countries surveyed among the academics employed at those institutions of higher education, which were viewed to be primarily emphasizing teaching. The strong emphasis placed on research in Japan turned out to be mirrored in a relatively high proportion of working time spent on research as well as in a relatively high number of publications. But the comparative survey of the early 1990s also indicated drawbacks: For example, more academics in Japan than in other countries reported that they felt under pressure to be more strongly active in research than they would prefer.

As already pointed out above, a stronger emphasis has been placed on the research function of higher education in many economically advanced countries since the 1990s, whereby the discourses on the challenges of the "knowledge society" and the rankings of "world-class universities" seem to have been drivers. Therefore, one could have assumed that the strong research orientation of the Japanese academic profession was interpreted as a sign in Japan of being well prepared for future challenges.

However, critical voices in Japan pointed out various problems: an extraordinarily low proportion of women among academics and a slow process of correction in this respect, delayed internationalization in terms of mobility and cooperation, and even signs of declining "academic productivity" in recent years (see, e.g., Arimoto, 2008, 2020). The Japanese government embarked on various campaigns for higher education reforms. On the one hand, efforts were undertaken to improve academics' teaching competencies, to enhance the quality of teaching and learning on the undergraduate level, and to underscore the importance of the teaching function in general. On the other hand, improving research in the top sector of higher education was a policy priority as well, as the "Global 30 Project" (MEXT, 2009) and the "Top Global University Project" (MEXT, 2013) show. Moreover, reforms were advocated to strengthen the power of university management, to improve evaluation in higher education in general, and to strive for increasing diversification of the functions of the individual higher education institutions.

In sum, Japan obviously can be seen as an interesting case to analyze how the academic profession has viewed and handled their teaching and research tasks and the relationships between teaching and research in recent decades. In some respects, the Japanese academic profession seems to have been prepared well for the worldwide growing emphasis on the research function. On the other hand, Japan already seems to have experienced some signs of overemphasis on research and some drawbacks of a possibly weakening teaching-research nexus quite early, and the case of Japan might show how other problems in higher education affect the situation of teaching and research. Such an analysis could possibly show that these settings in Japan might have led to specific ways how the academics view and handle teaching and research.

Changes in Viewing and Handling Teaching and Research Strategically: The Issues Raised in Comparative Research Projects

National surveys of the views and activities of the academic profession in Japan were undertaken in 1992, 2007, and 2017 in the framework of three major comparative analyses of the academic profession – each comprising more than a dozen countries: the Carnegie Study of the Academic Profession, the project "the Changing Academic Profession" (CAP), and the project "the Academic Profession in the Knowledge-Based Society (APIKS)." All three projects considered teaching and research as key themes to be addressed.

The results of the first survey (Altbach, 1996; Arimoto & Ehara, 1996) and the second survey (Teichler et al., 2013) about the Japanese academic profession have already been well documented and analyzed. Some publications paid attention to change over time as visible through a comparison of the first and the second survey (e.g., Arimoto, 2009). The academics' views and activities in the domain of teaching and research frequently were the focus of specific in-depth studies (e.g., Fukudome, 2015; Hasegawa & Ogata, 2010; Shin et al., 2014; Teichler, 2015; Teichler et al., 2013).

In many analyses of the findings of these three projects, the authors considered the responses to a certain question as most indicative of the relationships between teaching and research. In this question – posed identically in all three surveys – academics were asked about their own preferences: Whether their interests lie (a) primarily in teaching; (b) in both teaching and research, but leaning towards teaching; (c) in both teaching and research, but leaning towards research; and (d) primarily in research.

As already reported, the 1992 survey suggests that academics' orientation and practice seemed to be linked altogether in Japan: Japanese academics spent much time on research and published quite a lot on average. The responses to one of the questions raised in 1992, however, suggest that the strong emphasis placed on research in Japan was not appreciated without reservation on the part of the academics.

A comparison of the first two surveys – the Carnegie survey and the CAP survey – surprisingly shows that the proportion of research-oriented academics in Japan did not increase from 1992 to 2007. In 1992, 72% expressed a prime interest in research or an interest in both teaching and research with a stronger leaning towards research; the respective figure was 71% in 2007, i.e., more or less identical. The growing worldwide discourse about the importance of research since about the 1990s obviously has affected those countries, in which academics had been less strongly research-oriented in the past: In 1992, 53% of the respondents on average of all the countries surveyed characterized themselves as research-oriented; the respective figure increased to 58% in 2007. This proportion increased most visibly, from 52% to 71%, among academics in Australia and, from 55% to 67%, among academics in the United Kingdom.

In analyzing the responses to these and other questions of the two surveys and other information available as well, Arimoto (1994, 2015; Arimoto & Ehara, 1996) has put forward a typology of the teaching-research nexus:

- According to the "German model" (with Germany and Japan as typical cases), research is primarily in the mind of scholars, while teaching is viewed just as an additional task.
- According to the "Anglo-Saxon model," which in essence is close to the Humboldtian idea of the "unity of research and teaching," both teaching and research are held in high esteem by academics, and a close teaching-research link is advocated.
- According to the "Latin American model," academics are primarily in charge of teaching, and their identity is shaped by this assignment. Only a minority of academics are in charge of research as well. (This turned out to be true for scholars in Latin America in the CAP survey; one had to bear in mind though that the CAP survey hardly comprised any middle-level or low-level income countries from other parts of the world.)

Taking this typology into consideration, we note that the research orientation increased from 1992 to 2007 in various countries of the "Anglo-Saxon models" but remained constant on average in countries of the "German model" and of the "Latin American model."

A comparison of the findings of the CAP questionnaire survey undertaken close to the end of the first decade and of the APIKS questionnaire undertaken close to the end of the second decade of the twenty-first century is bound to surprise again: The proportion of research-oriented academics in Japan increased only marginally, from 71% in 2007 to 74% in 2017. It is even more surprising to note that the average proportion of academics across all countries surveyed did not turn out to have become more research-oriented: The average figure of 58% in the second survey (in 2007) and 57% in the third survey (in 2017) remained more or less unchanged.

In sum, the three comparative surveys on the academic profession indicate that the international public debate, which had increasingly underscored the importance of the research function of higher education in recent decades, has had a limited impact on the academics' research and teaching orientation. In Japan, many academics had already been strongly research-oriented prior to this period, and limited change could be observed on average thereafter. In many other countries, academics' research orientation was less pronounced at the outset and did not change very much as well. Only in some Anglo-Saxon countries, we observe a substantial increase in research-oriented academics. Altogether, the attitudes of the academic looked more stable over time in the recent decade than the public discourse in this domain.

The Purpose and the Design of the Subsequent Analysis

A relatively high degree of stability over time of the Japanese academics' views of the role of teaching and research and of the teaching-research nexus surfaced in response to the question about the academics' prime orientations and interests. Possibly, some substantial changes in the academics' views and activities in this domain have occurred notwithstanding.

Therefore, the purpose of the subsequent analysis is to examine and to discuss whether any other substantial changes have occurred in Japanese academics' views and activities in the areas of teaching and research. The analysis will focus on the responses to other issues of teaching and research addressed in the two surveys undertaken in 2007 and 2017.

Five themes will be discussed subsequently which had been addressed in both the CAP survey and the APIKS surveys. As for research:

- (1) Time spent on research (weekly hours spent on research and research-related activities during weeks when classes are in session)
- (2) Number of scholarly publications and reports (books authored or coauthored, books edited or co-edited, book or journal articles, research reports/monographs for funded projects, and papers presented at scholarly conferences) in recent 3 years

As regards teaching:

- (3) Time spent on teaching (weekly hours spent on teaching and teaching-related activities during weeks when classes are in session)
- (4) Development of instructional skills felt by respondents due to teaching evaluation

Finally, concerning the relationships between teaching and research:

- (5) The proportion of respondents considering teaching and research as hardly being compatible with each other

Attention will not be paid solely to the Japanese academic profession as a whole. Rather, we will examine whether differences among academics changed from 2007 to 2017 in relation to socio-biographic, career, and institutional dimensions:

- Gender.
- Academic rank and generation: Senior academics typically include associate professor, full professor, and equivalent academic positions. Junior academics refer to academics with other academic ranks like lecturer and assistant professor.
- Discipline ("hard," natural, life and medical sciences, and engineering, vs. "soft," humanities and social sciences).
- Institutional sector (national vs. private universities).
- Institutional research orientation (research universities – universities listed in programs such as the "Top 30 Project," 2010, and the "Top Global University Project," 2014 – vs. other universities).

The Japanese 2007 survey in the framework of the comparative project "the CAP" was conducted at 19 Japanese universities. A paper questionnaire was sent out, and 1,100 valid responses were received (24.5% return rate). The 2017 survey in the framework of the comparative project "the APIKS" comprised academics at 35 Japanese universities. By January 2018, 2127 valid responses were received (21.5% return rate).

Finally, the views and the activities of academics at Japanese universities will be compared with those of academics at German higher education institutions. This choice reflects the strong influence of the German model on the modernization of higher education in Japan. Moreover, the typology of research and teaching orientations developed by Arimoto based on the findings of the CAP questionnaire had named academics of both countries as representatives of the "German model" characterized by a clearly dominant research emphasis. Thus, a comparison between these two countries helps to understand how different or similar the views and activities are among conceptual neighbors.

Ambivalent Changes of Research Activities

As Table 5.1 shows, Japanese academics allotted more time to research and research-related activities during the periods of the year when classes are in session – in 2017 than they had done a decade earlier. Actually, there was an increase of 8% – almost one and half hours weekly. This finding seems to be in tune with the growing emphasis put on research in the public policy discourse. Further, this direction of change can be observed in terms of gender, discipline, and institutional sector. For example, time spent on research increased on the part of male academics (from 17.62 to 19.43), those from hard disciplines (from 18.09 to 21.01), and the national sector (from 18.31 to 20.60).

Most surprisingly, in contrast, Japanese academics surveyed in 2017 report that they published considerably less during the recent 3 years than their predecessors in 2007. While the subsequent tables refer to different types of publications, we can aggregate these data in the same way as they had been aggregated in the major report about the CAP survey (Teichler et al., 2013, pp. 146–151): to an index of academic productivity (3 for scholarly books authored or coauthored as well as edited or co-edited, 2 for articles published in academic books or journals, 2 for research reports, and 1 for papers presented). Surprisingly, as the productivity index suggests, the academic productivity of Japanese scholars declined from 30.53 in 2007 to 24.89 in 2017, i.e., by 18.5%. As the comparative surveys show that Japanese academics had published more in 1992 and 2007 than scholars of most countries surveyed, this recent decline is even more noteworthy. This decline in recent years might be due in part to a growing pressure felt to prefer highly selective publication outlets. But concerns were frequently voiced in Japan in recent years as well that Japanese scholars seem to fall behind scholars in other countries.

Table 5.1 Research activities at Japanese universities in 2007 and 2017

		CAP (2007)	APIKS (2017)	Sig.
Time spent on research (weekly hours when classes are in session)		17.38	18.81	**
Gender	Male	17.62	19.43	***
	Female	14.19	15.61	
Generation	Senior	17.40	18.46	
	Junior	17.28	19.40	
Discipline	Hard	18.09	21.01	***
	Soft	14.87	15.15	
Institutional sector	National	18.31	20.60	**
	Private	16.27	16.83	
Institutional research orientation	Research	20.46	21.43	
	Others	16.49	17.03	
Scholarly books you authored or coauthored		1.50	1.13	***
Scholarly books you edited or co-edited		0.46	0.32	**
Articles published in an academic book or journal		8.90	8.03	*
Research report/monograph written for a funded project		1.10	0.68	***
Paper presented at a scholarly conference		4.97	3.55	***
Productivity index		30.53	24.89	***
Gender	Male	31.72	26.58	***
	Female	17.67	17.45	
Generation	Senior	31.75	24.85	***
	Junior	22.13	25.08	
Discipline	Hard	35.27	29.68	***
	Soft	15.46	17.45	
Institutional sector	National	35.22	29.49	**
	Private	24.61	19.95	***
Institutional research orientation	Research	46.19	31.71	***
	Others	25.97	20.44	***

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

In looking at various socio-biographic, career, and institutional dimensions, we note that the decline of academic productivity was most striking among academics at research universities (from 46.19 to 31.71). As most research universities belong to the national university sector, the publication index shows that the overall decline in the number of research productivity seems to be primarily caused by the decrease of publication by academics from national research universities within 10 years. This is largely because, with the corporatization of national universities since April 2004, not only was the number of national universities decreased from 99 in 2003 to 86 in 2017 but also the amount of public funding allocated for national universities was cut one percent annually since 2004.

Somewhat Declining Emphasis Placed on Teaching

As the previous analysis has shown that academics in Japan spent somewhat more time on research in 2017 than 10 years earlier, the finding of declining time spent on teaching does not come as a surprise. Actually, the average weekly time in weeks when classes are in session was 20.90 h in 2007 and 18.25 h in 2017. Of the time spent on teaching, 13% got lost within 10 years.

A loss of time spent on teaching took place in terms of all socio-biographic, career, and institutional dimensions analyzed. It was most striking among female academics (from 27.53 to 22.47), i.e., academics, who tried to catch up in being involved in research, as well as among academics at national sector (from 18.49 to 15.44), i.e., those who seem to have been more engaged in societal activities and administration since their time spent on research was not significantly decreased within the 10 years mentioned earlier.

A declining emphasis placed on teaching is also indicated in the Japanese academics' response to the question of whether teaching evaluation encouraged them to improve their instructional skills. The average score on a scale from 1 (strongly disagree) to 5 (strongly agree) declined from 3.80 in 2007 to 3.25 in 2017, i.e., by more than half a point on a five-point scale. Such a decline was visible in terms of all socio-biographic, careers, and institutional dimensions analyzed, thereby varying only between about 0.4 and about 0.6 (Table 5.2).

Tensions Relating to Teaching-Research Nexus

The teaching-research nexus has been directly addressed both in the CAP and in the APIKS questionnaire in the question, how far the academics disagree or agree to the statement "Teaching and research are hardly compatible with each other." While often questions are raised about possible mutual benefits of the two core functions of the academic profession, this question, in turn, addresses problems of getting along well with these two functions.

In 2007, 23% of the academics on average of the countries surveyed considered teaching and research as hardly compatible (responses 1 and 2 on a scale from 1 = strongly agree to 5 = strongly agree to the statement quoted above). This was stated most frequently, i.e., by 51% of academics in Japan. Also, academics in China (42%), Finland (38%), and Germany (33%) stated this quite frequently. Such a conflict between these functions, in contrast, was perceived seldom by academics with a strong teaching emphasis – for example, by 6% of academics in Argentina and 7% in Brazil but also by only 11% academics in the Republic of Korea, where many academics are strongly research-oriented (see Teichler et al., 2013, pp. 127–130).

According to Table 5.3, which shows the academics' attitudes in terms of mean scale points, academics in Japan note problems of compatibility of teaching and research more or less as frequently in 2017 as in 2007. Interestingly, their views of

Table 5.2 Teaching activities and teaching conditions at Japanese universities in 2007 and 2017

		CAP (2007)	APIKS (2017)	Sig.
Time spent on teaching (weekly hours when classes are in session)		20.90	18.25	***
Gender	Male	20.28	17.32	***
	Female	27.54	22.47	***
Generation	Senior	21.30	18.29	***
	Junior	18.59	18.02	
Discipline	Hard	19.15	17.13	***
	Soft	24.32	21.57	***
Institutional sector	National	18.49	15.44	***
	Private	23.94	21.35	***
Institutional research orientation	Research	17.30	15.62	*
	Others	21.95	20.03	***
You are encouraged to improve your instructional skills in response to teaching evaluations		3.80	3.25	***
Gender	Male	3.80	3.22	***
	Female	3.82	3.41	***
Generation	Senior	3.82	3.28	***
	Junior	3.69	3.21	***
Discipline	Hard	3.85	3.16	***
	Soft	3.73	3.27	***
Institutional sector	National	3.78	3.13	***
	Private	3.83	3.38	***
Institutional research orientation	Research	3.50	2.86	***
	Others	3.89	3.50	***

Note: *** $p < 0.001$, * $p < 0.05$

the teaching-research nexus remained more or less constant from 2007 to 2017 in terms of all socio-biographic, careers, and institutional dimensions analyzed. This stability of responses to the teaching-research nexus certainly is surprising, as the academics' reports about teaching activities and research activities referred to above showed noteworthy changes.

Characteristics of Teaching and Research in Japan as Indicated Through a Comparison with a Conceptual "Neighbor"

The characteristics of teaching and research in Japan, according to the academics' views and activities, might be indicated and interpreted more convincingly, if they are seen in comparison to other countries. As already pointed out, a choice has been made here to compare the views and the activities of academics at Japanese

Table 5.3 Perceived (in)compatibility between teaching and research in 2007 and 2017

		CAP (2007)	APIKS (2017)	Sig.
Teaching and research are hardly compatible with each other		3.34	3.31	
Gender	Male	3.30	3.22	n.
	Female	3.75	3.71	
Generation	Senior	3.31	3.29	n.
	Junior	3.53	3.33	
Discipline	Hard	3.33	3.30	n.
	Soft	3.39	3.32	
Institutional sector	National	3.22	3.20	n.
	Private	3.48	3.42	
Institutional research orientation	Research	3.09	3.14	n.
	Others	3.41	3.42	

Note: n. means no significant differences

universities to those of academics at German institutions of higher education. Germany was chosen among others, because the German university model had a significant impact on the modernization of higher education in Japan. Moreover, the typology of research and teaching orientations developed by Arimoto based on the findings of the CAP questionnaire had identified both Germany and Japan and representatives of the "German model" characterized by a clearly dominant research emphasis. Thus, German academics can be viewed as possible "neighbors" of Japanese academics.

A close look at the findings of the 2007comparative study "the CAP," however, already had revealed both similarities and striking differences. The comparative study "the APIKS" indicates even more differences.

As Table 5.4 shows, scholars in Japan and Germany altogether look similar in terms of the time spent on research and the number of scholarly books they authored or coauthored and papers presented at a scholarly conference. But Japanese academics were more academically productive than German academics. Actually, this difference was even higher in 2007 – i.e., before the recent decline of publications occurred in Japan. Further, Table 5.4 indicates that academics in Japan spent substantially more time on teaching and teaching-related activities than academics in Germany, and they were more strongly encouraged through teaching evaluations to improve their instructional skills. Finally, academics in Japan considered teaching and research as hardly compatible more often than academics in Germany.

A comparative analysis of the academics' views activities in Japan and Germany, however, should take into consideration that the composition of the academic profession in these two countries differs strikingly (Teichler, 2015).

Two differences are particularly evident. First, the proportion of junior academics among all academics in Japan active at universities is exceptionally small, i.e., less than 20%, but very high in Germany, i.e., more than three quarters; many junior academics at German universities are employed exclusively for research tasks.

Table 5.4 Teaching and research activities in Japan and Germany in 2017

	Japan	Germany	Sig.
Time spent on teaching (weekly hours when classes are in session)	18.25	14.23	***
Time spent on research (weekly hours when classes are in session)	18.81	19.20	
Teaching and research are hardly compatible with each other	3.25	3.06	***
You are encouraged to improve your instructional skills in response to teaching evaluations	3.31	2.95	***
Scholarly books you authored or coauthored	1.13	0.27	***
Scholarly books you edited or co-edited	0.32	0.31	
Articles published in an academic book or journal	8.03	5.64	***
Research report/monograph written for a funded project	0.68	1.34	***
Paper presented at a scholarly conference	3.55	3.29	
Productivity index	24.89	19.00	***

Note: *** $p < 0.001$

Second, higher education institutions awarding at least bachelor or equivalent degrees in Germany are institutionally and functionally clearly segmented between universities, i.e., institutions equally in charge of teaching and research and all awarding doctoral degrees, and *Fachhochschulen* – institutions with a dominant teaching function, where the teaching load is more than twice as high as at universities, and with a limited research function of a more applied nature. In contrast, all institutions of higher education providing programs leading to a bachelor degree in Japan are called *daigaku* – usually interpreted as "universities" (teaching staff at Japanese institutions with shorter study programs were not included in the international comparative study); they do not differ formally, as far as the research and teaching functions are concerned, and the comparative surveys show academics at Japanese research universities or universities with a strong research thrust differ less from other universities with a strong teaching thrust than academics of German universities than those at German *Fachhochschulen*.

Other substantial differences are worth noting. Notably, nearly 80% of Japanese universities are private, whereas less than 10% of students in Germany are taught at mostly very small private institutions. Additionally, the proportion of women among academics in Japan is substantially lower than in Germany.

In the abovementioned comparison of academics in Japan and Germany based on the CAP data in 2007, only senior academics at research universities in Japan and senior academics at universities in Germany were compared. This choice was made, because the senior academics equally in charge of teaching and research in these two countries can be viewed as "neighbors." The following analysis is somewhat different: Table 5.5 provides the opportunity – based on the 2017 APIKS survey – to compare the views and activities of "senior academics" in Japan and Germany at all institutions of higher education offering at least bachelor programs as well as to compare all academics at Japanese research universities with all academics at German "Universitäten."

Table 5.5 Teaching and research activities in Japan and Germany in 2017 by status and institutional type

		Japan	German	Sig.
Time spent on teaching (weekly hours when classes are in session)	Senior	18.29	22.52	***
	Junior	18.02	11.16	***
	Research	15.62	12.41	***
	Others	20.03	24.16	
Time spent on research (weekly hours when classes are in session)	Senior	18.46	11.45	***
	Junior	19.40	22.06	***
	Research	21.43	20.97	***
	Others	17.03	9.61	
Teaching and research are hardly compatible with each other	Senior	3.28	3.01	***
	Junior	3.21	3.07	*
	Research	3.14	2.90	***
	Others	3.42	3.20	
You are encouraged to improve your instructional skills in response to teaching evaluations	Senior	3.29	3.05	***
	Junior	3.33	2.92	***
	Research	2.86	3.04	***
	Others	3.50	3.12	
Scholarly books you authored or coauthored	Senior	1.14	0.56	***
	Junior	1.08	0.19	***
	Research	1.22	0.25	***
	Other	1.07	0.43	
Scholarly books you edited or co-edited	Senior	0.32	0.76	***
	Junior	0.32	0.17	**
	Research	0.41	0.32	
	Others	0.26	0.26	
Articles published in an academic book or journal	Senior	7.96	10.42	***
	Junior	8.23	4.17	***
	Research	10.77	6.00	***
	Others	6.23	3.47	
Research report/monograph written for a funded project	Senior	0.71	2.01	***
	Junior	0.62	1.13	***
	Research	0.80	1.31	
	Others	0.60	1.49	
Paper presented at a scholarly conference	Senior	3.70	5.17	***
	Junior	3.30	2.71	**
	Research	4.34	3.43	**
	Others	3.04	2.48	
Productivity index	Senior	24.85	33.97	***
	Junior	25.08	14.39	***
	Research	31.71	19.75	***
	Others	20.44	14.48	***

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Accordingly, senior academics in Japan spent more time on research and less time on teaching than senior academics in Germany. Also, academics at research universities in Japan spent more time both on teaching and research than their colleagues in Germany.

As for their views of the statement "teaching and research are hardly compatible with each other," this problem is named more frequently by senior academics in Japan than by senior academics in Germany (mean scale points of 3.51 vs. 3.05). The same holds true for academics at Japanese research universities as compared to their German colleagues (3.14 vs. 2.90).

Furthermore, senior academics in Japan stated more frequently that they felt encouraged through teaching evaluations to improve their instructional skills than senior academics in Germany (mean scale points 3.29 vs. 3.01). In contrast, academics at Japanese research universities felt less encouraged through evaluations to improve their teaching competencies than their German colleagues (2.86 vs. 3.04).

Finally, as the productivity index shows, senior academics in Japan published less than senior academics in Germany (score of 24.85 as compared to 33.97). For example, senior academics in Japan were less academically productive than their German colleagues in all other forms of publications except for scholarly books they authored or coauthored. In reverse, academics at research universities in Japan published more than their German counterparts (score of 31.71 as compared to 19.75). To illustrate, academics from Japanese research universities published more in scholarly books they authored or coauthored, articles published in an academic book or journal, and papers presented at a scholarly conference than their German colleagues. The latter finding reflects the fact that more than 80% of academics at German universities, which emphasize both research and teaching, are junior academics, who as a rule publish much less than senior academics.

Concluding Observations

In comparing the views and activities of academics at Japanese universities stated in the framework of the two international comparative studies of the academic profession undertaken in 2007 and 2017, we note both change and continuity. Looking at the global public discourse on the growing importance of research, it is not surprising to note that time spent on research by academics in Japan increased substantially, while time spent teaching declined. However, it is surprising to see that, despite a rise in their time spent on research in 2017, their academic productivity, measured predominantly in publications, research reports, and other papers, declined substantially during this period in Japan. This is particularly true in the case of Japan's academics from research universities. As most of them belong to national universities, this has led in Japan to public debates about possible explanatory factors. For example, one of the debates is that the annual reduction of national funding on national universities by one percent since 2004 when they became national university corporations has resulted in the decline of Japanese academics' research productivity.

In contrast, the Japanese scholars' statements about their preferences as regards teaching and research did not change substantially over time. Also, the proportion of those considering teaching and research as being hardly compatible remained quite high without significant changes over the years. Further, the gender, disciplinary, and institutional differences in teaching and research activities, especially in many research publications, did not seem to become smaller from 2007 to 2017. Obviously, academics neither had been pushed strongly nor were inclined themselves to change substantially in those respects.

The two previous international comparative surveys on the academic profession had suggested that academics in Japan and Germany are "neighbors" in terms of a dominant research emphasis rather than in a close teaching-research nexus. The 2017 study, however, suggests that while as a whole academics in Japan were more academically productive as regards productivity index than their German colleagues, they tended to be somewhat more "teaching-oriented" if measured by their time spent on teaching and their being encouraged to improve your instructional skills in response to teaching evaluations. In addition, they also considered teaching and research as hardly compatible more often than their German colleagues. As regards generation, significant differences were confirmed in all aspects of teaching, research, and their relationships between the two "neighbors." Further, except for one indicator of academic productivity "research report/monograph written for a funded project," apparent and considerable differences were also identified in all their activities and views relating to teaching, and research, as well as teaching-research relationships between the two countries. In short, although there are more similarities in these regards between academics from other institutions of higher education in the two countries, the 2017 data reveals that Japan differentiates more strikingly in their views and activities from those in Germany. This may suggest that Japan's academics had shared less similarities with their German peers in 2017.

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Chapter 6
Teaching and Research in the Knowledge Society: Exploring Academics' Trade-Offs Through National Comparative Perspectives

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Abstract Similar trends have been shaping higher education systems in Europe. First, in modern university, the influence of Humboldtian values as the unity of teaching and research framed the organisation of higher education institutions (HEIs). More recently, under the ideological influence of both the knowledge economy/society and neoliberalism, European systems are compelled to demonstrate the utility of the knowledge produced, while they are making accountable to society, imposing an audit culture. This context leads to a stratification of institutions and academics, where the knowledge produced, usually measured by the number of publications, is an essential feature to determine the most prestigious institutions and academics.

At present, the time European academics dedicate to their main roles differs, with some dedicating more time to teaching, while others dedicate more time to research. It is expected that this distinction impacts directly on research outputs. Notwithstanding, personal characteristics, such as gender and seniority, are acknowledged to impact the number of research outputs.

This chapter illuminates on the effects of time organisation (time dedicated to teaching and to research) and of academics' individual characteristics (gender and seniority), on research outputs, placing Portugal in a comparative perspective with other six countries of Finland, Germany, Lithuania, Slovenia, Sweden and Turkey.

Findings confirm that prioritising one of academics' roles influences research outputs, with relevant variations between academics' gender and seniority, more than among countries.

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F. Huang et al. (eds.), *Teaching and Research in the Knowledge-Based Society*, The Changing Academy – The Changing Academic Profession in International Comparative Perspective 23, https://doi.org/10.1007/978-3-031-04439-7_6

Keywords Time organisation · Academics' trade-offs · Gender · Seniority · Teaching time · Research time

Introduction

With the emergence of modern university, and under the influence of Humboldtian ideals, European higher education systems have been organised under three main ideals: the university as the community of teachers and learners, research and teaching in solitude and freedom and unity of research and teaching (Teichler, 2014). More recently, changes in European higher education systems are identified as being a result of the ideological influence of both the knowledge society/economy and neoliberalism and new public management (NPM) (Slaughter & Rhoades, 2004; Bottrell & Manathunga, 2019; Frickel & Hess, 2014; Lueg & Graf, 2021). While the knowledge society imposes knowledge production to be social and of economic 'utility' oriented, neoliberalism and NPM highlight the need to turn higher education institutions (HEIs) into more efficient and effective organisations, demonstrating their value for money through quantitative measures.

The teaching and research nexus has been assumed as the main structural component of the social division of academic work being framed as a major reference of academic professionalism (Carvalho & Diogo, 2021). However, the relevance of knowledge in the framework of the knowledge society has been overvaluing research over teaching. This is evidenced not only in the vertical stratification of higher education systems, with research universities gathering a higher social status and recognition (Müller & Schneijderberg, 2020), but also at the individual level, with academics who have a higher performance in research, usually measured by the number of publications. These highly productive academics have been labelled as the academic elite (Kwiek, 2016, 2021). Simultaneously, there is now a consensus on the fact that academic work has become more intensified through the use of new technologies and through the imposition of managerialism and accountability politics and practices (Carvalho, 2012, 2017; Currie, 2004; Menand, 1996; Menzies & Newson, 2007; Noble, 2002). In this context, academics are compelled to rationalise their organisation of work (Vostal, 2021), trying to balance the time dedicated to teaching and to research (Carvalho & Diogo, 2021). However, the intensification of academic work in the near-full economisation of knowledge era is more assumed than empirically evidenced, with the literature shedding light on the different visions of this relationship (Horta et al., 2012), increasingly identified as a myth (Robertson, 2007). While some scholars emphasise the mutual synergies, complementarity and benefits between teaching and research (Quamar uz Zaman, 2004; Santiago & Carvalho, 2004), others assume teaching and research as mutually exclusive and competing activities, two clashing ideologies relying on different ontologies and epistemologies of knowledge (Austin, 1996; Barnett, 1992, 2003; Braxton, 1996). Furthermore, the analysis on the relationship between these academic activities becomes increasingly important, considering the

maintenance of the teaching and learning relevance in HEIs and of students' academic experience, while the focus on the knowledge production with academic research becomes a critical pillar for universities in today's knowledge society (Horta et al., 2012).[1]

Moreover, the literature also points to the way personal variables may influence the organisation of academic work and research outputs. Among these personal variables, gender and seniority are those more referenced. Gender inequalities have been widely and historically acknowledged, being recognised as persistent in industrialised and knowledge-based economies. Different studies, in fact, emphasise gender differences in professional roles and academic work with women giving priority to teaching and men to management and research (Nakhaie, 2002; Poole et al., 1997; Sax et al., 2002), even if others highlight that these differences are more related to organisational factors than with academics' preferences (Carvalho & Santiago, 2008). Seniority is a less studied variable, being more associated with the aging of academic population in Europe in recent times and with the distinct working conditions young academics have at the present. Usually, there is a correlation between age and seniority, and it is acknowledged that cognitive capacities diminish with age. As such, it is usual in some higher education systems that when academics become older and assume senior positions, they also assume different roles and may have different levels of research productivity. There is, however, a lack of consensus in the literature in this domain, with some empirical studies sustaining the existence of less productivity in older cohorts (Levin & Stephan, 1989; Kyvik, 1990), while others show that younger researchers are less productive than older cohorts (Gingras et al., 2008; Bayer & Dutton, 1977).

Taking this general context, this chapter attempts to answer the following questions: Is there a rupture with the teaching-research nexus ideal, promoting changes in the social division of academic labour? Is it possible to identify a segmentation of the academic profession in Europe with the emergence of an academic elite specialised in research at the expense of teaching and with better/more research productivity? How is the situation in Portugal when compared with other European countries? Is it the time organisation – prioritising teaching or research – which more influences research outputs, or are there other determining factors associated with individual characteristics such as gender and seniority? Is it possible to observe similar trends in Europe, or are there differences based on national systems?

In sum, this study aims to contribute to the debate on the relationship between teaching and research in European countries, paying special attention to Portugal, by analysing how this relationship influences the production of academic outputs, emphasising its relevance when comparing with personal characteristics.

The chapter starts with a brief contextualisation of the topic framed by the literature review. Then, the research design is explained to introduce a fourth section devoted to data analysis and discussion of the findings. The chapter concludes by

[1] In this analysis, the authors do not differentiate between universities and other types of higher education institutions (HEIs) as data were not segregated and include all HEIs.

presenting some implications for research and institutional practices, as well as the limitations of the study.

Knowledge Society/Economy: The Division of Academic Labour and Research Productivity

Higher education and research have been globally identified as promoters of nations' economic development, international cooperation and individuals' opportunities. On its social side, the growing role of higher education has been extending to the promotion of cultural diversity, political democracy and trade (Clark 1983, Marginson, 2010) while accommodating higher education core relationship between teaching and research. In the domain of governance mechanisms, teaching and research activities, higher education systems worldwide have been undergoing fundamental changes. These transformations have been embedded into and with the transformation of today's knowledge society and organisational economisation of knowledge, in which the idea of internationally top-level research and teaching is best stimulated by market-based competition and professional management (Lueg & Graf, 2021). Also, globalisation and Europeanisation of higher education have eased the increased dissemination of neoliberal 'academic capitalism' (Slaughter & Rhoades, 2004; Bottrell & Manathunga, 2019; Frickel & Hess, 2014; Lueg & Graf, 2021) discourses and practices as universities face increasing national and international competition for prestige and diversification of their funding base to establish and position themselves as world-class universities. Market pressures and managerialism have thus created tensions in the horizontal and vertical division of academic work (Santiago & Carvalho, 2004; Carvalho, 2017), with the assumed belief that scientific productivity is essential to improve national economic competitiveness, leading to a hyper-valorisation of research over any other activity in academia (Arimoto, 2014; Kyvik & Aksnes, 2015).

In these changing dynamics of higher education and Humboldt's conception of university, the teaching and research nexus is questioned. While the relation between the two main activities has been assumed as the main structural component of the social division of academic work and academic knowledge epistemologies, and as a major reference of academic professionalism, there seems to be a trend for teaching and research to be disintegrated and their roles fragmented (Carvalho, 2017). This is particularly evidenced in the split between research and teaching funding and in quality assessment mechanisms. As Robertson (2007) sustained, universities tend, even inadvertently, to help reward the two activities separately. In this disintegration, research assumes a leading role.

Within the context of knowledge society/economy and neoliberalism and NPM influence, scientific production – with its competition and collaboration pillars – becomes a central element to universities, which has been facilitated by ongoing internationalisation and Europeanisation of higher education and science. In this

renewed organisational economisation of knowledge, the research university is the key organisational form across countries (Powell & Dusdal, 2017), in a great extent stimulated by the institutionalisation of universities' rankings. Research universities are the ones with better positions in the rankings, also gathering more social prestige. The same idea of prestige tends to apply for those highly productive academics, as aforementioned, with those having higher research productivity –usually measured based on publication outputs – considered the academic elite in Europe (Kwiek, 2016). Bearing this general context in mind, and influenced by the attempt to align institutional strategies and individual practices, individual assessment evaluation processes generally overvalue research indicators (including research proposals, participation in conferences and number of publications and citations). Such institutional policies and practices drive academics to assume research and teaching apart (Colbeck, 1998; Durning & Jenkins, 2005) and to rationalise the time they dedicate to each activity (Carvalho, 2017).

The rationalisation of time is particularly important when attempts to turn higher education systems and institutions more accountable lead to the acceleration of time within academia (Vostal, 2016, 2021). This acceleration of and in academic time pressures academics to find strategies to balance their working time (Carvalho & Diogo, 2021). Adding to the already existent different views on this complex and often subtle relationships between activities (Horta et al., 2012), there is now a consensus on the fact that academic work has become more intensified through the use of new technologies and through the imposition of managerialism and accountability politics and practices (Carvalho, 2012, 2017; Currie, 2004; Menand, 1996; Menzies & Newson, 2007; Noble, 2002). Taking into consideration that both teaching and research are labour-intensive activities (Trice, 1992), balancing the time between both activities is crucial to be able to manage time in today's academia.

This increasing disintegration of teaching and research at the system, institutional and individual levels implicitly assumes that there is a relationship between academics' workload and specifically academics' teaching and research workload and research outputs. Nevertheless, there is a lack of consensus in the literature on the dependence of the two constructs. While some authors defend the existence of a negative relationship between teaching load and research outputs (Bellas & Toutkoushian, 1999; Fox, 1992), others demonstrate that academic productivity is positively affected by time allocation with time spent on research being positively related with higher research productivity (Olsen & Simmons, 1996). Nevertheless, time allocation cannot be assumed as the single variable influencing research productivity. Individual characteristics have also been identified as relevant variables and, in this sense, become particularly relevant to evidence the importance of gender and seniority.

Gender inequalities are widely acknowledged to persist in industrialised and knowledge-based economies, namely, in terms of organisational power distribution (belonging or not to decision-making places) and accessing to seniority roles (research) in academia. Despite some progress has been made regarding gender equality, gaps remain (Bettio & Sansonetti, 2015; OECD, 2017a, b), with visible phenomena of vertical and horizontal segregation in doctoral education and in the

labour market participation. Women are still concentrated in the lower-paid sectors of the labour market and are underrepresented in decision-making and in higher positions in the academic and research hierarchy (Rees, 2011; Carvalho & Diogo, 2018; ETUC, 2019; Diogo et al., 2021). The literature is straightforward on evidencing that teaching duties tend to be mainly performed by women (Angervall et al., 2015; Ryan, 2012) with men more devoted to research (Nakhaie, 2002; Poole et al., 1997; Sax et al., 2002; Lynch et al., 2020), leading Angervall and Beach (2018) to the conclusion that: 'Women in teaching have been made into profitable workers for others to use'.

Seniority has become a more recent focus of attention, considering the increasing differences in the academic work and working conditions among different generations. Seniority is associated with age, with the youngest academics usually occupying the bottom academic positions, while the oldest academics occupy top positions.

It is widely acknowledged that those in bottom positions, usually also denominated early-career researchers, tend to have more precarious working conditions assuming non-permanent positions and short-term contracts (Deem, 2020). In the establishment of the knowledge society, shaped by neoliberalism and NPM, where academic capitalism seems to be emulated (Vostal, 2021), *successful* careers in academia entail a significant percentage of insecurity and precariousness. In the development of the institutional and legal foundations of the knowledge economy (as in any other market), 'successful' workers play a paramount role, even if, frequently, 'success' is a synonym of precariousness and, consequently, with no (work) protection (Carvalho & Diogo, 2021; Ferreira, 2021). Taking their precarious conditions, these early-career researchers tend to assume teaching duties almost exclusively, with a heavy workload (Gale, 2011), and, therefore, have less time for research, which may lead to a lower research productivity, although this is a debatable argument in the literature, as previously mentioned (Gingras et al., 2008; Bayer & Dutton, 1977; Abramo et al., 2016; Levin & Stephan, 1989; Kyvik, 1990). Different studies point to different levels of research engagement considering different age cohorts and career levels.

Being HEIs, the locus of knowledge production, the mission of the university and the effects (e.g. segmentation) it has on its workers seem to be (again) under discussion or under two different statutes and speeds. Some academic staff, the least productive in research, would devote themselves to teaching duties, while others, the more productive and entrepreneurial in the production of scientific knowledge, would devote themselves to research tasks. Following such dynamics, a hierarchy or ranking of the working time would be also in place: longer for those devoted to research and, therefore, labelling researchers as more productive and useful in the economisation of knowledge than teachers (Carvalho & Diogo, 2021).

While there have been several studies focusing on this duality of the mission(s) of higher education, i.e. teaching-research nexus (Marsh & Hattie, 2002; Hughes & Tight, 1995; Altbach, 2011; Ferrer et al., 2021; Robertson & Bond, 2001) and its transformation along and with the academic profession (Levine, 1997; de Weert, 2009; Teichler et al., 2013; Carvalho, 2017; Siekkinen et al., 2020), few have

targeted these topics analysing their impact on research productivity (Horta et al., 2012) and taking a European comparative perspective. The following section explains the methodology used in this study that tries to analyse, in a comparative way, how the teaching and research workload impacts on research productivity.

Methodology

With this study, we intend to compare the effects of the Portuguese academics' time organisation and individual characteristics on research output with other six countries, Finland, Germany, Sweden, Slovenia, Turkey and Lithuania, making use of data from the APIKS (Academic Profession in Knowledge-Based Society) survey. These countries were selected based on such characteristics as (different) levels of maturity of their higher education systems, levels of public policies' development in terms of gender equality and reconciliation of professional and personal life legislation and levels of income per capita. In this respect, Portugal belongs to middle-income countries and is progressing (slowly) in terms of gender equality, along with Slovenia, Turkey and Lithuania. In turn, Finland, Germany and Sweden are categorised as high-income countries and pioneers in terms of gender equality. If possible, please provide any citations to support that case countries are categorised into different groups.

The data was collected through an online survey, distributed to a representative sample of academics working in the higher education system (at universities or universities of applied sciences), over 2017–2019, in the selected countries. The representativeness of the sample was ensured considering gender and academic rank. Nearly 21,000 academics from the HE systems under analysis responded to the survey. However, considering it was not mandatory to answer all the sections, we adopted a stricter approach by taking into account only the complete responses to the relevant questions of this study.

The data set has a final sample of slightly over 10,000 academics (11614, see Table 6.1). Portuguese academics represent 14% of the total sample. Germany is the country which verified a higher number of respondents (representing 43% of the sample).

Although the Lithuanian sample cannot be considered statistically representative, it was decided to include the country in this study due to the countries' selection characteristics applied mentioned earlier on (different levels of maturity of higher education and scientific systems, of gender equality public policies' development, of reconciliation of professional/personal life legislation and of income per capita levels). Moreover, although insufficient, these numbers contribute to picture some Lithuanian dynamics on these issues.

The opening hypothesis of this study was to test if the academics more dedicated to teaching activities have lower scientific productivity, comparing the results from Portuguese academia with the trends in the other selected European countries. In this respect, the operationalisation of the dependent variable was based on the

Table 6.1 Sample distribution by country

	Population	Survey respondents	Analysis sample	Sample distribution
Portugal	24266	3199	1668	14.4%
Finland	17093	1377	851	7.3%
Germany	201214	7236	4995	43.0%
Lithuania	4008	389	260	2.2%
Slovenia	4910	1035	810	7.0%
Sweden	30050	2480	1515	13.0%
Turkey	158098	5282	1515	13.0%
Total	–	–	11614	100.0%

Table 6.2 Descriptive statistics by gender and rank

	Male	Female	Senior	Junior	Total
Portugal	817 (49%)	851 (51%)	1048 (63%)	620 (37%)	1668
Finland	427 (50%)	424 (50%)	222 (26%)	629 (74%)	851
Germany	3156 (63%)	1839 (37%)	1254 (25%)	3741 (75%)	4995
Lithuania	112 (43%)	148 (57%)	223 (86%)	37 (14%)	260
Slovenia	405 (50%)	405 (50%)	354 (44%)	456 (56%)	810
Sweden	891 (59%)	624 (41%)	1148 (76%)	367 (24%)	1515
Turkey	736 (49%)	779 (51%)	1131 (75%)	384 (25%)	1515
Total	6544 (56%)	5070 (44%)	5380 (46%)	6234 (54%)	11614

number of articles published in scientific journals over the previous 3 years. Considering the explanatory variables, it was assumed the number of hours per week spent on teaching and research activities as proxies for the dedication to each activity.

Furthermore, the analysis on dedication to the academic activities and the scientific productivity was carried out considering the differences in gender and academic rank. For this purpose, it was considered two nominal variables: one for gender (1 = male; 2 = female) and another for seniority or career position (1 = junior; 2 = senior) labelled according to the country-specific rank. Moreover, a dummy variable was created for each of the countries under analysis. The descriptive statistics on the sample are presented in Tables 6.1 and 6.2.

Data Analysis and Discussion

The analysis was carried out through two main steps. First, the data were segregated by gender (male or female) and academics' career stage (senior or junior). Differences between these groups were assessed using hypothesis testing (cf. Table 6.3). Then, a linear regression analysis was conducted with the dependent variable being the number of research articles published in international journals/outlets in the last 3 years.

Table 6.3 Differences regarding the number of hours per week dedicated to teaching and research activities

		Total	Male	Female	Sig	Senior	Junior	Sig
Portugal	Teaching	17,04	16,11	17,96	***	17,13	16,89	***
	Research	11,01	11,37	10,64		11,56	10,08	
Finland	Teaching	12,16	12,67	12,38		13,80	11,58	**
	Research	18,55	17,76	18,53		12,20	20,79	***
Germany	Teaching	11,95	12,27	11,42	**	20,65	9,04	**
	Research	16,35	17,14	15,00	***	11,67	17,92	***
Lithuania	Teaching	20,12	17,70	21,95	*	20,82	15,92	*
	Research	15,04	16,29	14,09		14,63	17,49	
Slovenia	Teaching	18,69	18,22	19,16		18,19	19,08	
	Research	13,34	13,71	12,97		14,29	12,60	*
Sweden	Teaching	18,39	17,38	19,84	***	19,48	15,00	***
	Research	14,36	15,00	13,45	*	13,14	18,19	***
Turkey	Teaching	17,35	16,87	17,81		19,54	10,91	***
	Research	12,66	12,32	12,99		12,40	13,43	
Total	Teaching	14,90	14,38	15,56	***	19,04	11,32	***
	Research	14,77	15,50	13,81	***	12,43	16,78	***

Significance level: **p* .05; ***p* .01; ****p* .001

An overall picture demonstrates that, except for Finland and Germany, academics in Portugal and in other four countries – Lithuania, Slovenia, Sweden and Turkey – spend on average more time in teaching than research, although, in general terms, this is not a striking difference. Only looking at these countries individually, more visible differences emerge. Portugal evidences a bigger gap between teaching and research hours (6,03). On the contrary, Finnish academics spend on average more 6,39 h researching than teaching.

Although Swedish evidences the same trend as Portugal, this country has the slightest difference regarding the time dedicated to these activities (4,03). It would be therefore expected that academics in those countries, where more time is dedicated to research, would evidence higher values in scientific production when compared to those in which more time to teaching is spent. As analysed later in this section, this does not seem to be the case (cf. Tables 6.4 and 6.5). What seems to corroborate the literature is the fact that on average, and considering the total sample, women tend to dedicate more time of the week to teaching activities, while men tend to be more dedicated to research. This trend is verified in Portugal, Lithuania and Sweden, but not in Germany, one of the countries where – contrary to the dominant average trend – more time is spent on research than teaching. The remaining countries do not present gender differences regarding the division of academic work. This might not be seen as a surprise when one bears in mind these countries' legal frameworks regarding gender equality and reconciliation of work/family personal time. However, although this is expectable for countries like Finland, for example, Sweden figures as an *exceptional* case, featuring closer to Portugal (than to Finland) in this domain.

Table 6.4 Average number of articles published in the last 3 years

	Total	Male	Female	Sig	Senior	Junior	Sig
Portugal	7,00	7,40	6,62		7,97	5,35	***
Finland	5,60	6,02	5,17		9,45	4,23	***
Germany	4,40	5,17	3,08	***	7,57	3,34	***
Lithuania	6,17	6,55	5,89	***	6,55	3,92	***
Slovenia	5,40	5,82	4,93	*	7,37	3,83	***
Sweden	7,76	8,75	6,36	***	8,48	5,53	***
Turkey	6,63	7,18	6,10	*	7,67	3,55	***
Total	5,7	6,28	4,95	***	7,89	3,81	***

Significance level: *p .05; **p .01; ***p .001

Table 6.5 Estimation of the relationship between division of labour and scientific production

	Model I	Model II
Hours dedicated to teaching	−0,051***	−0,07**
Hours dedicated to research	0,086***	0,28*
Gender (female)	−1,10***	−0,47
Rank (junior)	−4,32***	−2,22***
Finland	−0,734*	
Germany	−1,85***	
Lithuania	−1,95***	
Slovenia	−0,93**	
Sweden	−0,13	
Turkey	−1,0***	
R2	9,1	9,2
N	11614	1668

Significance level: *p .05; **p .01; ***p .001

The average number of hours dedicated to the academic activities in a typical working week varies according to the academic rank. The higher the academic rank is, the higher the average number of hours spent in teaching activities. On the other hand, academics in higher ranks seem to dedicate, on average, less time to research. This is true for Germany, Finland and Sweden, countries where junior academics spend more time doing research than senior professionals. However, this pattern is not fully evidenced in Portuguese academia, where there are differences between the time dedicated to research between senior and junior academics, but these differences are rather slight when one looks to the time dedicated to teaching between both groups.

We considered the number of articles published in scientific journals over the last 3 years as a proxy of academic output of the professionals. In this regard, the results point to gender differences in our sample with male academics reporting, on average, a higher productivity, a fact that is in line with the literature. Only Portugal and Finland do not present statistically significant results, which seems a paradoxical

result – considering that these countries rank in quite disparate positions in terms of gender equality policies and work protection (and even in levels of income per capita).

With respect to academic rank, and contrary to the main findings, the senior academics report, on average, a higher number of articles published comparing with the junior academics, with Finland leading the gap of scientific production between senior and junior academics (5,22). Interestingly, Portugal evidences the slightest difference in the number of publications between junior scholars and senior academics: only 2,62 (cf. Table 6.4). These data are quite striking, considering the national panorama of scientific employment and the overall lack of investment in science and technology policies (Chagas Lopes, 2014; Ganga et al., 2016; Ferreira, 2021); however, despite this scenario, the number of scientific publications in the country has been increasing (Carvalho et al., 2021). It should be mentioned also that these findings go in line with the study of Huang et al. (forthcoming), who reveals that in such countries as Argentina, Canada, Finland, Germany and Malaysia, junior academics published fewer edited or co-edited scholarly books, articles in academic journals and papers presented at scholarly conferences.

To estimate the relationship between the scientific production (measured by the number of articles published over the last 3 years) and the division of the academic work, we conducted a regression analysis. In this regard, two models were considered: the first covers the global sample including the data from the seven countries analysed, considering Portugal as reference. The second model only reports the Portuguese results.

The data confirms our hypothesis for both models. The academics more dedicated to teaching activities tend to have a lower scientific production. In turn, the academics that spend more hours per week doing research and related activities also publish more articles in scientific journals. Portuguese results follow the same trend as the global sample.

With respect to gender, female academics tend to publish less than male academics. However, this relationship is not verified in Portuguese academia, which is somehow striking considering that Portugal, contrary to the Nordic countries, does not rank high in terms of gender equality neither in terms of policies/measures aiming at reconciling (academic) work/professional life with personal/familiar life. Also, the academic rank impacts on the scientific productivity as junior professionals reporting a lower number of publications, which aligns with the time they dedicate to research: fewer than senior academics.

Comparing the countries of the sample and considering Portugal as a reference, only Swedish academics do not report a lower scientific productivity than Portuguese professionals.

Considering Portuguese academics and their national characteristics, additional questions can be placed in terms of how Portuguese academics manage to cope with these numbers. And what happens to teaching? Is it possible to observe a ranking concerning the *attractiveness* of teaching activities, being the bachelor lectures less *profitable* than those of doctoral programs?

Conclusions

Based on a representative data set provided by the APIKS project, and analysing the seven countries of Finland, Germany, Portugal, Lithuania, Slovenia, Sweden and Turkey, data analysis allows us to identify common directions in the use of working time in academia but also the existence of many national variations.

Concerning the engagement in teaching-research nexus, it is relevant to highlight that the ideal of having a nexus between the two, which characterised the Humboldtian idea of the University, is still dominant in Europe. In fact, there is a general tendency for academics to incorporate both teaching and research activities in their working activities, although with a higher emphasis on teaching. The two exceptions for a higher number of hours dedicated to teaching are Germany and Finland. These countries are, along with Sweden, those that allocate a higher investment in R&D in the EU (Eurostat, 2019). Even if the Swedish case requires more attention, one can raise the hypothesis that a higher investment in R&D can lead to a reconfiguration of academic work aligned with a post-Humboldtian perspective, with more emphasis on research.

Concerning the personal characteristics, despite the increasing awareness of gender differences in academia and of the growing number of HIEs that define and implement gender equality plans (Figures, 2021), there are still countries in Europe with gender differences in the organisation of time. In Portugal, Lithuania and Sweden, women spend in average more time in teaching than men. Germany also presents differences but in the opposite direction with women dedicating more time to research. Taking into consideration the strong tradition of Sweden in implementing affirmative actions in academia, one needs to question: Which is the factor leading European countries to have a more equal division of labour? However, it seems that the gender differences in the allocation of time do not have a direct impact on the gender differences in research outputs. Both in the countries where women and men spend the same time in teaching and research and in those where this time differs, there is a tendency for men to publish more than women (even if this difference is not statistically significant for Portugal and Finland). Taking this, one can say that the allocation of time cannot be considered as the only factor determining the gender differences in research outputs.

Another relevant trend in Europe is the decrease in the number of hours dedicated to research along the career. More hours dedicated to teaching in the senior positions may be a result of having a higher involvement in research previously in the career, which allows also for those in senior positions to present more publications.

The opening hypothesis of this study was to test if the academics more dedicated to teaching activities demonstrate a lower scientific productivity. A linear regression analysis was conducted with the dependent variable being the number of research articles published in international journals/outlets in the last 3 years. There is a positive correlation between the number of hours academics spend in research and the number of papers academics publish in scientific journals. Taking that, as seen

previously, there is still a tendency for assuming the teaching-research nexus, the continuous valorisation of research over teaching may lead to an increasing segmentation of the academic profession in Europe with some academics more specialised in research at the expense of teaching and having, as a result, better/more research productivity.

Among the countries analysed, Portugal emerges as an exception, standing among the countries where academics produce a high number of scientific articles, and with the slightest difference between junior and senior academics. These findings demand our deepest reflection, considering the national panorama of scientific employment and the overall lack of investment in science and technology policies (possibly also visible in Slovenia, Turkey and Lithuania). How are these figures achieved in a scenario of increasing burnout and casualisation of academic work (Ferreira, 2021)? In fact, the cross-comparison of these countries placing Portugal in perspective seems to reveal paradoxical scenarios. While, on the one hand, it is not possible to evidence a total rupture with the teaching-research nexus ideal, on the other hand, changes in the social division of academic labour emerge, with research being prioritised over teaching. In addition, this segmentation of activities is shaped by significant gender differences – being these much more visible than the academic rank. In other words, in Portugal, the personal characteristic of gender seems to be 'more important' in terms of scientific production than the academic rank, corroborating the persistence of gender inequalities in the division of academic work. This situation – the combination of high number of scientific articles and high discrepancy of gender differences regarding the time dedicated to teaching and research – is also visible in Lithuania, Sweden and Turkey, with Sweden showing the highest average number of articles published in the last 3 years, combined with a significant difference of junior scholars dedicating more time to research than teaching and that of their senior colleagues. Looking at the seven countries analysed in this chapter, Finland seems to be committed in maintaining its equality culture, visible in the teaching-research nexus – in terms of the variables analysed (gender balance by type of activity and academic rank/ratio scientific production).

Additional questions and reflections that emerge along this study pertain to the trade-offs and personal efforts that are being made to maintain the actual level of the economisation of the knowledge society and the idea of successful career. Academics make strong efforts to maximise the levels of productivity, working harder and longer in a (new) work environment based on an auditing and monitoring culture, which has become increasingly incorporated by academics – and their followers (usually junior scholars) – who become more demanding and rigorous with themselves, leading to the definition of strategies to conciliate teaching and research activities.

Additionally, the results also suggest that the average number of hours dedicated to the academic activities in a typical working week varies according to the academic rank. Academics in lower ranks seem to dedicate, on average, more time to research. When analysing data regarding the gender variable, the chapter confirms most of the literature findings, as female academics tend to publish less than male

academics. However, this relationship is not verified in Portuguese academia, a situation that is somehow fascinating, considering that Portugal still lags behind the Nordic countries in terms of gender equality, work protection and legislation aiming at reconciling professional life with personal/family life, as referred earlier. On this, it should be mentioned the limitation of our study of not analysing the type of working contract these junior and female academics have, and disciplinary areas as well, as more explanations/justifications could emerge regarding the relationship between the number of scientific articles produced and academic rank. For example, when analysing the challenges and difficulties that nontenured staff face, Fogg (2003) refers that in applications for tenure and promotion positions, the number of publications is more valued than the number of students advised (e.g. supervisions) and/or service obligations. And, with respect to different disciplinary fields, how would these figures reveal if these data were segregated bearing different fields of study?

Although more research is needed to estimate the relationship between the individual characteristics of the academics (e.g. gender, the type of the institution where academics work and the type of working contract) and the time dedicated to each academic activity, these findings already point to important issues to reflect. Being HEIs, the locus of knowledge production, their mission and the effects, as segmentation, for example, seem to be (again) under discussion or under two different statutes and speeds. Some academic staff, the least productive in research, would devote themselves to teaching duties, while others, the more productive and entrepreneurial in the production of scientific knowledge, would devote themselves to research tasks. Following such dynamics, a hierarchy or ranking of the working time seems to be also in place: longer for those devoted to research and, therefore, labelling researchers as more productive and useful in the economisation of knowledge than teachers.

Acknowledgements This work was financially supported by the POCI-01-0145-FEDER-029427 – funded by FEDER, through COMPETE2020 – Programa Operacional Competitividade e Internacionalização (POCI), and by national funds (OE), through FCT/MCTES (Portugal).

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Chapter 7
Teaching and Research in Malaysian Higher Education: Does a Nexus Really Exist?

Chang Da Wan, Norzaini Azman, Doria Abdullah, and Nik Sabrina Abdullah

Abstract Two basic roles of a university are teaching and research, their nexus being at the core of higher education. The implicit assumption is that active researchers provide a high-quality learning experience, with research-informed teaching at its core. Ultimately, the teaching-research nexus is seen to support the belief that a dynamic relationship exists between teaching quality and research productivity; this, however, remains contentious. This chapter reports on a comparative approach to examine the hypothesis about the importance of the teaching and research nexus in the Malaysian academic profession across two timeframes: 2007 and 2019. The aim is to explore how the teaching-research nexus is articulated in expectations, practice and outcomes, as well as how it is differentiated by seniority, gender and types of institution. The study concluded that while research has gained prominence across institutions, female and junior academics express a stronger preference for teaching over research. To further examine this nexus, the trends from Malaysia were compared with those from two other developing/emerging systems in Asia, Kazakhstan and Taiwan. All three systems demonstrated similar trends, with variations only in the extent to which research has been prioritised over teaching.

Keywords Malaysia · Workload · Preference · Teaching · Research · Kazakhstan · Taiwan

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F. Huang et al. (eds.), *Teaching and Research in the Knowledge-Based Society*, The Changing Academy – The Changing Academic Profession in International Comparative Perspective 23, https://doi.org/10.1007/978-3-031-04439-7_7

Introduction

Academics carry out various tasks simultaneously throughout the academic year. They teach; supervise students at bachelor, master and/or PhD levels; and conduct research in their respective fields of speciality. Macfarlane (2007, pp. 47) described two additional services carried out by academics: one, internal services that support university functions, such as acting on committees and taskforces, academic administration duties and tasks related to disciplinary associations, such as serving as peer reviewers and on editorial boards, and two, external services that meet the needs of a range of stakeholders, such as consultancy services, service learning and community engagement and outreach activities. As such, Boyer (1990) redefined 'scholarship' for academics along four dimensions: discovery, teaching, integration and application.

The dynamics between teaching and research, known as the teaching-research nexus (henceforth referred to as TRN), is a longstanding conversation topic in higher education, generating heated discussions among scholars and practitioners alike. It involves three broad types of connection: the tangible connection, which relates to '… the transmission of advanced knowledge and the most recent facts…'; the intangible connection, which relates to '… the development in students of an approach and attitude towards knowledge…' and providing 'a stimulating and rejuvenating milieu for academics…'; and, finally, the global connection, which describes '… the interaction between teaching and research at the departmental and not just individual level…' (Neumann, 1992, p. 162). While a dichotomy exists between the academics' beliefs about TRN and what happens in reality, both teaching and research roles are strongly interrelated (Hattie & Marsh, 2004; Griffiths, 2004; Mägi & Beerkens, 2016; Mathieson, 2019), with no clearly distinguishable or delineated connections (Jenkins, 2004; Benton & Cashin, 2010).

This chapter describes TRN within the context of the Malaysian academic community. Indicators and data sets from two iterations of a global survey are used to identify current trends and blind spots in TRN: the Changing Academic Profession (CAP) global survey, administered in 2007, and the Academic Profession in the Knowledge-Based Society (APIKS) global survey, administered in 2019. The chapter also adopts a comparative perspective to examine two other developing/emerging systems in Asia, Kazakhstan and Taiwan, for reflection on the Malaysian situation. The chapter concludes by highlighting implications for policy and practice for scholars and practitioners.

Higher Education in Malaysia

The higher education system in Malaysia is made up of public and private institutions. Public institutions include universities, polytechnics and community colleges funded by the state, while private institutions include universities, university colleges, international branch campuses (IBCs) and colleges, wholly or partly funded

Table 7.1 Demographics of Malaysian higher education system, 2007 and 2019

	2007			2019		
Type of Institution	Number of Institutions	Staff size	Student population	Number of Institutions	Staff size	Student population
Public University	20	23,567	382,997	20	31,626	567,625
Private Higher Education Institutions						
University	33	18,081	365,800	48	11,087	328,978
University College	15		39,806	33	3731	88,530
International Branch Campus	4		10,525	10	1937	28,103
College	488		174,005	345	9206	187,733

by students' tuition. Public and private institutions are established and governed by different laws. Table 7.1 provides the demographics of the Malaysian higher education system in 2007 and 2019.

The Evolution of Teaching and Research in Malaysia

In the early stages of development, higher education institutions (HEIs) in Malaysia were principally teaching institutions, oriented to produce manpower for a developing economy (Harun & Komoo, 2020). By the early 1990s, the Malaysian government began to increase its support for university research mainly through large-scale, long-term national R&D projects like Intensification of Research in Priority Areas (IRPA), which aimed at developing fundamental knowledge and technologies in the public sector (Malaysia 1991). Such a development was instrumental in shifting the orientation of the oldest public universities in the countries – Universiti Malaya (UM), Universiti Kebangsaan Malaysia (UKM), Universiti Sains Malaysia (USM), Universiti Putra Malaysia (UPM) and Universiti Teknologi Malaysia (UTM) – from merely being teaching and learning focussed to also being research-driven (Komoo et al., 2016). Today, these universities are known as the Malaysian research universities (MRUs), receiving additional public funds beyond the annual block allocations to conduct R&D activities.

When the Malaysian government established the Ministry of Higher Education (MoHE) in 2004, the research agenda became even more relevant and important. The National Higher Education Strategic Plan (NHESP) 2007–2020 (MoHE, 2007) underlined the role of HEIs in enhancing R&D by developing a critical mass of researchers and knowledge corpus capable of elevating Malaysia to the global level of technology creation and innovation (Lee, 2019). In addition, the emergence of global rankings placed heavier emphasis on research productivity and global competitiveness of Malaysian HEIs. As a result, various excellence initiatives at the

national level, such as the establishment of MRUs between 2004 and 2010 and the introduction of Higher Institution Centres of Excellence (HICoE) schemes in 2012, were also aimed at accelerating the nation's drive towards achieving world-class universities. The Malaysia Education Blueprint 2015–2025 (Higher Education) (MEB), replacing the NHESP in 2015, further accentuated the role of universities in the development of research and innovation ecosystems critical to the nation's economic growth (Lee, 2019).

The dramatic increase in the number of colleges and universities in Malaysia, and the subsequent increase in international student enrolment from the late 1990s to 2010, marked the beginning of increasing teaching responsibilities, as well as of market-driven academic programmes. Higher education was expected to be responsive to the needs of the job market, so graduate employability metrics, such as the percentage of individuals getting employed within 6 months of their graduation, were introduced by the MoHE (Ma'dan et al., 2020; Yoong et al., 2017). The Malaysian Quality Agency (MQA) was set up in 2007, entrusted with monitoring and overseeing the quality assurance practices and accreditation of the Malaysian higher education system. The MQA drew up strict guidelines in the hiring of academics, specifying teaching qualifications, lecturer to student ratio and learning infrastructure, and used market surveys to assess programme viability and graduate marketability. It also introduced the Rating System for Malaysian HEIs (SETARA) and the Discipline-Based Rating System (D-SETARA) to assess the quality of teaching and learning in HEIs.

In 2006, the MoHE launched a rating exercise called the Malaysian Research Assessment Instrument (MyRA) in order to evaluate the quality of research conducted by Malaysian HEIs. MyRA is an annual self-assessment audit applicable to all HEIs. Even though the MyRA underscored the importance of accountability in public funds allocated to research, it has unfortunately led to an obsession for tangible measures in R&D (Azman et al., 2014; Lee & Ong, 2017). Research productivity (number of publications), 'quality' (the 'impact factor' of the journal) and intellectual contribution (article type and the rank of authorship) are embedded into annual appraisals of academics and carry more weight compared to teaching and service. The emphasis on research output is also evident in tenure/appointments, contract reviews and promotions, giving rise to the 'publish or perish' mantra (Azman et al. 2014, 2016).

A new policy on career pathways represents a significant national higher educational reform movement under Shift 2 (Talent Excellence) in the Malaysia Education Blueprint 2015–2025 (MEB). This shift highlights the importance of developing, nurturing and supporting talent/excellence among academic staff and institutional leaders via a new academia talent framework. Briefly, the model aims to create holistic academics with baseline capabilities in core domains of scholarship such as teaching, research and leadership/management contribution while nurturing and developing excellence and leadership in at least one of these core domains (MoE, 2015). *The Orange Book: Strengthening Academic Career Pathways and Leadership Development* (MoHE, 2016) was launched to provide guidelines for implementing the differentiated career pathways in the HEIs.

Purpose and Research Questions

Two critical questions need to be addressed in order to ascertain the existence of TRN in Malaysian higher education, before measuring its impact on Malaysian higher education development:

(i) Is there a difference in the manifestation of TRN among academics based on:
   (a) Academic ranks categorised into two subgroups: juniors (senior lecturers and lecturers) and seniors (those holding associate professor and professorial posts).
   (b) Gender.
   (c) Types of HEI dichotomised into public and private since the options for institutional type somehow vary across the two surveys.

(ii) To what extent do the awareness, understanding and implementation of TRN change over time?

The next section outlines our exploration of these questions.

Instrumentation and Sampling

The data used in this chapter is from the Changing Academic Profession (CAP) study administered in 2007 and the Academic Profession in the Knowledge-Based Society (APIKS) study in 2019. These surveys were intended to gather empirical data about the academic profession in Malaysia, as part of the global survey. The surveys covered topics such as workload, work preferences, key aspects of teaching and research activities and work orientation. They also included demographic questions to enable disaggregated comparison by academic rank (seniority), discipline, gender and types of institution.

A total of 4368 academics responded to the APIKS survey, making a response rate of 33.0%. Of the total number of respondents, 44.4% were male, while 55.6% were female. The majority of the respondents were from public HEIs (92.1%), and the rest were from private HEIs (7.9%). Of the respondents, 73.0% were junior academics, and 27.0% of the respondents were senior academics. For the CAP study, 1155 academics completed the survey, making a response rate of 15.0%, considered fairly acceptable. Male respondents (51.7%) slightly outnumbered female respondents (48.3%) in the sample. The majority of the respondents worked in public HEIs (73.1%), while the rest worked in private HEIs (26.9%). More than three quarters of the respondents were junior academics (76.0%), while the others were senior academics (24.0%).

Findings

To explore the dynamics between teaching and research, we examined three specific dimensions relating to teaching and research:

(i) The preference of academics: whether they were more inclined towards research or teaching.
(ii) Time spent on various activities: how academics spent their time on various activities such as teaching, research, service, administrative and other academic activities.
(iii) Perception of research reinforcing teaching: to what extent did these academics agree that their research activities reinforced teaching?

Furthermore, the above dimensions were divided for comparison across three major aspects in 2007 and 2019 in terms of academic rank, gender and type of HEI.

TRN by Academic Rank

Figure 7.1 shows respondents' preference for teaching or research according to their academic rank. The interest of junior academics (lecturers and senior lecturers) in teaching increased by 5.2% from 57.5% in 2007 to 62.7% in 2019, while interest in research decreased from 42.5% in 2007 to 37.3% in 2019. In the case of the senior academics (associate professors and professors), it was the reverse. Interest in teaching reduced by 3.6%, from 43.2% in 2007 to 39.6% in 2019, while interest in research increased from 56.8% in 2007 to 60.4% in 2019.

Table 7.2 paints a sobering picture of how a Malaysian academic spends his/her week when an academic semester is in session, based on academic rank. The findings show that the average total of workhours increased substantially for both junior and senior academics from the first to the second study. A junior academic logged an average of almost 37 h per week in 2007, and by 2019 the total hours logged per week had increased by 10 h (to almost 49 h). Similarly, a senior academic logged slightly more working hours than a junior academic per week in 2007 (42 h), and the total hours increased by 12 h to almost 54 h per week by 2019.

Using mean score level, we performed several independent *t*-tests of the variables with the three different academic characteristics: rank, gender and institution types. The results on mean differences for all the variables are presented in Appendix.

Results of the *t*-test for mean hours allocated for academic tasks for CAP 2007 show differences between junior and senior academics in all the activities ($p > 0.05$) except for service ($t = 1.810$, $p > 0.05$) (see Appendix). For APIKS 2019, differences were evident in how seniors and juniors allocated their job scope in all the activities, i.e. teaching, research, service and administration. Junior academics spent more hours on teaching but fewer hours in research, service and administration than the seniors in 2007 and 2019. A persistent career stage gap was evident between

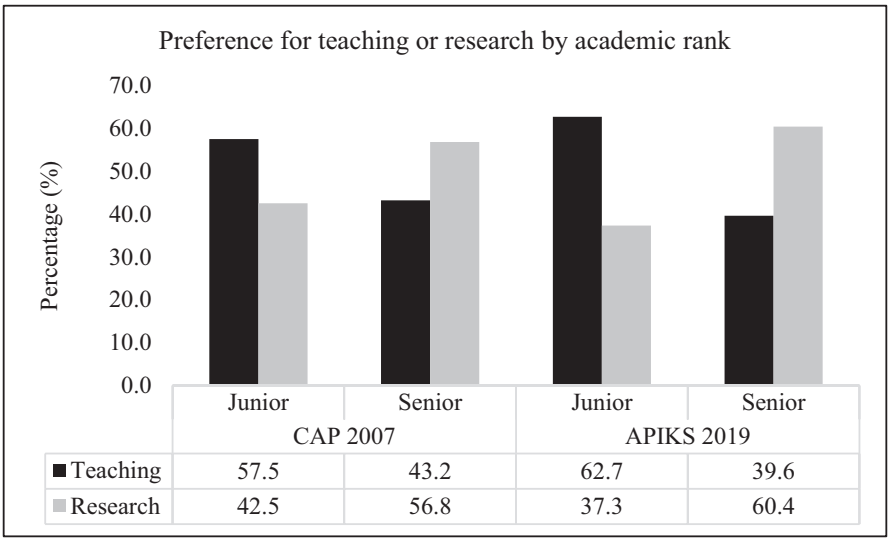

Fig. 7.1 Preference for teaching or research by academic rank, 2007 and 2019 (percentages)

Table 7.2 Average hours spent on academic activities by academic rank

Activities	CAP 2007 (N = 1035)		APIKS 2019 (N = 4266)	
	Junior (n = 800)	Senior (n = 235)	Junior (n = 3107)	Senior (n = 1159)
Teaching	18.94	17.14	21.00	16.30
Research	6.83	9.97	11.59	14.13
Service	2.52	3.21	4.31	5.82
Administration	6.26	8.39	8.23	10.55
Others	2.27	3.23	3.77	6.13
Total	36.82	41.94	48.90	52.93

juniors and seniors in the scope and magnitude of the academic activities. In sum, the figures in Table 7.2 indicate that across a 12-year period, academics in Malaysia not only overworked beyond the stipulated 40 h/week required in civil service but also logged significant workhours.

The top three academic activities for both junior and senior academics remained the same across CAP 2007 and APIKS 2019, that is, teaching, research and administration. The message was clear: teaching still remained the dominant function of academics in Malaysia. However, more time was spent on research than on teaching in 2019 than in 2007. The time spent on administration also increased substantially in 2019, as compared to 2007. It appears that Malaysian academics had not benefitted from waves of digital transformation in higher education over the past decade. Process automation and systems development should ideally have reduced rather than increased time spent on administration matters.

Table 7.3 Perceptions of TRN by academic rank, 2007 and 2019 (percentages)

	CAP 2007 (N = 1125)		APIKS 2019 (N = 4277)	
Likert scale	Junior (n = 854)	Senior (n = 271)	Junior (n = 3096)	Senior (n = 1181)
Strongly agree (5)	26.8	42.2	30.0	50.1
4	35.3	38.2	40.8	36.7
3	26.3	14.5	21.3	9.5
2	6.4	3.6	5.7	2.5
Strongly disagree (1)	5.0	1.6	2.2	1.2

Table 7.3 shows respondents' perceptions of TRN, in terms of whether they believed that their research reinforced their teaching activities. A smaller proportion of junior academics believed that their research reinforced teaching (70.8%) compared to their seniors (80.4%) in 2007. Similarly, fewer junior academics (70.8%) expressed agreement with this statement in 2019 compared to their seniors (86.9%). Results of the t-test were significant for both CAP and APIKS (see Appendix). Consistent patterns of differences in 2007 and 2019 between junior and senior academics' perceptions of teaching and research synergy are evident.

Perceptions of TRN by Gender

Figure 7.2 shows gender differences in the respondents' preferences for teaching and research activities in 2007 and 2019. The trends are as expected and are consistent across CAP 2007 and APIKS 2019. A significantly higher proportion of male academics preferred research to teaching, recording 52.3% compared to 42.2% for female academics in the CAP 2007 survey. This trend persisted in the APIKS 2019 survey, with 47.4% for male academics compared to 39.5% for female academics.

Female academics preferred teaching to research. In the CAP 2007 survey, over 57% of female respondents indicated their preference for teaching, compared to 47.7% of male respondents. The trend remained the same for the APIKS 2019 survey, where over 60% of female respondents indicated their preference for teaching, compared to 52.6% of male respondents.

This observation is consistent with the general perception that teaching is a career dominated by women. However, such a trend will not encourage gender inclusivity in academia, particularly in research. In view of the government's drive for increasing research focus in recent years, there should be increased women representation in research, particularly in the fields of science, technology, engineering and mathematics (STEM). Their contribution is necessary to ensure inclusive and all-encompassing solutions and innovations for the most pressing issues faced by humankind.

Next, Table 7.4 shows the amount of time spent on academic activities by gender. The average male academic logged more than 50 h per week in 2019, as compared to 49 h logged by their female counterparts. These numbers are significantly higher

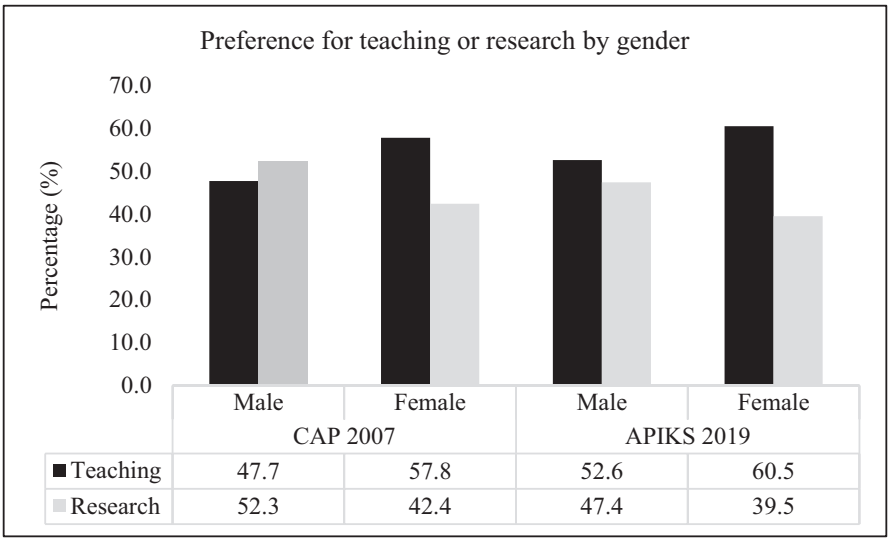

Fig. 7.2 Preferences for teaching or research by gender, 2007 and 2019 (percentages)

Table 7.4 Average time (hours) spent on academic activities by gender, 2007 and 2019

	CAP 2007 (N = 1083)		APIKS 2019 (N = 4266)	
Activities	Male (n = 553)	Female (n = 530)	Male (n = 1884)	Female (n = 2382)
Teaching	17.38	18.18	17.74	20.29
Research	7.99	6.47	12.94	11.75
Service	3.14	2.03	5.56	4.06
Administration	6.69	6.27	8.91	8.82
Others	2.63	2.12	5.23	3.76
Total	37.83	35.07	50.38	48.68

than those logged in 2007: 38 h for male academics and almost 35 h for female academics. While male academics logged more working hours per week than female academics in 2019 and in 2007, the differences in overall total working hours per week between male and female academics seem small. *T*-test analyses were performed to compare the mean values of males and female responses for each of the activities. Results in Appendix exhibit significant differences between the mean scores of male and female academics in research ($t = 3.404$, $p < 0.05$) and service activities ($t = 3.603$, $p < 0.05$) in 2007. Male academics logged more hours than female academics in research, service and administration, while females allocated more hours than males for teaching. Similar patterns show up in 2019: female academics allocated less time to research, service and administration but more time to teaching than their male counterparts. However, a significant gender difference was found in service activities ($t = 6.731$, $p < 0.05$).

Table 7.5 Perceptions of TRN by gender, 2007 and 2019 (percentage)

	CAP 2007 (N = 1125)		APIKS 2019 (N = 4277)	
Likert scale	Male (n = 854)	Female (n = 271)	Male (n = 3096)	Female (n = 1181)
Strongly agree (5)	34.7	25.5	38.7	32.8
4	34.9	36.8	40.6	38.5
3	22.0	25.1	14.5	21.2
2	4.6	7.4	4.3	5.3
Strongly disagree (1)	3.7	5.2	1.9	2.1

Finally, Table 7.5 displays the respondents' perceptions of TRN, in terms of their belief that their research reinforces their teaching activities. Across both CAP 2007 and APIKS 2019, the perception that research reinforces teaching activities is consistent across both genders. However, *t*-test results indicate significant differences between the proportions of male and female academics who hold the view that research reinforces teaching (see Appendix). A higher proportion of male academics (69.6%) expressed agreement with this statement, compared to female academics (62.3%) in 2007. In 2019, a higher proportion of male academics (79.3%) expressed agreement with this statement than their female colleagues (71.3%) did.

TRN by Type of HEI

The variability for comparison across the types of institutions was greatly reduced due to the different classification of institutions as well as the absence of identifiable indicators in the CAP 2007 survey on the different types of institutions. Although higher education in Malaysia is divided into public and private HEIs, further subvariations exist within public and private institutions. Across 20 public universities, these institutions are divided into five research universities, six comprehensive universities, four technical universities and five focused universities in the areas of defence, education, management, marine and maritime studies and entrepreneurship. In the private sector, there are 51 universities, 10 IBCs and 37 university colleges. Nonetheless, to ensure compatibility for comparison, the responses in both surveys were synchronised into only public and private institutions.

Figure 7.3 shows respondents' preferences for teaching or research based on type of institution in 2007 and 2019. Different trends in preference emerged for either of the two activities across public and private institutions. While the preference remained relatively similar in public institutions in 2007 and 2019, there was a significant change in the private institutions during the same period. In public institutions, slightly more than half preferred teaching over research at a ratio of 54:46% in 2007 and aggregated to 56:44% in 2019. However, in the private institutions, a sharp increase was seen in the preference for teaching from 52:48% teaching vs. research in 2007 to 68:32% in 2019.

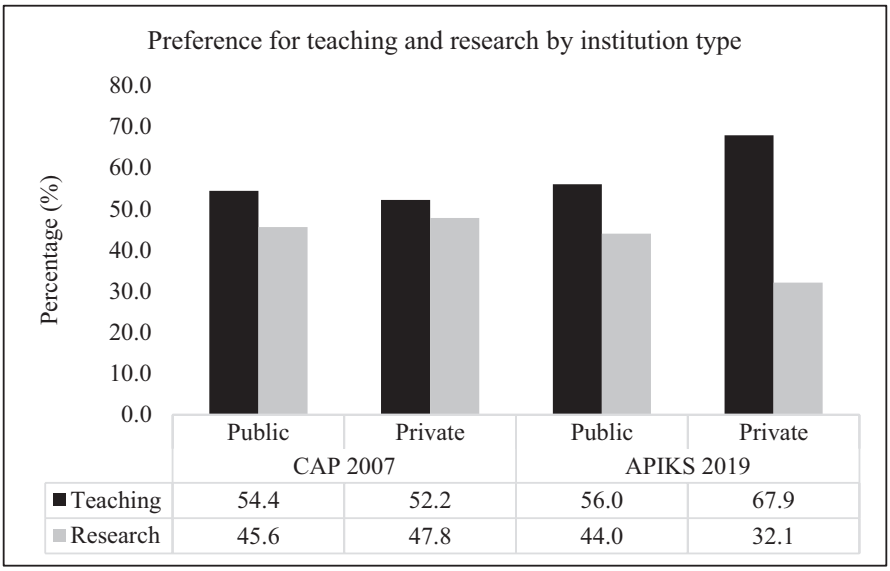

Fig. 7.3 Preference for teaching and research by institution type, 2007 and 2019 (percentages)

Table 7.6 Average time (hours) spent on academic activities by type of institution, 2007 and 2019

	CAP 2007 (N = 1024)		APIKS 2019 (N = 4266)	
Activities	Public (n = 751)	Private (n = 273)	Public (n = 3929)	Private (n = 337)
Teaching	18.02	19.61	19.83	18.50
Research	7.89	6.31	12.70	7.34
Service	3.04	1.92	4.86	3.16
Administration	7.04	5.99	8.92	8.26
Others	2.71	1.97	4.50	3.28
Total	38.70	35.80	50.81	40.54

This shift in the private institutions seems surprising as teaching is the bread and butter of private institutions, but in recent years there has been a push towards research as these institutions also joined the competition in the prestige-chasing game of university rankings. Yet, the academics indicated that their preference remained mainly in teaching, with a clear decline in their interest in research.

Next, Table 7.6 illustrates time spent on academic activities based on types of institution. Academics in public institutions logged more working hours per week than their counterparts in private institutions in 2019, but the difference between them was much smaller in 2007 (2.9 h). The average academic in public institutions logged more than 50 h per week in 2019, compared to almost 41 h logged by their counterparts in private institutions. These numbers are significantly higher than those recorded in 2007: more than 38 h in public institutions and almost 36 h in private institutions. The average in 2019 for both public and private institutions exceeded a 40-hour week with those in the public institutions clocking in an

additional one to one and a half working day in a week. Clearly, this refutes a general perception in Malaysia that the public sector is more laid-back than the private sector, especially in context of higher education.

T-test results (see Appendix) indicate that significant differences exist in the mean scores of time allocated for research ($t =$, $p < 0.05$) and service ($t =$, $p < 0.05$) between public and private institutions in 2007 and 2019. In 2007, while the academics from private institutions reported more hours spent on teaching than their colleagues in the public institutions, the latter spent more hours on research and service activities. In 2019, the differences were evident in how time was allocated according to job scope: academics from the public institutions allocated more hours to all the activities (teaching, research, service and administration) than their counterparts in private institutions, with a stark difference in the hours allocated for research.

Table 7.7 shows respondents' perceptions of TRN, that their research reinforced their teaching activities. The results show that across both CAP 2007 and APIKS 2019, the perception that research reinforced teaching activities was consistently held across types of institution. In 2019, 76.1% of academics in public institutions expressed agreement with this statement, compared to 69.6% in 2007. As for academics in private institutions, 60.0% expressed agreement with this statement, compared to 56.2% in 2007. Overall, there was a consistent increase in the number of respondents having this perception in both public and private institutions. Additionally, there seem to be differences of perceptions between academics from public and private institutions in both CAP2007 and APIKS 2019 with regard to interest in the teaching and research spectrum as exhibited by the significant results of the *t*-test (see Appendix). In 2007 and 2019, a higher proportion of academics from public institutions agreed that research reinforced teaching (69.6%, 66.1%) than those from the private institutions (56.2%, 60.0%). Given the increase in the number of hours spent on research by the public institutions, it is surprising that the proportion that claimed a primary interest in research slightly decreased in the 2019 survey.

Table 7.7 Perceptions of TRN by type of institution (percentages)

	CAP 2007 ($N = 1040$)		APIKS 2019 ($N = 3987$)	
Likert scale	Public ($n = 780$)	Private ($n = 260$)	Public ($n = 3677$)	Private ($n = 310$)
Strongly agree (5)	31.8	25.0	36.4	23.5
4	37.8	31.2	39.7	36.5
3	20.8	29.6	17.5	26.5
2	5.0	9.2	4.6	8.4
Strongly disagree (1)	4.6	5.0	1.8	5.2

Comparisons with Emerging Systems in the Region

In order to contextualise the Malaysian teaching and research data, we used the APIKS international data set to compare Malaysia with two other developing/emerging higher education systems in Asia that are at a level of development comparable to Malaysia's: Taiwan and Kazakhstan. Tables 7.8, 7.9, 7.10, 7.11 and Figs. 7.4, 7.5 compare the academics' perceptions of teaching and research across the three countries in the five areas examined earlier.

In contrast to Malaysia, Taiwan and Kazakhstan data show minimal differences in the academics' preference for teaching or research among junior and senior academics. In Taiwan, a slightly higher proportion of juniors (48.6%) than seniors (45.9%) preferred teaching, while in Kazakhstan, 56.7% of juniors and 58.9% of seniors preferred teaching to research. The responses by the Malaysian junior and senior academics with regard to preference for teaching or research were more polarised: 62.7% of juniors and only 39.6% of seniors indicated a preference for teaching. This means that more juniors than seniors in Malaysia and Taiwan preferred teaching, whereas more seniors than juniors in Kazakhstan indicated a preference for teaching. In turn, higher proportions of senior academics in Malaysia and Taiwan indicated preference for research, but it was the reverse in Kazakhstan. In Kazakhstan, a slightly bigger percentage of junior academics (43.3%) seemed to show stronger interest in research than their seniors (41.1%).

The average time spent on academic activities by academic rank in the three countries is shown in Table 7.8. What is similar among them is that most hours were allocated for teaching, followed by research and administration. On average, senior academics worked more hours than their junior colleagues in all the three countries: 3 h more in Malaysia (52.9) and in Kazakhstan (53.1) than in Taiwan (50.8). Compared to Malaysia, senior academics in Taiwan and Kazakhstan allocated more time than their juniors for their teaching activities. However, seniors in all the three countries spent more time in research, service and administration activities compared to their junior colleagues.

Table 7.8 Average time (hours) spent on academic activities by academic rank in Malaysia, Kazakhstan and Taiwan

	Malaysia		Kazakhstan		Taiwan	
Activities	Junior	Senior	Junior	Senior	Junior	Senior
Teaching	21.00	16.30	24.42	24.56	15.61	19.96
Research	11.59	14.13	10.85	12.27	11.37	12.41
Service	4.31	5.82	4.23	4.95	5.44	6.02
Administration	8.23	10.55	6.89	7.63	6.06	9.36
Others	3.77	6.13	3.53	3.77	1.39	3.13
Total	48.90	52.93	49.61	53.11	39.69	50.76

Table 7.9 Perceptions of TRN by type of institution (percentages): Malaysia, Kazakhstan and Taiwan

	Malaysia ($N = 4277$)		Kazakhstan ($N = 1019$)		Taiwan ($N = 1224$)	
Likert scale	Junior ($n = 3096$)	Senior ($n = 1181$)	Junior ($n = 669$)	Senior ($n = 350$)	Junior ($n = 37$)	Senior ($n = 1187$)
Strongly agree (5)	30.0	50.1	51.4	63.7	21.6	27.7
4	40.8	36.7	16.3	17.1	37.8	42.0
3	21.3	9.5	13.9	9.1	29.7	22.6
2	5.7	2.5	5.2	2.3	10.8	6.1
Strongly disagree (1)	2.2	1.2	13.2	7.7	0.0	1.5

Table 7.10 Mean and SD time spent on academic activities by gender: Malaysia, Kazakhstan and Taiwan

		Malaysia ($N = 4266$; male = 1884; female = 2382)		Kazakhstan ($N = 1013$; male = 276; female = 737)		Taiwan ($N = 1172$; male = 761; female = 411)	
Activities	Gender	Mean	SD	Mean	SD	Mean	SD
Teaching	Male	17.74	11.564	23.34	13.060	19.29	9.152
	Female	21.29	88.815	24.89	13.626	20.48	9.776
Research	Male	12.94	12.052	11.94	12.068	12.86	7.595
	Female	11.75	36.894	11.12	11.007	11.51	7.773
Service	Male	5.56	8.145	4.50	8.297	6.00	5.932
	Female	4.06	5.912	4.47	7.968	5.98	6.043
Administration	Male	8.91	8.460	6.71	9.981	9.23	9.327
	Female	8.82	9.401	7.31	10.113	9.16	10.146
Others	Male	5.23	38.640	3.64	7.734	3.02	5.920
	Female	3.76	5.035	3.60	6.846	3.14	5.281

Table 7.11 Perceptions of TRN by gender (percentage): Malaysia, Kazakhstan and Taiwan

	Malaysia ($N = 4227$)		Kazakhstan ($N = 1019$)		Taiwan ($N = 1224$)	
Likert scale	Male ($n = 1181$)	Female ($n = 3096$)	Male ($n = 277$)	Female ($n = 742$)	Male ($n = 790$)	Female ($n = 427$)
Strongly agree (5)	38.7	32.8	54.9	55.9	27.1	28.6
4	40.6	38.5	21.3	14.8	42.5	41.2
3	14.5	21.2	11.2	12.7	23.0	21.8
2	4.3	5.3	4.3	4.2	6.2	6.3
Strongly disagree (1)	1.9	2.1	8.3	12.4	1.1	2.1

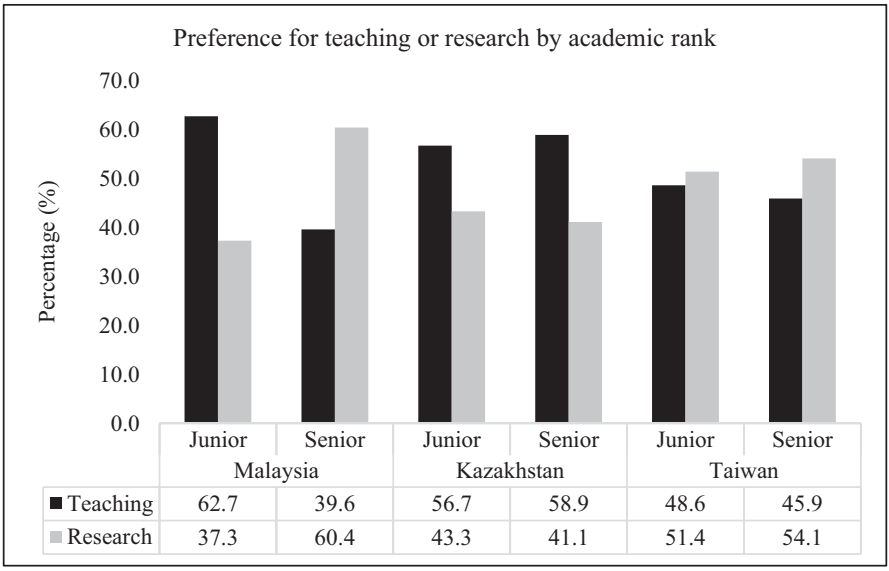

Fig. 7.4 Preference for teaching or research by academic rank (percentages)

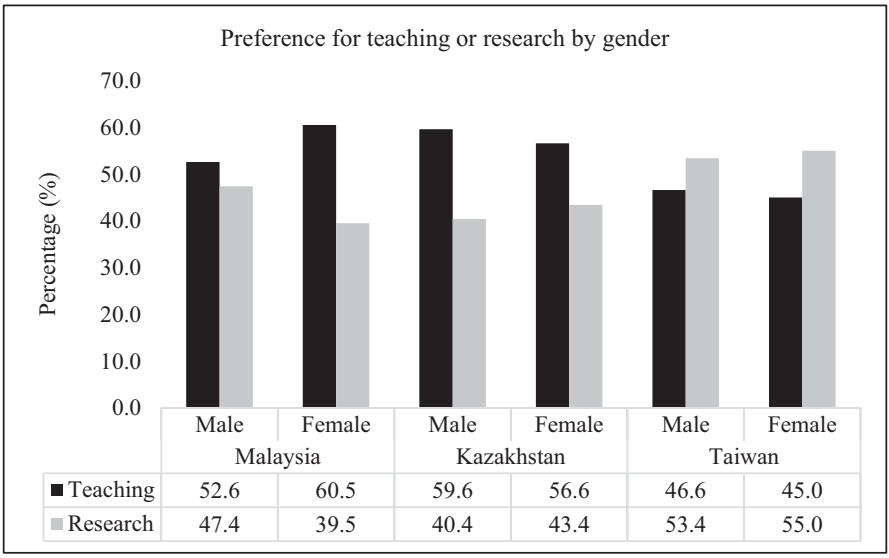

Fig. 7.5 Preference for teaching or research by gender (percentages): Malaysia, Kazakhstan and Taiwan

In a typical week, junior academics in Kazakhstan allocated more time to teaching (24 h) than their counterparts in Malaysia (21 h) and Taiwan (15.6 h). While Kazakhstan's junior academics spent less time in research than their counterparts, Taiwan's junior academics spent more time in service activities. Malaysian junior academics engaged more in administration compared to their counterparts.

Malaysian senior academics spent slightly more time in research and administration than their counterparts in Taiwan and Kazakhstan. On the other hand, senior academics in Taiwan allocated more time in service activities. The fact that both junior and senior academics in Taiwan spent more time on service activities seems to indicate that service was given formal importance in their performance and evaluation system.

Table 7.9 presents the respondents' views on the relationship between teaching and research from the three countries. The data shows that both juniors and seniors tended to perceive research as enhancing teaching. This may indicate that the majority were likely to use research as input to their teaching. More respondents from Malaysia and Kazakhstan than from Taiwan considered that their research enhanced teaching. More than two thirds of senior academics from Malaysia (86.8%) and Kazakhstan (80.8) strongly agreed on the synergy of research and teaching compared to senior academics in Taiwan (67.7%). Among the junior academics, more respondents from Malaysia agreed that research reinforced teaching, followed by Kazakhstan (67.7%) and Taiwan (59.4%) with the lowest proportion.

Figure 7.5 shows data on academics' preference for teaching or research by gender in Malaysia, Taiwan and Kazakhstan. A few surprises emerged in the overall data: more male academics in Taiwan and Kazakhstan seemed to prefer teaching than their female counterparts. While more female academics preferred research to teaching in these two countries, the differences in terms of gender are small. The reverse is the case for Malaysia, and the differences seem bigger in Malaysia than in Taiwan and Kazakhstan. A substantial portion of Malaysian female academics (60.5) preferred teaching compared to male academics (52.6%), and a slightly higher proportion of female academics in Taiwan preferred research (55%) compared to male academics (53.4%).

Table 7.10 displays gender differences in the focal academic activities in the three countries. Male academics spent less time on teaching and more time on research and services in all the three countries. While female academics spent more time on teaching, the proportion of time spent on teaching by male academics is higher in Taiwan and Kazakhstan compared to Malaysia. Across the three countries, male academics allocated more time for research and services than their female counterparts. Female academics in Kazakhstan spent more time than their counterparts in administrative activities.

Generally, an impressive majority of males and females perceived the interconnection of research and teaching in all the three countries. Slightly more male respondents in Malaysia and Kazakhstan than in Taiwan considered that their research contributed to their teaching. The difference in this perception between male and female academics in Taiwan is extremely small (0.2%). The findings indicate that that the majority of male and female academics in the three countries not only professed interest in both teaching and research but also perceived their roles in teaching and research as interdependent.

Discussion

A number of key trends are observable with regard to teaching and research across CAP and APIKS, as well as from the aspects of gender, seniority and institution type. One is an increasing preference for teaching rather than research. Female academics, who are now the majority in academia, have consistently shown a stronger preference for teaching to research. A similar pattern can also be seen among academics in the private HEIs, where the preference for teaching increased tremendously across the two surveys. Furthermore, there could be changes in preference between teaching and research as one's career progresses, but this change in trend does warrant further exploration as there are implications to the career development of academics, as well as ways and extent to which research and teaching activities are conducted and valued in terms of their outcome, impact and contribution.

Another trend is that the number of working hours, on the whole in Malaysian academia, has increased and surpassed the stipulated 40 h per week arrangement. This increase underlines a serious threat to the academic profession in the form of overwork and a lack of work-life balance. The total number of hours devoted to academic work has increased slightly over the last 12 years, with greater orientation towards teaching, research and administration across the board emanating from managerialism, resulting in academics having less time and energy for service activities (Azman et al., 2014; Azman, 2019). Although there is no difference among ranks in the hours spent by academics, the fact that the seniors spend significantly more hours on research, service and administration highlights that the higher the level of appointment, the greater the workload required for research and administration, thus less time for teaching. However, the seniority differences also suggest that senior academics are spending more time on every aspect of their academic work, except for teaching. This significantly implies the need for further discussion on the teaching-research nexus.

Academics in public universities are expected to spend extra hours on research, given the increased emphasis on research across these institutions, but their colleagues in the private HEIs have in fact spread out their hours on more activities including research, service and administration, with a slight decrease in teaching, though it remains the largest component in terms of hours spent. The scenario in the private HEIs may suggest a changing emphasis and diversity in the functions of private HEIs from being a teaching-only institution to becoming more comprehensive as a university.

Yet another trend, across the board, is that the majority of academics agree that research activities reinforce their teaching activities, with only a small proportion disagreeing. The percentage of those in agreement has increased from a decade ago among senior and junior academics, from both gender groups and in both public and private institutions. However, the number of academics from private institutions who agree is still the smallest, and this may be due to the maturity of the research ecosystem within private institutions that have focused more on teaching due to the nature of these institutions relying on tuition fees as their most important and biggest source of revenue.

Thus, it can be inferred that Malaysian academics in 2019 are more receptive of research as an integral component in academia, as compared to the general perception one decade ago. This may be attributed to the rewards and incentives provided, in terms of promotions, monetary incentives and other forms of privileged access for those who excel in research. Academics also seem to try to avoid, as much as possible, the repercussions of not doing research on their career progression and future professional development. Furthermore, as the prestige of universities as measured by rankings is heavily dominated by research, there has also been a strong impetus for the state to increase investment in research, given the encouraging momentum and the academics' readiness to be more involved in research.

A steady and significant difference remains between male and female academics, and between public and private institutions in higher education with regard to the time allocated to research and service activities, and in perceptions of how research reinforces teaching. This may be related to the mission differentiation between public and private institutions: public university academics are expected to be active teachers as well as researchers, and public institutions have more postgraduate courses that are more research-based. This implies that the differences in Malaysian academic work are real and not mere stereotypical opinions, and these findings are helpful in gaining insights into the academic culture and identity of the majority who play strong teaching and research roles. While they hold to the academic values by spending long hours on teaching and research, they are also undertaking unnecessary amounts of administrative tasks most likely due to benchmarking, ranking and quality audit requirements.

Malaysian academics as a whole differ from their colleagues in Kazakhstan and Taiwan in their being more inclined to prefer research although the conformity to both teaching and research has increased recently. Taiwan academics seem to hold on to a half and half orientation of research and teaching. It is argued that a more balanced attention to teaching and research is a response to the criticism of neglect of teaching that was raised by the both the academics and the public in Malaysia.

A comparison of time allocation to core activities shows Malaysian academics as being more focused on their research and administration activities, while Taiwan academics appear to play a more prominent role in teaching and service. Kazakhstan's academics, on the other hand, are strongly involved in teaching although the more junior academics in Kazakhstan spend more time on research than those in higher ranks, presumably because of the research ambitions of the younger staff and because recruitment into the academic profession is increasingly dependent on research qualification. Also, the higher education of Kazakhstan during the Soviet era involved only teaching while research was conducted separately in research institutes. Hence, research in higher education is a relatively recent phenomenon in Kazakhstan, and, as expected, the junior academics are spending more time on research than their senior counterparts.

Conclusion and Policy Implication

In conclusion, while having a teaching-research nexus is ideal for the holistic development of universities and students, there is a need for specific efforts and initiatives to promote excellence in teaching and research as well as to integrate both. While academics in Malaysia may recognise the importance of this nexus, there remain significant challenges in enabling such a nexus to be created, sustained and further developed.

As research has been given more emphasis in the pursuit of performance and prestige, especially in public universities, a number of policy and institutional initiatives have been taken in attempting to strike a balance by also emphasising teaching. Such initiatives include a teaching pathway for promotion in the University Transformation Programme (*Orange Book*) on Multiple Career Pathways for Academics. Some institutions have implemented a teaching track for academic promotion, as well as giving out teaching awards. While these initiatives may succeed in giving equal emphasis on teaching as on research, it is still insufficient towards developing a teaching-research nexus.

Specific policies and initiatives need to be considered in developing the nexus. If government-funded research can require output in terms of patents, commercialised products, students and publications in indexed journals, consideration should also be given to the extent research findings have been incorporated into teaching, training and other forms of teaching activities. Modules for training, research publications listed as key reading in related courses or serving as guest lecturer in courses where the research is related can also be considered as output from research projects.

In addition, teaching awards in universities, rather than merely recognising creative or excellence in teaching, could also include a specific category to showcase the lecturer's effort in terms of integrating research into a course. A notable example is the Sofia An Teaching Award given by Nazarbayev University in Kazakhstan to an academic staff nominated by students in recognition of his or her excellence in integrating research and teaching. Such specific recognition can foster efforts among academics to develop the culture of incorporating research and teaching, thus creating a nexus.

Two other patterns emerging from the surveys highlight the need to consider promoting a research culture while also addressing the workload situation in academia. As female and junior academics prefer teaching over research, incentives in the form of small research grants can be developed specifically for these groups of academics. However, importantly, these research grants should also be more flexible to adjust to the teaching workload, such as not having as tight or rigid a timeframe as demanded of a full-time researcher. Also, these grants, while fostering research interest, can provide incentives for the recipients to connect research with their teaching responsibilities.

Furthermore, the overwork situation in academia can discourage academics from devoting effort to creating a teaching-research nexus, in which ideally the culture of research is vibrant and teaching is equally appreciated. Influenced by the culture of managerialism, every university has mechanisms in place to keep track of their staff attendance and duration of work, including academic staff, although the extent of monitoring may differ across institutions. While such mechanisms exist to ensure staff are working and imply a trust-deficit environment in these universities, there is a lack of clear policy to manage academic talent in most universities. First, not many universities have designated tracks of entry for academic staff upon recruitment. Having such tracks when one is up for promotion is not helpful as some may have been drowned by multiple conflicting interests upon joining academia. Also, the designated tracks, at least those provided in the *Orange Book*, are single track, with no mention of any mixed tracks that are essential for developing the nexus. Lastly, there is also no policy or guideline for academic staff who wish to compensate for unused/available time on a particular aspect with other aspects at different times according to needs. For instance, when an academic wins a research grant of a significant amount, the grant money could be used to offset their teaching responsibilities accordingly, and when the grant is completed, they can reallocate their time and priority to teaching. This flexibility is essential, given the individualistic nature of academic work, but a policy or regulation to enable such adjustments has yet to be considered.

Appendix: T-Test Analyses by Rank, Gender and Institution Types

	CAP 2007					APIKS 2019				
Group	N	Mean	SD	t	p	N	Mean	SD	t	p
Synergy of T&R										
(i) Senior	249	1.84	0.913	−6.336	0.000*	1076	4.33	0.833	13.464	0.000*
(ii) Junior	809	2.28	1.089			2715	3.90	0.971		
(iii) Male	567	2.08	1.040	−3.470	0.001*	1686	4.10	0.932	4.510	0.000*
(iv) Female	499	2.30	1.086			2105	3.96	0.965		
Time spent (hours)										
(a) Teaching										
(i) Senior	235	17.14	11.279	−2.110	0.035*	1158	16.30	10.402	−2.045	0.041*
(ii) Junior	800	18.94	11.528			3107	21.00	78.012		
(iii) Male	553	17.38	11.298	−1.116	0.265	1884	17.74	11.564	−1.726	0.084
(iv) Female	530	18.18	12.113			2382	21.29	88.815		
(b) Research										
(i) Senior	235	9.97	8.496	5.201	0.000*	1158	14.13	13.159	2.568	0.010*
(ii) Junior	800	6.83	6.814			3107	11.59	32.645		

(continued)

	CAP 2007					APIKS 2019				
Group	N	Mean	SD	t	p	N	Mean	SD	t	p
(iii) Male	553	7.99	7.703	3.404	0.001*	1884	12.94	12.052	1.347	0.178
(iv) Female	530	6.47	6.986			2382	11.75	36.894		
(c) Service										
(i) Senior	235	3.21	5.616	1.810	0.071	1158	5.82	8.953	5.271	0.000*
(ii) Junior	800	2.52	5.003			3107	4.31	6.106		
(iii) Male	553	3.14	5.533	3.603	0.000*	1884	5.56	8.145	6.731	0.000*
(iv) Female	530	2.03	4.515			2382	4.06	5.912		
(d) Administration										
(i) Senior	235	8.39	8.603	3.486	0.001*	1158	10.55	9.604	7.187	0.000*
(ii) Junior	800	6.25	7.022			3107	8.23	8.678		
(iii) Male	553	6.69	7.029	0.938	0.348	1884	8.91	8.460	0.312	0.755
(iv) Female	530	6.27	7.852			2382	8.82	9.401		

*Significant at $p < 0.0$

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Chapter 8
The Teaching-Research Nexus in the Lithuanian Higher Education Compared to Other European Higher Education Systems

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Abstract This chapter explores the nexus of teaching and research activities at universities in Lithuania – a small, peripheral, post-Soviet higher education system – and discusses the findings in comparison with representatives of different models of higher education, specifically, Germany as a representative of the Humboldtian model, Portugal as a representative of the Napoleonic model, Sweden as a representative of the Scandinavian model and Croatia and Estonia as further representatives of a post-Soviet model of higher education. Our findings show that Lithuanian academics spend more time on teaching than on research while being equally interested in teaching and research and perceiving a strong link between the two activities. We thus argue that Lithuania has moved closer to a balanced teaching-research nexus. Similar results were found for Estonia, Croatia and Portugal, whereas German and Swedish respondents put stronger emphasis on research. Here academic rank matters. The study shows hierarchical assymetries in this regard in Lithuania, Estonia, Croatia and Portugal. In line with the findings of previous studies, we found female academics to spend significantly more time on teaching compared to their male colleagues in all of the analysed countries – a fact which has serious implications for gender equality in higher education.

Keywords Lithuania · Post-Soviet higher education · Teaching-research nexus · Academic rank · Gender

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F. Huang et al. (eds.), *Teaching and Research in the Knowledge-Based Society*, The Changing Academy – The Changing Academic Profession in International Comparative Perspective 23, https://doi.org/10.1007/978-3-031-04439-7_8

Introduction

The role of teaching and research in higher education and especially the relationship between the two in academic work have been at the centre of teaching-research nexus discussions in higher education research literature (see, e.g. Brew, 1999; Clark, 1997; Leišytė et al., 2009). Earlier research has found that higher education reforms have fostered competition and focused on increasing research performance across higher education systems. Studies have shown that these reforms have significantly impacted the teaching-research nexus (Shin et al., 2014). In this race, small and peripheral countries seem to struggle extremely hard to stay in the performance game and thus, we may assume, incentivise their academics and their institutions to focus more on research than on teaching (Leišytė & Wilkesmann, 2016).

This chapter focuses on academic perceptions of task division between teaching and research and the teaching-research nexus of academics at universities in Lithuania as compared to those of academics at universities in five other European countries. The Lithuanian higher education system has undergone significant reforms since the restoration of independence from the Soviet Union in the early 1990s. While during Soviet times teaching and research were decoupled, the latter being conducted in institutes of the Academy of Sciences and not at universities, after 1990 the Lithuanian higher education system has been reformed towards linking teaching and research in universities in the face of increasing competition for research performance and resources. We still know very little how the division between teaching and research tasks is perceived by academics today and how this squares with similar developments in other higher education systems. Therefore, we pose the following questions:

- How are teaching and research distributed, and how is teaching-research nexus perceived in the Lithuanian higher education system by academics?
- How do the distribution between the two tasks and the perceptions of teaching-research nexus in Lithuania compare to other European higher education systems?
- How does the perception of the division of tasks between teaching and research compare by gender and academic rank?

After exploring the Lithuanian case, we compare it to the situation found in higher education systems representing different types of European higher education models – Germany, Portugal, Sweden, Estonia and Croatia.

Teaching and Research in Universities

The historical evolution of European universities can be divided into three stages, the pre-nation state stage, nation state stage and globalisation stage (Scott, 2006). Early institutions of higher education, e.g. in China and the Islamic world, had a strong focus on teaching and the training of elites for religious and political

purposes (Perkin, 2007). The establishment of universities in Europe in medieval times followed a similar trend. Being among the first European universities to be established, Paris and Bologna were semi-autonomous institutions, which were subject to the church authority. Universities were knowledge repositories that aimed to create and transfer knowledge. Transfer of knowledge, however, was perceived as university's primary mission, and thus, teaching was central in medieval universities (Paleari et al., 2015; Scott, 2006). The nation state stage saw the rise of the early modern university, which was subject to processes of nationalisation, democratisation and the emergence of a public service mission. Universities were increasingly expected to serve national and societal need, and their autonomy suffered under increasing state control, leading to struggles for authority between the state and the university. Teaching, especially the education of governmental leaders, civil servants and, later, citizens, was the main focus of the universities. The pursuit of knowledge through original inquiry gained momentum, however, in the early to mid-nineteenth century (Paleari et al., 2015; Scott, 2006) and thus a research mission of universities was born. Finally, the globalisation stage saw the emergence of the postmodern university. The postmodern university is characterised by processes of internationalisation, leading to teaching and research being conducted across borders in a globalising environment, as well as by the emergence of a third mission, which goes beyond teaching and research. Ideas such as the 'Entrepreneurial University' (Clark, 1997) or models such as the 'Triple Helix' university-industry-government relations (Etzkowitz & Leydesdorff, 2000) or, lately, 'Quadruple Helix' underline the role of universities for economic growth and societal development. Research, teaching and the new third mission are increasingly expected to serve to improve societies, e.g. by creating skilled workforce, contributing to economic growth or tackling societal challenges.

Literature is in disagreement on the nexus between teaching and research (Calikoglu et al., 2020). While some authors see the close, symbiotic relationship between the two activities as in the ideal of the Humboldtian university model and argue that teaching and research are indispensably intertwined, others claim that there is no relationship between these two core tasks performed at universities (see, e.g. Brew, 1999; Clark, 1997; Hattie & Marsh, 1996; Zubrick et al., 2001) and that research-intensive universities do not necessarily provide better teaching (Enders & de Weert, 2009; Marsh & Hattie, 2002).

Although teaching gains importance in hiring and promotion procedures, it is undisputed that academic reputation and prestige depend heavily on research achievements (Clark, 1997). As Clark has argued already in the 1990s, research is done 'in time freed from teaching', and time spent on teaching is considered as 'time diverted' (Clark, 1997, pp. 72–73). Similarly, Leišytė et al. (2009) have found that academics experience increasing competition and conflicts between teaching and research time. A strong research orientation has especially been found among younger generations of researchers, who experience stronger publication and research performance pressures (Kwiek, 2015). Rising competition not only on individual but also organisational levels has further led to the introduction of differentiated career paths with teaching-only or research-only positions in several countries (De Weert, 2009; Finkelstein, 2014; Leišytė & Dee, 2012), differentiating

the career opportunities for academic staff and suggesting a gradual shift away from the classical Humboldtian ideal.

Further differences with regard to the teaching-research nexus have been found between institutional types (Brew, 2006), whereby institutions such as colleges or universities of applied sciences have a stronger focus on teaching than research universities, between disciplines (Brennan et al., 2019; Griffiths, 2004), levels of study (Neumann, 1992; Taylor, 2008) and female and male academics (Leišytė & Hosch-Dayican, 2014b; Jacob et al., 2020). How academic rank in academia affects the teaching-research nexus, however, so far has attracted limited attention (Leišytė, 2007).

Teaching and Research in Lithuania: Historical Developments Since the 1990s

During Soviet times, the Lithuanian higher education and research sector was structured according to the dual Soviet model where research was conducted in scientific research institutes, affiliated with the Academy of Sciences or respective ministries, while higher education institutions were primarily involved in teaching. The first Law on Research and Studies (Lietuvos Respublikos Aukščiausioji Taryba, 1991) of the newly independent Lithuania declared the Academy of Sciences a public institution, a collective expert body, and 29 research institutes became independent scientific institutions. The Law did not regulate the distribution of workload between research and teaching in HEIs and just indicated that academics should meet qualification requirements approved by the government and apply for an academic position in an open competition. University statutes, in particular, the first version of the statute of Vilnius University (Lietuvos Respublikos Aukščiausioji Taryba, 1990), did not mention the proportion of teaching and research in the overall workload of academics. We may assume that the inertia of concentrating research in scientific research institutes continued, while HEIs remained mainly preoccupied with teaching, and this lasted throughout the first decade of independence in Lithuanian higher education. The situation was partially determined by a challenging economic situation and the severe underfunding of research activities, while fee-paying students became the main sources of additional income for academia. Consequently, a first thorough evaluation of research in Lithuania, conducted by the Norwegian Research Council in 1996 highlighted the existing division into two distinct spheres: the research institutes and the universities. Experts of the Norwegian Research Council noted that perhaps, as an aftermath of the Soviet period, academics at universities faced a teaching overload leading to a lack of time for conducting research. They concluded that ‘teachers with enough time for research are exceptions’ (Norwegian Research Council, 1996, p. 24). Moreover, many academics carried out a considerable amount of work outside their institution to sustain themselves financially. On the other hand, the competence and capacity of the present research institutes were utilised too little in teaching.

The OECD review on education in Lithuania, conducted 6 years later, also noted that many university lecturers were engaged in professional activities outside their regular duties. In most cases, they taught in other HEIs, colleges and sometimes in secondary schools. As a result, the level of research activities was considerably reduced. The OECD (2002) report indicated that academics spent an average of 600 h per year on teaching, which was significantly higher than European average. In their recommendations, the OECD experts suggested reducing the teaching load to provide more room for research activities. In addition, Lithuanian authors revealed a discrepancy between the manifested and factual workload allocated for research:

> All university teachers are considered as researchers with the coefficient of 0.3. Formally it meets the European standards. In Germany professors, depending on the field of their activities, allocate from 22 to 47 percent of their working time for research. Although no special studies were done on the topic, we assume that our teachers allocate much less of their time for research. (Daujotis et al., 2002, p. 71)

Changing university governance structures and an increase of institutional autonomy precluded the possibility of introducing the proportion of teaching/research on parliamentary or governmental levels in the 2000s, and universities themselves started to decide on the amount and proportion of the workload for the academic staff. In 2002 version of the Vilnius University statute, we can find that the university senate sets the norms of teaching, research and methodological work (Lietuvos Respublikos Seimas, 2002). However, the ministry can provide recommendations. For example, in 2011, the Minister of Education and Science recommended to allocate no more than 50% of the overall workload of academic staff for face-to-face teaching (Lietuvos Respublikos švietimo ir mokslo ministras, 2011), i.e. not including teaching-related activities. EU accession and availability of European funds changed the situation of teaching and research distribution in the workloads of academics. Since the availability of the EU Structural Funds, research grants are distributed by the Lithuanian Research Council on a competitive basis. Currently, Vilnius University has established an annual working load of 1584 h for the academic staff, with 528 h (one-third of the entire workload) allocated for research (Vilniaus universiteto rectorius, 2019). Other Lithuanian universities now follow similar proportions. Further, the promotion requirements today expect not only performance and qualifications in teaching but also research performance, such as a specific number of publications.

Theoretical Considerations

Although increasing convergence towards a market-oriented paradigm has been witnessed between universities in Europe and worldwide (e.g. Dobbins & Knill, 2009; de Boer et al., 2007; Leišytė & Kiznienė, 2006), literature distinguishes three ideal type European models of higher education, namely, the Anglo-Saxon, the

Humboldtian and the Napoleonic model. The Anglo-Saxon or British model of higher education is characterised by its focus on liberal and professional education with a strong research basis. Universities in this model enjoy high degrees of institutional autonomy, and there is a low degree of state control (Gellert, 1993; Neave, 1982).

The Napoleonic model, a model tied to the emergence of the nation state among others in France and Spain (Scott, 2006), is characterised by strong state control, a high degree of centralisation (Schwartzman & Klein, 1994) and consequently a low degree of institutional autonomy. The Napoleonic model of higher education regards universities as teaching and training institutions, and research takes place outside of universities.

The Humboldtian model emerged at the beginning of the nineteenth century based on the ideas of the philosopher and government functionary Wilhelm von Humboldt in Germany. It is characterised by a high degree of academic freedom and free inquiry of research. The Humboldtian university is publicly funded and the state safeguards before mentioned freedoms. Although the holistic combination of teaching and research is one of the main characteristics of the ideal type of higher education, literature shows that selective funding mechanisms have led to the research mission being increasingly favoured over the teaching mission in the Humboldtian university (Scott, 2006).

Two further models are relevant for the presented study: the post-Soviet and the Scandinavian or Nordic models of higher education. The post-Soviet model of higher education has traditionally been based on the Humboldtian model; however, during Soviet times, research was separated from teaching activities and no longer conducted in universities, but in Academies of Sciences (Leišytė et al., 2018). Traditionally strongly based on a welfare model regarding investments into education as beneficial for society as a whole and emphasising the importance of teaching, the Scandinavian or Nordic higher education model nowadays increasingly favours research (Geschwind & Boström, 2015; Torjensen et al., 2017).

Recent studies on changes of the academic profession have confirmed an increasing differentiation of academic tasks and have revealed a divergence between ideal types of higher education assigned to countries and the actual practices of teaching and research of academics in these countries. As Arimoto (2014) has shown, the German higher education system, the inventor of the Humboldtian model, is no longer characterised by a unity of teaching and research but rather a research orientation. For the purpose of this chapter, we therefore move beyond the geographically and temporally connoted model presented above and draw upon the work of Arimoto, who distinguishes between countries with (a) an emphasis on research, (b) a balanced teaching and research orientation and (c) a strong emphasis on teaching.

Existing research suggests that the teaching-research nexus is relevant not only on an individual level but also on broader, departmental levels or beyond (the ‘global nexus’, Neumann, 1992). We investigate the teaching-research nexus on the system level but include individual academic perceptions by not only focusing on time spent on teaching- or research-related tasks and the primary interests of academics

but also on academics' perceptions of how their teaching and research reinforce each other, that is, how they perceive teaching-research nexus.

Methodology

Case Selection and Sample

In this study, we use the method of typical cases (Seawright & Gerring, 2008) to select countries that are representative for various types of European higher education models and differ in how their higher education systems have developed (see Table 8.1). The cases of Lithuania, Croatia and Estonia were selected as post-Soviet higher education systems based on the Humboldtian model, yet with significant historical differences (Leišytė, 2014, 2018; Flander et al., 2020; Smolentseva et al., 2018). Germany represents the Humboldtian model, although previous research has shown dominance in research, but teaching is still an integral part of the German higher education system (Arimoto, 2014). Portugal was selected as a representative of the Napoleonic model (Donina & Paleari, 2019), and Sweden represents the Scandinavian model of higher education (Torjensen et al., 2017). As the teaching-research nexus in European countries differs strikingly by type of higher education institution – non-university higher education usually favouring teaching over research – our analysis focuses solely on the university sectors of the selected countries, as these offer doctoral degrees and are likely to experience the tensions between teaching and research missions.

To investigate the academic perceptions of the teaching-research nexus and compare the distribution between these two activities in Lithuanian higher education

Table 8.1 Number and type of respondents per country

		Number of respondents		Gender		Academic rank	
	Higher education model	University	Other	Male	Female	Senior	Junior
Croatia	Humboldtian/post-Soviet	1038	0	424	607	395	643
		100.0%	0.0%	41.1%	58.9%	38.1%	61.9%
Estonia	Humboldtian/post-Soviet	785	0	383	400	385	400
		100.0%	0.0%	48.9%	51.1%	49.0%	51.0%
Germany	Humboldtian	6112	0	2938	1896	939	5123
		100.0%	0.0%	60.8%	39.2%	15.5%	84.5%
Lithuania	Humboldtian/post-Soviet	389	0	149	210	322	67
		100.0%	0.0%	41.5%	58.5%	82.8%	17.2%
Portugal	Napoleonic	1929	0	659	638	1127	693
		100.0%	0.0%	50.8%	49.2%	61.9%	38.1%
Sweden	Scandinavian	1954	0	1085	836	1271	678
		100.0%	0.0%	56.5%	43.5%	65.2%	34.8%

with other countries, we analyse the dataset of the international project Academic Profession in the Knowledge-based Society (APIKS) (see Table 8.1 for key characteristics). The data was gathered via online surveys between 2017 and 2018 and consists of professors, researchers and lecturers at universities.

Operationalisation and Data Analysis

To investigate the perception of the distribution of teaching and research, we use three dependent variables based on previous CAP study literature and current APIKS studies: (1) the average weekly time spent on teaching (including the preparation of materials and lesson plans, classroom instruction, advising students, reading and evaluating student work, etc.) and research activities (including reading literature, writing, conducting experiments/fieldwork, etc.) in percent, (2) academics' interest in teaching and research and (3) the reinforcement of academics' research activities on their teaching (Locke, 2012; Shin & Kim, 2017; Karram Stephenson et al., 2020; Müller & Schneijderberg, 2020, Leišytė et al., 2009). The independent variables are country, gender and academic rank. Due to the very low number of respondents that have indicated their gender as 'other', gender was treated as a binary variable with the values *male* and *female*. Academic rank is a binary variable with the values *senior academics* (including full/associate professor, senior/leading researchers) and *junior academics* (including assistant professors, lecturers and senior/assistant researchers).

In order to answer the research questions, we conduct a descriptive analysis to show the distribution of the dependent variables related to teaching-research nexus by country. This is followed by t-tests to investigate the differences by gender as well as by academic rank.

Findings

To answer our first research question ('How are teaching and research distributed in the Lithuanian higher education system as perceived by academics?'), we first present the results on the percentage average of academics' weekly activities for teaching and research, distinguishing between periods in which classes are in session and periods in which classes are not in session. In a second step, we show the preferences of academics for teaching and research. Finally, we show the responses to the question research activities reinforce teaching. To answer our second research question (How does this distribution compare with other countries in Europe?), we compare and discuss the main findings from the APIKS survey in Lithuania with the findings of the APIKS surveys in Croatia, Estonia, Germany, Portugal and Sweden.

Distribution of Teaching and Research in the Lithuanian Higher Education System

The academics surveyed were asked to estimate how much time per week they spend on teaching, research, external activities, administrative tasks and other activities. For this analysis, we observed the total working week's percentage spent on teaching and research activities when classes are in session and not in session. Responses with zero hours for all activities in both periods were filtered out of the analysis.

In Fig. 8.1, the means for academics' weekly activities on teaching and research are presented. Overall, academics in Lithuania reported that they spend most of their time on teaching when classes are in session and on research when classes are not in session. When classes are in session, Lithuanian respondents spend on average 41% of their working time on teaching and 27% on research tasks. When classes are not in session, they spend on average 12% on teaching activities and 31% of their working time on research activities.

However, when we take a closer look at the histograms in Fig. 8.2, we see relatively large differences in the responses for weekly hours spent on teaching and research activities. Overall, during both the period in which classes are and in which classes are not in session, a number of outliers are identified who do not spend any time on teaching or research. Other respondents stated quite the opposite and indicated to spend 100% of their weekly working time only on teaching or research (see Fig. 8.2). Here, special attention needs to be paid to the period in which classes are not in session. Overall, the average time spent on teaching and research-related activities seems to depend a lot on the individual academic. A vast majority of respondents indicated not to spend any time on teaching and research-related activities when classes are not in session. Short-term employment contracts for only the periods when classes are in session may be the reason for these responses. Further, few respondents in Lithuania indicated to be engaged only in teaching. Yet, the average time spent on teaching per week in the period in which classes are not in session is relatively low. Also, the weekly share of time devoted to research varies significantly among respondents strong.

Furthermore, we asked the academics in Lithuania whether their interest lies primarily in teaching or research (see Fig. 8.3). The majority of respondents expressed interest in both but with some leaning towards teaching (35%) and some towards research (36%). Fewer respondents were primarily interested in teaching (13%) or research (16%). Altogether, the respondents are slightly more interested in research (52%) than in teaching (48%).

Finally, we studied how respondents perceive the teaching-research nexus in terms of research reinforcing teaching (see Fig. 8.4). For this purpose, we asked the academics whether they agree with the statement: 'Your research activities reinforce your teaching'. A vast majority of respondents (78%) agreed with this statement, and only a small number of respondents disagreed (8%). Fourteen percent of respondents gave a neutral answer. Thus, the majority of Lithuanian respondents

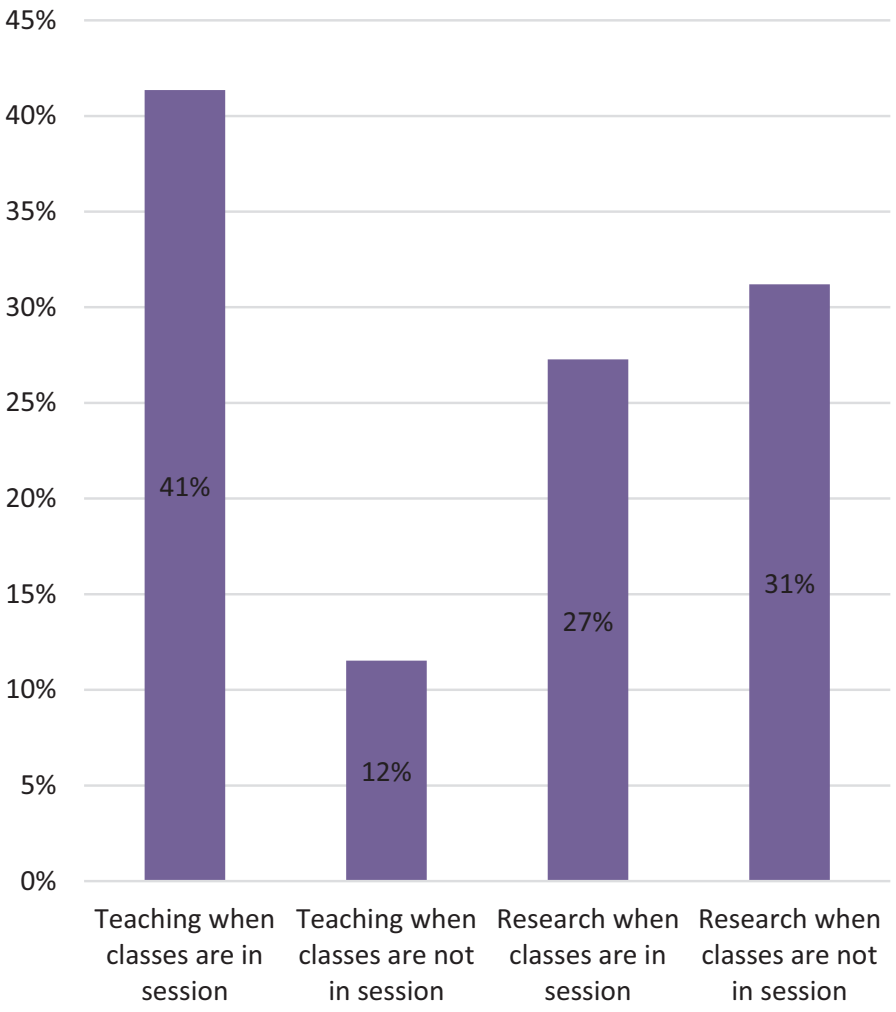

Fig. 8.1 Average time spent on teaching and research per week by Lithuanian respondents (%) (missing percentages spent on tasks other than teaching and research)

believe in a strong teaching-research nexus where research activities have a positive impact on teaching.

Overall, the Lithuanian APIKS study shows that respondents think their work division between teaching and research is balanced. Both activities seem to be very important for the surveyed academics in Lithuania. On average, the respondents are most engaged in teaching during the semester and most engaged in research in the teaching free period. However, there are substantial differences between individual respondents. Some respondents reported 0% for research and teaching activities during the teaching free period. This shows that the employment of Lithuanian

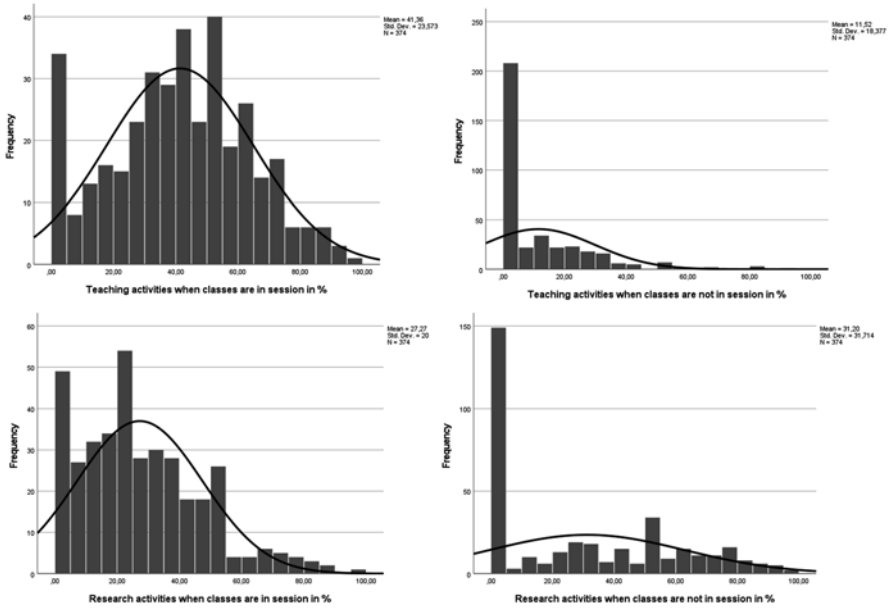

Fig. 8.2 Histograms of weekly time spent on teaching and research by Lithuanian respondents (%)

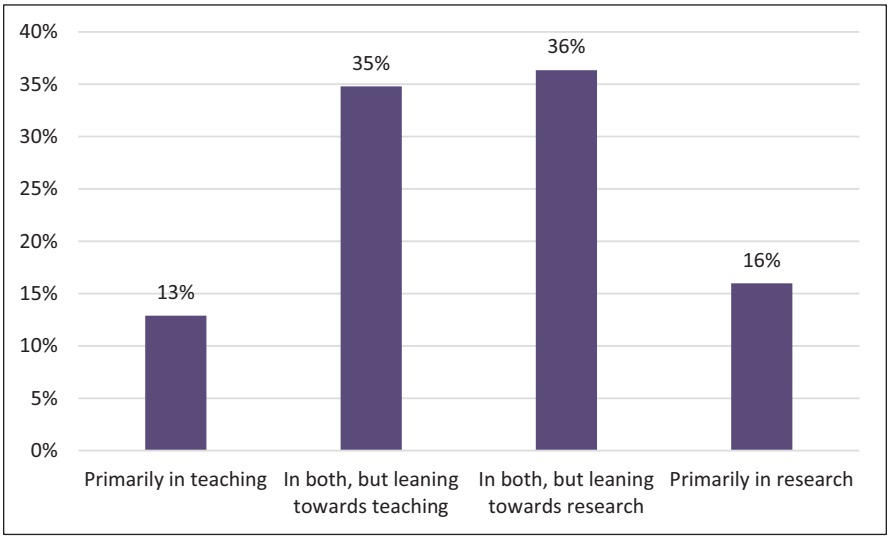

Fig. 8.3 Preferences for teaching and research among Lithuanian respondents (%)

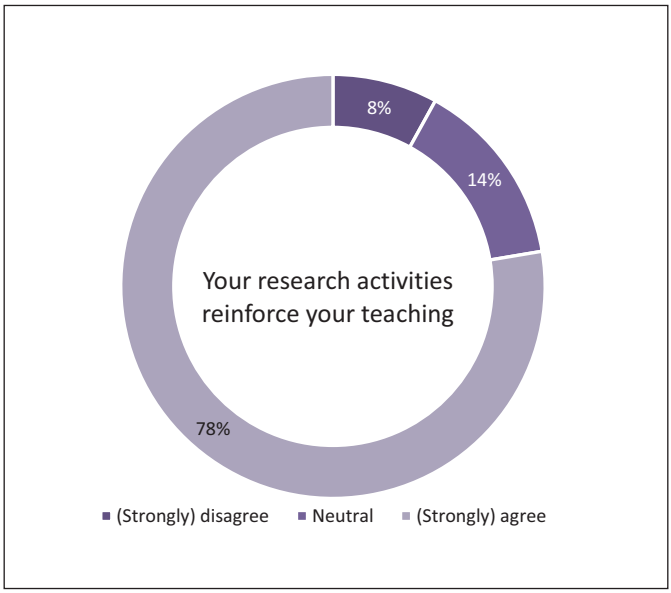

Fig. 8.4 Perceptions of teaching being reinforced by research among Lithuanian respondents (%)

academics is particularly precarious, especially among early career academics; they may be unemployed, or they may work outside academia in between the semesters.

The majority of Lithuanian respondents believe in a strong research-teaching nexus through positive reinforcement of their teaching through research. This also transpires in their interests leaning to both teaching and research. Only a small percentage of respondents are interested only in teaching or research. Thus, the Lithuanian respondents' perceptions about their activities and their beliefs are congruent and seem to be in line with the balanced teaching-research country profile, which is a significant shift from teaching-intensive Soviet higher education model.

Distribution of Teaching and Research in a Cross-Country Comparison

In order to answer the second research question, we compare the key findings from the Lithuanian case with the findings of responses from other European APIKS study countries.

Actually, the perception of the average time spent on teaching and research varies greatly across the six countries under study (see Fig. 8.5). Similar to Lithuanian respondents, academics in Croatia, Estonia, Portugal and Sweden seem to spend the largest share of their time on teaching when classes are in session and on research when classes are not in session. As the only exception, German respondents indicate

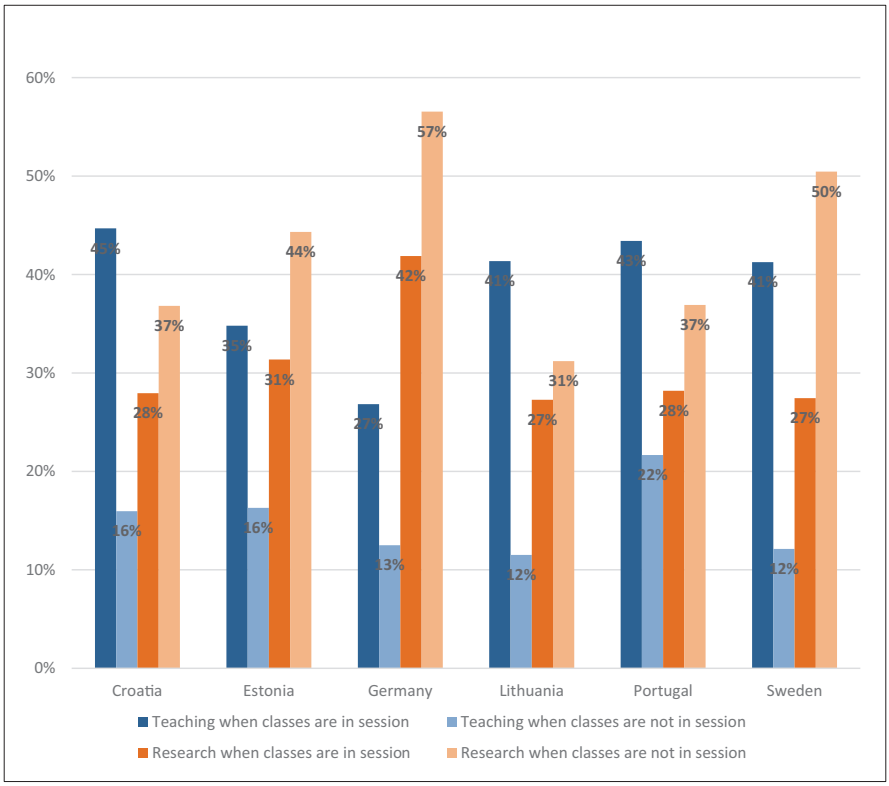

Fig. 8.5 Perceived average weekly time spent on teaching and research in cross-country comparison (%)

being engaged in research tasks in the majority of their time both when classes are in session and when classes are not in session.

Looking more closely at teaching activities, we note that academics in Sweden, similar to academics in Lithuania, spend 41% of their time on teaching when classes are in session and 12% when classes are not in session. In comparison, academics in Estonia (35%) and Germany (27%) spend less time on teaching and academics in Croatia (45%) and Portugal (43%) spend more time on teaching than Lithuanian respondent (41%) when classes are in session. When classes are not in session, respondents in Croatia (16%), Estonia (16%), Germany (13%) and Portugal (22%) spend more time on teaching than in Lithuania (12%). Thus, respondents from Lithuania are close to the average regarding their time spent on teaching when classes are in session, and they spend the least time on teaching when classes are not in session.

On aggregate, Lithuanian respondents seem to spend the least time on research compared to the other countries both when classes are in session and when classes are not in session: only Swedish respondents spend almost as little time as Lithuanian

respondents when classes are out of session (27%). German respondents, in contrast, seem to spend substantially more time on research. Actually, respondents in Lithuania spend 31% of their time on research when classes are not in session as compared to those in Croatia and Portugal who spend 37%, in Estonia 44%, in Sweden 50% and in Germany 57%.

Altogether, some countries stand out with a strong teaching profile, while others have a strong research profile. Academics in Croatia and Portugal spend the largest proportion of time on teaching. Lithuanian, Swedish and Estonian respondents are in the middle, while German respondents spend the least time on teaching. As regards time devoted to research, German respondents stand out, followed by Swedish and Estonian respondents. Academics in Croatia and Portugal spend far less time on research. Thus, teaching activities still dominate academic work at Lithuanian universities.

Table 8.2, presenting the ratio of teaching and research activities, indicates that teaching tasks dominate among academics in Croatia, Lithuania, Portugal and Sweden, when classes are in session, while the teaching-research ratio is more balanced and German academics tend to focus on research. When classes are not in session, academics in all countries work are more strongly involved in research than in teaching – notably in Sweden and Germany. Looking at the annual overview, we note that academics notably in Germany and also in Estonia are predominantly active in research, and those in Croatia, Lithuania and Sweden almost equally involved, while academics in Portugal are primarily active in teaching.

A comparison of academics' interests in teaching and research (see Fig. 8.6) indicates that, similar to Lithuania, academics of all other countries surveyed show a strong interest in both activities. Croatian responses stand out in this respect with 50% leaning towards research and 38% leaning towards teaching. A similar picture can be found in Portugal with 47% and 37% respectively, as well as in Lithuania, where 35% leaning towards teaching and 36% leaning towards research. Interestingly, Lithuania has the highest share of respondents (13%) whose interest primarily lies in teaching. In contrast, more than one in four respondents in Germany and Sweden are primarily interested in research. Estonia's academics are positioned in the middle of the ranking in this respect. Research interest prevails somewhat as well in Estonia: almost one fifth of the respondents stated an interest primarily in

Table 8.2 Ratio of teaching and research activities in cross-country comparison

	Teaching-research ratio when classes are in session	Teaching-research ratio when classes are not in session	Teaching-research ratio for the whole year
Croatia	1.6	0.4	1.1
Estonia	1.1	0.4	0.8
Germany	0.6	0.2	0.5
Lithuania	1.5	0.4	1.1
Portugal	1.5	0.6	1.2
Sweden	1.5	0.2	0.9

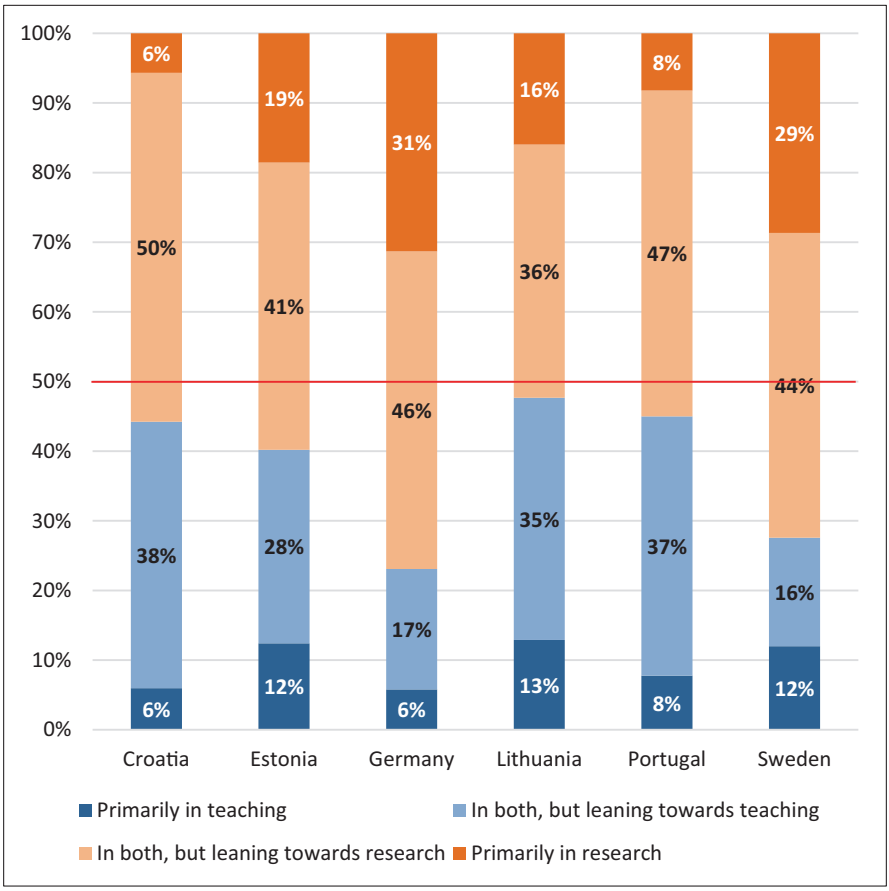

Fig. 8.6 Academics' preferences in teaching and research in cross-country comparison (%)

research. In Lithuania, responses are rather balanced with 16% expressing an interest primarily in research and 13% primarily in teaching.

We further examined the extent to which academics think that their research reinforces their teaching across the six countries (see Fig. 8.7). In Lithuania (78%), Portugal (80%) and Sweden (77%), a vast majority of respondents state that research reinforces their teaching. In Germany and Estonia, almost two thirds of respondents state that their research reinforces their teaching. In contrast, only half of all academics surveyed in Croatia perceive a boost of teaching activities due to their research activities; almost 30% gave a neutral answer, and 23% disagreed with this statement.

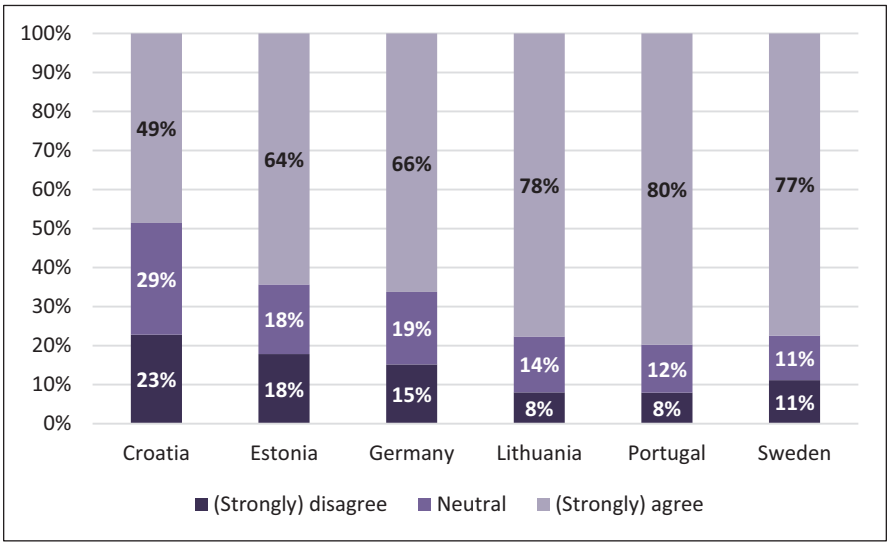

Fig. 8.7 Perceptions of research reinforcing teaching in cross-country comparison (%)

Gender and the Teaching-Research Nexus

Additionally, we investigate the effects of gender on the teaching-research nexus. Using an independent sample t-test, we compare the means of female and male academics' responses regarding their time spent on teaching and research (see Table 8.2). We find statistically significant differences between female and male academics in all six countries. Across all countries, data suggests that there are typical gender differences regarding time spent on teaching and research activities. Across the board female academics spend more time on teaching, and male academics spend more time on research, both in periods where classes are in session and periods where classes are not in session. Only for male academics in Croatia this correlation has not been found to be significant.

We also note that male academics are more likely to prefer to carry out research than their female counterparts. Finally, in analysing the perception how research reinforces teaching, we do not note any statistically significant differences: the response patterns are very similar for female and male academics. Thus, based on the t-test analyses, we conclude that the teaching-research nexus implies a gender bias in all countries as regards the allocation of time to teaching and research, but not as regards their preferences (Table 8.3).

Table 8.3 Independent sample t-test of academics' teaching-research nexus by gender in cross-country comparison

T-test for equality of means								
	Country	T	df	Sig. (2-tailed)	Mean difference	Std. error difference	95% confidence Interval of the difference	
							Lower	Upper
Teaching activities when classes are in session in %	*Croatia*	−3.667	1004.000	0.000	−4.772	1.301	−7.325	−2.219
	Estonia	−1.824	203	0.070	−4.840	2.654	−10.073	0.392
	Germany	−2.528	3599.955	0.012	−1.826	0.723	−3.243	−0.410
	Lithuania	−2.344	344.000	0.020	−5.928	2.529	−10.902	−0.954
	Portugal	−2.442	1274	0.015	−3.036	1.243	−5.475	−0.597
	Sweden	−1.951	586.334	0.052	−4.147	2.125	−8.321	0.027
Teaching activities when classes are not in session in %	*Croatia*	0.178	1004	0.858	0.207	1.158	−2.066	2.479
	Estonia	−1.570	184.000	0.118	−3.015	1.921	−6.804	0.774
	Germany	−3.711	3667.273	0.000	−1.964	0.529	−3.002	−0.926
	Lithuania	−1.575	344.000	0.116	−3.223	2.046	−7.246	0.801
	Portugal	−1.708	1274	0.088	−2.154	1.261	−4.628	0.320
	Sweden	−1.327	562	0.185	−1.761	1.326	−4.366	0.845
Research activities when classes are in session in %	*Croatia*	3.042	1004	0.002	3.237	1.064	1.149	5.325
	Estonia	0.943	203	0.347	2.362	2.505	−2.577	7.302
	Germany	3.347	3807.864	0.001	3.027	0.904	1.254	4.800
	Lithuania	4.011	249.949	0.000	9.012	2.247	4.587	13.437
	Portugal	1.530	1274	0.126	1.609	1.052	−0.455	3.673
	Sweden	2.515	759.000	0.012	4.659	1.852	1.023	8.296
Research activities when classes are not in session in %	*Croatia*	0.677	1004	0.498	1.240	1.831	−2.353	4.832
	Estonia	1.471	184	0.143	4.388	2.984	−1.499	10.275
	Germany	0.291	4769.000	0.771	0.269	0.925	−1.545	2.083
	Lithuania	1.963	264	0.051	6.947	3.539	−0.023	13.916
	Portugal	0.018	1274	0.985	0.028	1.543	−2.999	3.056
	Sweden	0.978	688.000	0.328	2.229	2.279	−2.246	6.704
Regarding your own preferences, do your interests lie primarily in teaching or research?	*Croatia*	1.739	1004	0.082	0.077	0.044	−0.010	0.164
	Estonia	2.159	776.061	0.031	0.142	0.066	0.013	0.271
	Germany	2.779	3807.631	0.005	0.069	0.025	0.020	0.119
	Lithuania	3.174	344	0.002	0.309	0.097	0.117	0.500
	Portugal	0.088	1267	0.930	0.004	0.042	−0.079	0.086
	Sweden	0.088	1267.000	0.930	0.004	0.042	−0.079	0.086
Your research activities reinforce your teaching	*Croatia*	−1.858	989	0.063	−0.151	0.081	−0.310	0.008
	Estonia	−0.629	669.000	0.530	−0.060	0.095	−0.247	0.127
	Germany	1.139	3143.206	0.255	0.042	0.037	−0.031	0.116
	Lithuania	−0.565	309	0.572	−0.068	0.120	−0.303	0.168
	Portugal	−0.115	1234	0.908	−0.007	0.057	−0.117	0.104
	Sweden	−0.115	1234.000	0.908	−0.007	0.057	−0.117	0.104

Academic Rank and the Teaching-Research Nexus

Finally, we examine the influence of academic rank on the teaching-research nexus of the academics. For this purpose, we use the t-test to compare the means of the studied perceptions regarding teaching-research nexus and activity distribution among junior and senior respondents (see Table 8.4).

We note substantial differences between the responses of junior and senior academics in the six countries studied. In Germany and Lithuania, junior academics spend more time on research than senior academics. In the other four countries – Croatia, Estonia, Portugal and Sweden – junior academics, in contrast, spend more time on teaching activities than senior academics. Interestingly, the involvement in research activities that may be crucial for career advancement varies between senior and junior academics according to on the academic calendar. When classes are in session, senior academics in Croatia, Estonia, Lithuania and Portugal are more often involved in research than junior academics. In contrast, junior academics in Germany and Sweden seem to be more frequently involved in research activities when classes are in session. When classes are not in session, the percentage of research activities was higher for senior respondents than for junior academics in Estonia. In the other five countries, junior academics spend more time on research when classes are not in session.

Senior and junior academics in all six countries are interested both in research and teaching activities. In Germany and Lithuania, senior academics show slightly more interest in research and junior academics slightly more interest in teaching. In contrast, junior academics in Croatia, Estonia, Portugal and Sweden are more interested in research than senior academics. Finally, we note that senior academics in all six countries more frequently perceive research activities reinforcing teaching. Altogether, rank matters as regards the teaching-research nexus in part similarly and in part differently between countries.

Discussion and Conclusion

The findings of the Lithuanian APIKS study have shown that both teaching and research are carried out in Lithuanian universities and that respondents perceive a strong link between research and teaching, thus a tight teaching-research nexus. In this regard, following Arimoto's (2014) categorisation, Lithuanian higher education system can be characterised as having a balanced teaching and research orientation, if one takes into account the division of time spent on both activities as well as the perceptions of teaching-research nexus. These findings show a clear departure from the decoupled nature of the teaching-research nexus that prevailed in this system historically, where universities focused largely on teaching, while research was carried out in the research institutes of the Academy of Sciences.

Table 8.4 Independent sample t-test of academics' teaching-research nexus by academic rank in cross-country comparison

T-test for equality of means								
	Country	T	df	Sig. (2-tailed)	Mean difference	Std. error difference	95% confidence interval of the difference	
							Lower	Upper
Teaching activities when classes are in session in %	*Croatia*	−4.190	914.040	0.000	−5.285	1.261	−7.760	−2.809
	Estonia	−3.839	204	0.000	−10.111	2.634	−15.305	−4.918
	Germany	18.919	1593.374	0.000	13.150	0.695	11.787	14.514
	Lithuania	2.996	80.945	0.004	11.188	3.735	3.758	18.619
	Portugal	−4.449	1508	0.000	−5.269	1.184	−7.592	−2.946
	Sweden	0.697	366.932	0.486	1.680	2.410	−3.060	6.420
Teaching activities when classes are not in session in %	*Croatia*	−0.636	1008	0.525	−0.744	1.170	−3.039	1.551
	Estonia	−3.216	106.801	0.002	−6.770	2.105	−10.944	−2.597
	Germany	5.042	1432.405	0.000	2.846	0.564	1.739	3.953
	Lithuania	2.659	162.227	0.009	4.670	1.756	1.202	8.138
	Portugal	−2.886	1508	0.004	−3.516	1.218	−5.906	−1.126
	Sweden	3.219	787	0.001	4.073	1.265	1.589	6.557
Research activities when classes are in session in %	*Croatia*	2.008	1008	0.045	2.165	1.078	0.049	4.280
	Estonia	1.139	204	0.256	2.906	2.550	−2.122	7.934
	Germany	−20.973	2165.216	0.000	−15.505	0.739	−16.955	−14.056
	Lithuania	0.077	80.494	0.939	0.252	3.273	−6.261	6.764
	Portugal	1.559	1508	0.119	1.541	0.988	−0.398	3.480
	Sweden	−3.903	322.069	0.000	−9.058	2.321	−13.624	−4.492
Research activities when classes are not in session in %	*Croatia*	−2.774	1008	0.006	−5.115	1.844	−8.733	−1.497
	Estonia	1.799	185	0.074	5.446	3.028	−0.527	11.419
	Germany	−11.507	1554.097	0.000	−10.889	0.946	−12.745	−9.032
	Lithuania	−2.524	372	0.012	−10.847	4.297	−19.296	−2.398
	Portugal	−0.081	1508	0.935	−0.121	1.480	−3.024	2.782
	Sweden	−4.616	429.536	0.000	−11.241	2.435	−16.028	−6.454
Regarding your own preferences, do your interests lie primarily in teaching or research?	*Croatia*	1.656	1008	0.098	0.074	0.045	−0.014	0.162
	Estonia	6.813	753.100	0.000	0.434	0.064	0.309	0.560
	Germany	−6.027	1563.292	0.000	−0.153	0.025	−0.203	−0.103
	Lithuania	−1.434	372	0.152	−0.178	0.124	−0.422	0.066
	Portugal	5.183	1497	0.000	0.206	0.040	0.128	0.284
	Sweden	2.319	1086.905	0.021	0.115	0.049	0.018	0.212
Your research activities reinforce your teaching	*Croatia*	0.751	993	0.453	0.061	0.082	−0.099	0.222
	Estonia	6.133	651.723	0.000	0.569	0.093	0.387	0.751
	Germany	19.227	1718.552	0.000	0.668	0.035	0.600	0.736
	Lithuania	2.100	336	0.036	0.336	0.160	0.021	0.650
	Portugal	4.464	1412	0.000	0.248	0.056	0.139	0.357
	Sweden	6.857	744.302	0.000	0.460	0.067	0.329	0.592

However, we get a more nuanced picture when looking at preferences regarding teaching and research orientation. The division of time between the two activities puts Lithuanian respondents alongside with Portuguese and Croatian respondents, who spend more time overall on teaching than on research when the classes are in session. Looking at the whole year, most teaching activities are carried out when classes are in session, while most research activities are carried out in periods where classes are not in session, as seen in responses from Croatia, Estonia, Portugal, Lithuania and Sweden. Here Germany is an exception, as respondents in this country strongly focus on research throughout the year. This study thus confirms earlier research findings showing German academics to be oriented largely towards research throughout the whole year; thus, Germany continues to be a country with a strong emphasis on research. These results, however, have to be handled with caution: in Germany, the proportion of junior academics – often employed on third-party funded, research-based contracts, and without teaching obligations – among all academics employed at university is exceptionally high.

This study has found female academics to spend significantly more time on teaching than male academics in all of the analysed countries – both during and periods when classes are in session and when classes are not in session. This finding is in line with the previous literature and has serious implications for the career prospects of female academics and gender equality in higher education (see, e.g. Leišytė & Hosch-Dayican, 2014a).

The findings of our study regarding the importance of academic rank for the perception of time spent on different activities and the importance of teaching-research nexus suggest that there is an aspiration of Lithuanian academics, particular at the senior career level, to be more research-oriented. Further, we observe that early carrier academics in Sweden and Germany are strongly involved in research when classes are in session; notably, the proportion of junior academics exclusively employed for research purposes is high in Germany. In contrast, junior academics of other countries do not have time for research during that period. This shows hierarchical asymmetries in Lithuania, Estonia, Croatia and Portugal, where senior academics are engaged in research also during the teaching-intensive periods.

Altogether, Lithuanian respondents spend slightly more time on teaching than on research on average all over the year. The proportion of academics being more interested in research and those more interested in teaching is almost the same, and most of them state that research reinforces teaching. Looking at all these findings together, we note that Lithuanian higher education system has moved close to a more or less balanced teaching-research nexus – similarly as Estonia, Croatia and Portugal. A clearly stronger research emphasis was found among German respondents and a somewhat stronger research emphasis among the Swedish respondents.

Small, peripheral post-Soviet systems like Lithuania, Estonia and Croatia seem to strive to be more research-oriented than they have been in the past, and they obviously made strides towards a more balanced teaching-research nexus following the Humboldtian ideal. The Napoleonic model-based system, Portugal, seems to spend more time for both teaching and research and to emphasise a strong research-teaching nexus; thus, it confirms its position as a balanced system (Shin &

Cummings, 2014). The German and Swedish systems are most research-oriented, as the previous comparative studies of academic profession already have shown (see Shin & Cummings, 2014). Altogether, the drift towards research has hold true across the board no matter which model the system is based on. This notwithstanding, this chapter suggests that in spite of a globally increasing research role, a tight teaching-research nexus seems to persist in many European higher education systems.

This chapter has shown that one has to look at historical developments as well as at the 'global nexus' (Neumann, 1992) in order to understand the changing teaching-research nexus. It is important to acknowledge both the path-dependence of academic activities stemming from higher education models prevalent in the past and to take into consideration the dynamics unfolding due to the pressures of competition and performance management. To understand the changes in 'global nexus', it is important to take into account not only the perceived division of time between different activities but also the preferences as well as imagined linkages between the two activities by academics, as this allows us to identify the nuances of the 'vulnerable linkage' between teaching and research (Teichler & Arimoto, 2014).

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Chapter 9
The Teaching-Research Nexus of the Academic Profession in Finland, Estonia and Sweden

Timo Aarrevaara, Pekka Vasari, and Ville Tenhunen

Abstract In this chapter, we discuss the teaching-research nexus in the higher education sectors in Estonia, Finland and Sweden. We analyse the extent to which the teaching-research nexus has changed in Finnish dual higher education system and, based on APIKS 2018 data, compare findings to the notions of the relationships of teaching-research nexus in Estonia and Sweden. We first look at how Finnish research and the teaching have changed between the CAP and APIKS surveys of 2008 and 2018, respectively. Second, we consider how the teaching-research nexus can be compared between these three countries. Estonia and Finland have binary higher education systems, and the Swedish university system has research universities and university colleges with an emphasis on teaching. Further, we outline the reasons why scholars moved into research. This phenomenon makes research- and teaching-focused higher education institutions convergent, and the chapter explores the change in teaching and research roles over time. The institutional and public expectations about the work in the academy are less focused on research as scholars' use of their time suggests. Although the roles of the higher education sectors are different, in higher education sectors respondents considered that research activities reinforce teaching.

Keywords Academic profession · Research · Teaching · Higher education · Estonia · Finland · Sweden

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F. Huang et al. (eds.), *Teaching and Research in the Knowledge-Based Society*, The Changing Academy – The Changing Academic Profession in International Comparative Perspective 23, https://doi.org/10.1007/978-3-031-04439-7_9

Introduction

In Estonia, Finland and Sweden, the Humboldtian system has contributed to the presence of teaching and research in all forms of higher education. This is followed by the feature that differences between universities and teaching-oriented higher education institutions are not always clear, because both can have a strong teaching focus and a strong research, development and innovation (RDI) focus. Teaching-oriented higher education institutions are the universities of applied sciences in Finland (ammattikorkeakoulu) and Estonia (kõrgkool), and in Sweden there are universities (universitet) and colleges (högskola) with different profiles in terms of basic research and teaching emphasis. The APIKS survey was conducted during the Estonian reform, and regulation has increased the autonomy of higher education institutions and harmonised quality criteria (Lundborg & Geschwind, 2021; Mägi et al., 2021).

Estonia, Finland and Sweden have a long common history in higher education. Estonia and Finland were part of the Swedish empire in the seventeenth century, and a higher education institution was established in various parts of the kingdom, such as the Universities of Lund and Uppsala in Sweden, Tartu in Estonia and Åbo in Finland. In the nineteenth century, the Nordic countries represented higher education systems in which the combination of teaching and research had been the starting point for universities since the mid-nineteenth century and combined into the Humboldtian university tradition as research, teaching and learning which emerged in Germany in the nineteenth century (Teichler et al., 2013). The German influence in the nineteenth century was obvious, as many Finnish university scholars had received their education in Germany and later in Sweden, which had been influenced by the 'Humboldtian' tradition defined elsewhere in this volume. A direct model was not adopted in Finland, but the 'Humboldtian' notion contributed to both teaching and research has long been a part of academic work in Finnish higher education.

Since the early 1990s, Finland's higher education has been provided to the 5.5 million Finns by a binary system of universities and labour market-focussed universities of applied sciences (Aarrevaara & Dobson, 2016). In Finnish higher education, there are 13 universities, 11 of which have independent corporations under public law and 2 are foundation-based universities under the Foundations Act (Universities Act 558/2009). The research profession in Finland totals about 80,000 people working in RDI, of which about 33% are employed by universities and universities of applied sciences, 57% in business and enterprises and about 8% in government departments or agencies.

In Estonia there are four types of higher education institution: six universities under public law, nine privately owned universities, five private professional higher education institutions and eight state professional higher education institutions. For this reason, Estonia has a dual higher education system, and this makes it possible to compare Estonian and Swedish APIKS results with those from Finland. A private higher education system in Estonia is not included in this data set. Sweden does not

have a binary model of higher education, but it has a university system with research universities and university colleges emphasising the teaching function. Universities of applied sciences in Estonia and Finland and university colleges in Sweden have played a significant role in the realisation of student massification in higher education in the last few decades.

As a relatively small country with 1.33 million inhabitants, the role of higher education in the economic development of Estonia is crucial. More than half (55%) of RDI personnel work in higher education, about 40% in business and enterprises and about 4% in government departments or agencies.

In Sweden with its population of 10.4 million inhabitants, there are 4 types of higher education institution. Universities are equivalent to the research universities in Estonia and Finland, whereas the role of the university colleges is equivalent to that of the universities of applied sciences, with a major teaching orientation. They have only a limited opportunity to award doctoral degrees. In addition, this category includes universities of fine arts, applied arts and performing arts. Like Finland and Estonia, in the 1980s, university colleges were higher vocational institutions, which became universities in the 1990s and the early 2000s as a result of academic drift. In Finland the universities of applied sciences were founded from upper vocational teaching institutions in the early 1990s, and the first permanent licenses were based on OECD review (1995), institutional evaluations and government decisions. There are 15 public universities in Sweden, 17 public university colleges and 7 private universities and university colleges owned by foundations and associations.

Sweden is different in this respect, with 21% of RDI personnel working in higher education but 73% in business and enterprises and about 5% in government departments and agencies (OECD, 2020). From this perspective, the role of higher education in these countries' innovation systems is strongest in Estonia and significant in Finland. The lower figure in Sweden is explained by the research funding system, which favours co-operation between actors in different sectors.

To define the analysis for this chapter, we discuss how higher education systems in Finland, Sweden and Estonia are classified in the literature. Whitley (2007) has classified research in different countries based on their evaluation systems. Strong research evaluation systems emphasise the importance of institutions such as universities and research institutes with well-established standards, evaluation systems and rankings. In established systems, research is an integral part of teaching assignments. Weaker research evaluation systems, on the other hand, are financial instrument-focused. The number of criteria set in advance in them, such as research programmes, is often small, and there is limited documentation about decision-making, so the government control is low.

These three countries are also united by the fact that in all these systems, the teaching-research nexus is based on the integration of teaching and knowledge production. In research universities, this means research-based teaching and the incorporation of teaching in universities of applied sciences or university colleges in RDI functions. The teaching and research functions in Estonia, Finland and Sweden are defined by regulations and higher education institutions' decisions regarding the freedom of extensive teaching and research (Geschwind et al., 2019b). For example,

the teaching in Finland is basically open for the public to attend and to follow. In practice, the relationship between teaching and research determines the profession: in the universities of applied sciences, teaching competence is crucial to the selection of teaching positions, and research competence cannot displace the kudos attributed to teaching and practices in the workforce. In universities, a research focus dominates, but teaching does not ignore the research experience of academic staff. Thus, the role of teaching and research in the two higher education sectors creates unnecessary stability in the system. This is reflected in the low mobility between higher education systems. In all these reference countries, there are also research projects, research-focused research assignments, university research professors and RDI staff at universities of applied sciences who have no formal teaching achievements at all. Thus, the two higher education sectors have tasks with no teaching-research nexus. However, the majority of academic staff has the nexus of teaching and research.

In Finland, the university of applied sciences reform since 2013 separated them from their previous municipal ownership and transformed them into limited companies. At the same time, the research role of universities of applied sciences was strengthened in legislation. Universities of applied sciences have a different status in that they are either independent, a few of them are allied with universities, and some universities of applied sciences are allied with universities of applied sciences consortiums. In addition to regulation, performance of core functions in both higher education sectors in Finland is also determined by the performance funding agreements between the Ministry of Education and Culture and the higher education institutions, which are based on the funding formula to enhance higher education institutions' opportunity to reach their performance goals in core functions (Jongbloed et al., 2020). They define the effectiveness of teaching and research in a way that determines the effectiveness of staff in their core tasks. Higher education institutions have various internal allocation models, ranging from working conditions and human resource practices. These guide the scholarly activities on which academics spend their working hours (Diogo, 2020).

An additional peculiarity in Finland is the high proportion of fixed-term employment relationships, and this is reflected in the analysis of the results. This is a key factor in determining research and teaching, as early-career workers are mainly employed under fixed-term contracts. In Finnish and Estonian universities, academic careers are based on a four-tier career system, whereas in Sweden, there are five career stages because doctoral students are in a separate category from early-stage researchers and teachers. In Finnish universities, the first two stages require a strong research orientation to gain academic tenure. It is for this reason that young researchers in Finland are more research-oriented than are their senior scholar colleagues. In universities of applied sciences, the experience gained in teaching and in the work force is important in career trajectories.

Thus, the higher education institutions in all three countries can have a strong either theoretical or practical emphasis on education (de Weert & Kaap, 2014). The

common features of the higher education system of these three countries make it possible to compare between the teaching and research nexus variables in the APIKS data. In these three countries, there are similar factors related to the system, but the structure of higher education systems is different. Therefore, it is justified to compare the expectations about research and teaching positions in the academy, the importance of research for teaching and the importance of research to careers in the academy.

All three reference countries in this chapter have demographic factors that guide the development of higher education. In these countries, workforce age groups are shrinking, and maintaining an extensive network of universities requires internationalisation or a substantial transition to the digitalisation of learning platforms (Beerkens, 2021). Higher education is global, but the ability of relatively small countries to succeed with international emphasis is not self-evident. Until now, Sweden and Finland have emphasised the internationalisation of higher education institutions in their funding models. In Estonia, internationalisation plays a key role as a performance indicator of higher education institutions, but it also has a strong attachment to the country's industry.

In the 2008 Changing Academic Profession (CAP) survey, Finland was found to be one of those countries that underscored the teaching-research nexus (Teichler et al., 2013). These three countries form a whole in which the results of APIKS can be compared. Based on this comparison, we draw conclusions as to whether the trends observed in Finland can also be verified in the higher education systems of Estonia and Sweden. In Estonia, Finland and Sweden, there have been simultaneous higher education and research system reforms in the twenty-first century that have affected the importance of teaching and research in higher education. All these reference countries are part of the European Higher Education Area and the European Research Area. Their universities play a significant role in European Union research and programme funding, and they also play a significant role in the national research systems. In Sweden, there has been a regulation since 2008 that has secured the growth of funding for university research and teaching (Lundborg & Geschwind, 2021; Pinheiro et al., 2019).

We examine developments in two higher education systems – universities and university colleges or universities of applied sciences – and the teaching-research nexus is discussed according to the themes of professional identity and professional autonomy. In this chapter, we analyse the extent to which the teaching-research nexus has changed in Finland both at universities and at universities of applied sciences from 2008, when the Changing Academic Profession (CAP) survey was conducted, to 2018 of APIKS survey. We compare the 2018 findings in Finland to the notions of the relationships between teaching and research reported by academics at universities and at more strongly teaching-oriented institutions in Estonia and Sweden. We also examine the expectations of academic work in three reference countries and different institutions.

Data and Methods

The data for this chapter is twofold. First, we examined the change of the teaching-research nexus in Finland and also compared the 2008 CAP survey and the 2018 APIKS survey. Then, we analysed Finland's 2018 APIKS data compared to the other two reference countries, Estonia and Sweden. Finland has extensive co-operation with these countries, and Finnish students and academics commute between Finland and Estonia and Sweden more than the student traffic between other countries.

The population defined are members of staff in research, teaching and RDI, including PhD students employed by higher education institutions. Participants in the sample from all Finnish universities and universities of applied sciences were selected using stratified sampling with simple random sampling without replacement (Table 9.1).

All the cases classified as 'missing' have been checked, and most of them could be left in the data, meaning a small reduction in the number of 'missing cases'. Partial completion has a number 'No answers' between [32, 99], and the rest are 'missing cases'. The realised sample of the respondents corresponds well to the population from which survey was taken. Respondents' characteristics are presented in Table 9.2, based on respondents' institutions, gender and academic rank (senior/junior).

The research data are based on an incomplete and ineffective random sample. This is because random sampling was not implemented with identical methods in all three countries and higher education sectors. Despite this, statistical inference and statistics is are used. Mainly Pearson chi-square ($\chi 2$) test and the corresponding effect size measure Cramer's *V* were carried out. These statistics make it possible to compare the strength of association in contingency tables with different sizes (number of rows or columns or number of observations). When Cramer's *V* is interpreted, it is important to note the number of rows and columns, the minimum of which (=

Table 9.1 Main characteristics of the Finnish APIKS data of survey carried out in 2018

	Universities	Universities of applied sciences
Number of institutions involved (total)	10 (13)	23 (23)
Population	15,382	6225
Sample size	5606	3402
Respondents	765	612
Response rate (AAPOR RR4)	13.6%	18.0%
Complete questionnaires – N	765	523
Complete questionnaires – %	12.2%	15.4%
Partially completed questionnaires	1.2%	2.3%
Complicated respondents	0.3%	0.3%
		APIKS 2018

Source: APIKS-IDB

Table 9.2 Characteristics of APIKS survey respondents in Estonia, Finland and Sweden

	Estonia	Finland	Sweden
Institutions			
Universities	785	765	1954
Other	76	612	454
Total	861	1377	2408
Gender			
Male	**399**	621	1307
Female	460	719	1066
Other or not available	2	37	35
Total	861	1377	2408
Academic rank			
Senior	394	287	1555
Junior	467	1081	848
Not available	0	9	5
Total	861	1377	2408

Source: APIKS-IDB

k) is crucial. Effect size limits (0.1 = small, 0.3 = medium or typical, 0.5 = large) must be multiplied by $1/\sqrt{(k-1)}$. All the test and effect size results have been interpreted with caution.

Development of Research and Teaching in Finnish Higher Education

The results of the Finnish APIKS survey provide a strong perspective of academic work in teaching and research when compared with the Finnish results from the 2008 Changing Academic Profession (CAP) survey. As in the CAP survey, basic research and curiosity-driven research still exist in all disciplines, but research in the 2010s was more often assessed by performance management indicators. In the 2010s, research topics came to be influenced by research programmes such as government strategic funding instruments, and the national innovation agency has had a stronger role in determination of the research agenda (Aarrevaara & Pietiläinen, 2021). Reporting research results is also becoming more results-driven, and the effectiveness of higher education institutions is possessed by a national publication forum.

There is a clear difference between the strong research interest of university academics and strong teaching emphasis of academics in the universities of applied sciences. There was only a marginal increase in research emphasis in both groups of academics in both Finnish higher education systems from the CAP (2008) to the APIKS (2018) surveys. It seems that junior academics at universities have more or less the same interest in research, while senior academics at universities of applied

Table 9.3 Preference for teaching or research by higher education sector and seniority in Finland

	CAP 2008			APIKS 2018		
	UNI	UAS	TOTAL	UNI	UAS	Total
Primarily teaching	73	127	200	42	. 252	294
Both-teaching emphasis (N)	163	130	293	100	202	302
Teaching emphasis (N)	236	257	493	142	454	596
Teaching emphasis %	22	79	35	19	75	44
Both-research emphasis (N)	489	53	542	339	90	429
Primarily research (N)	374	17	391	280	64	344
Research emphasis (N)	863	70	933	619	154	773
Research emphasis%	79	21	65	81	25	56
Total	1099	327	1426	761	608	1369
Seniority						
Teaching emphasis						
Senior %	19	61	28	15	60	35
Junior %	22	85	36	20	79	46
Research emphasis						
Senior %	81	39	72	85	40	65
Junior %	78	15	64	80	21	54

Source: CAP (2010) and APIKS-IDB

sciences are clearly more research-oriented than junior academics. In both respects, there was little change between CAP and APIKS. Table 9.3 clearly indicates the difference between the two higher education sectors in Finland, with a strong emphasis on research in universities and a smaller proportion with a strong emphasis on teaching. Significant numbers of fixed-term employee are employed in teaching positions in both sectors. In higher education, teaching covers a large proportion of work tasks, so it is natural that the focus is on teaching for fixed-term employees. In addition, a significant number of scholarship researchers in universities do not have an employment relationship with the university at all and, therefore, were not included in the APIKS sample. This type of weak affiliation in universities is also typical in other European countries like Poland, Germany and Switzerland (Fumasoli & Goastellec, 2015). The number of fixed-term research posts in Finnish Universities is higher than permanent research posts, and this is particularly affected by the large number of full-time doctoral students in the first career step. This is because academics' first entry assignments are mainly research-based, and they do not necessarily involve teaching at all. This is a curiosity in that those in senior positions at Finnish universities teach more than those who work in junior positions.

The situation was shown to be similar in the CAP study (Aarrevaara et al., 2013). These early-career scholars belong globally to the 'path-taker generation', which is characterised by possession of a PhD, short-term contracts linked to funded projects and institutional moves more often than experienced by previous generations and a pragmatic look at academic outputs such as publications in exclusive scholarly journals (Macfarlane & Burg, 2019).

As indicated in Table 9.3, in universities of applied sciences, the emphasis on teaching is strong, and the emphasis on research only is weaker. Comparing the APIKS results with the CAP 2008 survey, the teaching emphasis in universities has decreased from substantial, and correspondingly research emphasis (70%) has increased over the ten intervening years. This is because entry into the field is strongly regulated by research orientation and more academics are in fixed-term research-focused junior posts, and their number has increased in universities. In Finnish universities of applied sciences, the teaching emphasis in 2008 was higher than in the APIKS study in 2018. Correspondingly, the research emphasis was lower than in the CAP rather than in the APIKS study (Aarrevaara et al., 2013). The results indicate that the academic work of the two higher education systems is gradually drawing closer to each other. On the other hand, teaching assignments apply to both junior and senior scholars, but the emphasis on teaching is slightly stronger for those in universities of applied sciences with fixed-term posts. This ratio has grown between 2008 and 2018 (sources CAP (2010) and APIKS-IDB (2020)). The respondents were asked if their interest, regarding their own preference, lie primarily in teaching, in both but leaning towards teaching or towards research or primarily on research.

As Table 9.4 shows, the use of time by respondents at Finnish universities indicates the difference between classes in sessions (semesters) and not in session (beyond). When classes are in session, university academics with permanent posts spend 18.5 h per week teaching, but academics with fixed-term contracts spend only half that time. This is because many academics in the first two levels of the career system work on projects or are hired as doctoral students. Their duties usually

Table 9.4 The weekly hours spent in Finnish universities when classes are in session and not in session. Respondents according to status of employment

	In session		Not in session	
Activity	Permanent	Fixed-term	Permanent	Fixed-term
Teaching (preparation of instructional materials and lesson plans, classroom instruction, advising students, reading and evaluating student work)	18.5	9.2	6.9	2.7
Research (reading literature, writing, conducting experiments, fieldwork)	12.1	23.9	19.8	28.6
Externally oriented activities (services to clients and/or patients, unpaid consulting, public or voluntary services)	2.0	1.6	2.3	1.8
Applying for research funding	2.6	2.5	3.7	2.9
Administration and services within academia (committee work, paperwork, activities in academic associations, reviews etc.)	6.9	2.6	6.6	2.6
Other academic activities (professional activities not clearly attributable to any of the categories above)	1.8	1.4	2.1	1.7
Total	44.0	41.3	41.4	40.4

Sources: CAP (2010) and APIKS-IDB

comprise about 5% of teaching, which leads to a reduction in the number of teaching hours for fixed-term and junior positions.

The results in Table 9.4 thus indicate the situation recognised in the Finnish CAP reporting: seniors working in permanent positions in Finnish universities teach more than those working in fixed-term research positions (Aarrevaara et al., 2013). When classes are not in session, the situation is the same even though the number of teaching hours is slightly lower. However, it seems that in the ten years between CAP and APIKS, the results have not changed significantly in this respect. The significance of Table 9.4 is that the results indicate the permanence of the approach to teaching. Academics in fixed-term contracts work on research duties for more than half of their working time during sessions, and those with fixed-term contracts work on research more than two-thirds of their working time when classes are not in session.

The official length of the working week in Finnish universities is 37.5 h, but most scholars clearly exceed this. There was a separate question in the Finnish survey about applying for research funding being added to the research work, which increases to more than 30 h per week for those with fixed-term contracts when classes are not in session.

Table 9.5 indicates that the proportion of those who are emphasising teaching or research for ten or fewer hours is significant in universities when classes are in session. The large number of respondents is because these are mainly research-oriented and junior-based, whose work involves teaching about 5% of the total working hours. In universities of applied sciences, the amount of teaching when classes are in session is higher than in universities, and the amount of teaching has increased in the period 2008–2017 when classes are in session.

The number of respondents from universities that teach 1–10 h per week has increased significantly (from 30.6% to 39.5%), as the number of those teaching 21–30 h has decreased. This is because the number of early-career scholars has increased between the two surveys on the academic profession, and the number of those seniors who teach less has not increased. The number of scholars teaching 11–20 h in universities of applied sciences has decreased, and the number of scholars teaching 21–30 h has increased (Aarrevaara et al., 2013).

In terms of research, it seems that in universities of applied sciences, the number of scholars working on research for more than 10 h a week has increased over the decade between surveys. This has also taken place in the higher education institutions, which indicates two phenomena. First, it is precisely in terms of research that the higher education sectors have converged. On the other hand, research has become one of the basic tasks since the new regulation of universities of applied sciences in 2014, which explains the increased amount of research work.

Research and education-focused orientation can implement equally dedicated career tracks depending on role descriptions and criteria that create institution-specific type of higher education institution (Smith & Walker, 2021). However, the

Table 9.5 Hours spent on teaching and research activities, when classes are and are not in session in Finnish higher education institutions

	CAP 2008		APIKS 2018	
	UNI (%)	UAS (%)	UNI (%)	UAS (%)
Classes in session				
Teaching				
0 h	18.9	5.7	18.3	8.0
1–10 h	30.6	12.5	39.5	12.4
11–20 h	23.2	28.7	22.1	23.9
21–30 h	16.9	23.6	13.8	26.3
>30 h	10.3	29.4	6.3	29.4
	100	100	100	100
Research				
0 h	7.6	30.7	5.1	37.1
1–10 h	33.4	57.4	29.8	48.4
11–20 h	20.9	7.8	21.2	9.2
21–30 h	14.4	2.7	20.5	3.1
>30 h	23.8	1.4	23.4	2.1
	100	100	100	100
Classes not in session				
Teaching				
0 h	32.8	24	41.2	24.1
1–10 h	53.9	50.9	50.9	43.0
11–20 h	10.5	15.4	5.7	17.6
21–30 h	2.0	5.7	1.4	6.7
>30 h	0.9	4	0.9	8.5
	100	100	100	100
Research				
0 h	4.3	29.5	3.6	34.1
1–10 h	14.2	44.7	12.1	46.5
11–20 h	20.3	16.3	20.8	9.3
21–30 h	23	4.7	28.6	6.7
>30 h	38.2	4.7	34.9	3.3
	100	100	100	100

Sources: CAP (2010) and APIKS-IDB

number of senior respondents from universities of applied sciences has been increased by the proportion of those working in research, development and innovation. From Table 9.3, it is possible to conclude that entry tasks for academics working in universities are primarily research-based, and in universities of applied sciences, they are primarily teaching-based.

Comparing Teaching and Research in Three Reference Countries

When comparing Finland's teaching and research nexus with that of Estonia and Sweden, the differences in the characteristics of these systems are clearly visible. The following is a comparison of the variables describing the three reference countries teaching research nexus based on the APIKS survey 2018.

Table 9.6 shows that most scholars at universities in all three countries are convinced that their research activities reinforce their teaching, and the responses look similar (Cramer's *V* is only 0.11). However, more respondents from Estonia (17.8%) disagree, i.e. called into question such a link between research and teaching, than those from Sweden (11.1%) and Finland (9.7%).

Table 9.7 shows that a lower proportion of academics at universities of applied sciences and other more teaching-oriented institutions consider research activities as reinforcing teaching, as one could expect. However, the responses vary substantially by country. $\chi 2$ 106.25 is largely (52%) based on Finnish (only 17.3%) and Swedish (44.7%) respondents with strongly agree (5) answers. Actually, 37.2% of Finnish respondents did not perceive such a reinforcement (categories 1 and 2). The respective rate is lower for Sweden (27.7%), but there is still a clear difference between scholars at university colleges and scholars at universities. In contrast, Estonian scholars at universities of applied sciences found such a reinforcement (18.6%) in Estonian universities.

As shown in Table 9.8, the proportion of those who are primarily in teaching in Estonia is lower than in Finland and Sweden. This is due to the lower proportion of respondents in universities of applied sciences than in the other two countries. On the other hand, in Sweden the large proportion of research emphasis can be explained by the opportunities for research funding, the volume of which is higher than in Finland or Estonia. The formation of a research funding mechanism is favourably influenced by the fact that the development of Swedish research funding has been index-linked since 2008 (Lundborg & Geschwind, 2021).

Table 9.6 Perceived reinforcement of teaching by research activities – scholars at universities in Estonia, Finland and Sweden

	Estonia		Finland		Sweden		In all	
Research activities reinforce teaching	N	%	N	%	N	%	N	%
1 Strongly disagree	39	5.8	21	3.7	100	5.8	160	5.4
2	81	12.0	34	6.0	91	5.3	206	7.0
3	120	17.8	94	16.6	196	11.3	410	13.9
4	177	26.3	185	32.6	495	28.9	857	29.0
5 Strongly agree	256	38.0	233	41.1	832	48.5	1321	44.7
Total	673		567		1714		2954	

Source: APIKS-IDB
Note: $\chi 2$ (8) = 72.29, $p < 0.001$, Cramer's $V = 0.11$

Table 9.7 Respondents from universities of applied sciences (Estonia and Finland) and university colleges (Sweden) with the statement that research activities reinforce their teaching

	Estonia		Finland		Sweden		Total	
Research activities reinforce teaching	N	%	N	%	N	%	N	%
1 Strongly disagree	3	4.3	124	25.2	44	10.9	171	17.7
2	10	14.3	59	12.0	23	5.7	92	9.5
3	18	25.7	113	23.0	69	17.0	200	20.7
4	13	18.6	111	22.6	88	21.7	212	21.9
5 Strongly agree	26	37.1	85	17.3	181	44.7	292	30.2
Total	70		492		405		967	100

Source: APIKS-IDB
Note: $\chi 2\ (8) = 106.25\ p < 0.001$, Cramer's $V = 0.23$

Table 9.8 Respondents' preferences 'in teaching' and 'in research' in Estonia, Finland and Sweden

	Estonia		Finland		Sweden		Total	
Universities	N	%	N	%	N	%	N	%
Primarily 'in teaching'	97	12.4	42	5.5	231	12.0	370	10.7
In both, but leaning towards teaching	217	27.8	100	13.1	300	15.6	617	17.8
In both, but leaning towards research	322	41.2	339	44.5	843	43.8	1505	43.4
Primarily 'in research'	145	18.6	280	36.8	552	27.8	977	28.2
Total	781	100.0	761	100.0	1926	100.0	3469	100.0

$\chi 2\ (6) = 134.27$, $p < 0.001$, Cramer's $V = 0.12$

UAS/university college	Estonia		Finland		Sweden		Total	
	N	%	N	%	N	%	N	%
Primarily 'in teaching'	18	23.7	251	41.4	118	26.3	387	34.2
In both, but leaning towards teaching	38	50.0	202	33.3	95	21.2	335	29.6
In both, but leaning towards research	19	25.0	90	14.8	158	35.3	267	23.6
Primarily 'in research'	1	1.3	64	10.5	77	17.2	142	12.6
Total	76	100.0	607	100.0	448	100.0	1131	100.0

$\chi 2\ (6) = 106.67$, $p < 0.001$, Cramer's $V = 0.22$

All higher education institutions	Estonia		Finland		Sweden		Total	
	N	%	N	%	N	%	N	%
Primarily 'in teaching'	115	13.4	293	21.4	349	14.7	757	16.5
In both, but leaning towards teaching	255	29.8	302	22.1	395	16.6	952	20.7
In both, but leaning towards research	341	39.8	429	31.4	1001	42.2	1771	38.5
Primarily 'in research'	146	17.0	344	25.1	629	26.5	1119	24.3
	857	100.0	1368	100.0	2374	100.0	4599	100.0

Source: APIKS-IDB
Note: $\chi 2\ (6) = 129.70$, $p < 0.001$, Cramer's $V = 0.14$

Overall, a research emphasis is stronger among scholars at universities and a teaching emphasis at other institutions of higher education in all three countries. However, Table 9.8 presents two surprising results. First, among scholars at universities, the proportion of those stating a preference for teaching is remarkably high in Estonia (40.2%) as compared to Sweden (27.6%) and Finland (18.6%). Second, in turn, the research emphasis is strong among scholars at institutions with a dominant teaching function in Sweden (52.5%) as compared to Estonia (26.3%) and Finland (25.3%).

In Table 9.8, Finland has the largest proportion of respondents from universities that primarily chose the 'in research' option as the primary content of their work. In Estonia, the lower number of those who focus primarily on research can be explained by the clearly higher number of respondents primarily 'in teaching' at universities in Finland and Sweden. In contrast, at universities of applied sciences, the number of respondents choosing primarily 'in teaching' is the same in Finland and Estonia. Table 9.8 clearly indicates that Sweden differs from the other reference countries. The emphasis seems to be on research (68.7%), while in Finland it is in teaching (43.5%) and in Estonia leaning towards teaching (29.8%) and primarily in research (only 17.0%), which is much less than in the other countries. In the Swedish university colleges, regarding 'primarily in teaching' the proportion of respondents is clearly lower than in the other reference countries. The Swedish university colleges have a strong emphasis on research (50.5%) compared to universities of applied sciences in Estonia (26.3%) and Finland (25.3%). When universities are compared, Finland is significantly different from the others. In Finnish universities, 81.3% of the respondents answered that their emphasis is on research. In this respect, Finnish universities differ notably from Estonian (59.8%) and Swedish (72.5%) universities.

Differences in Table 9.8 are significant, and the effect size is medium (Cramer's $V = 0.22$). This is explained by the fact that the number of academics emphasising research tasks at the Swedish Colleges is almost as high as it is at Estonian universities. The test for teaching research orientation is looking at how much time is actually spent on activities. Here, the review focuses on all three countries, and the results show how action is being taken in the fields of higher education. The data from three reference countries support the observation that research supports the implementation of teaching tasks, but scholarship of teaching and learning may not produce innovative lines of research (Tight, 2019).

When looking at the results by country in Table 9.9, it is reasonable to take the higher education institutions' perspective to the expectations of academics. In this regard, the respondents were asked what the regular expectations that guide the content of the work are. In Estonia, it is typical to monitor the number of hours teachers spend on lectures and the amount of student participation in lectures. In Finland and Sweden, control is low, which is mainly because higher education institutions emphasise measuring results. Controlling individual indicators then is not in the preference of institutional level.

Table 9.9 The expectations respondents consider themselves to be exposed to their higher education institution in Estonia, Finland and Sweden (1 = yes, 2 = no)

Regulatory expectation	Estonia	Finland	Sweden	Total	χ2 and Cramer's *V*
Number of hours in the classroom	544 72.9% *N* = 746	518 47.9% *N* = 1081	937 42.1% *N* = 2224	2317 49.3% *N* = 4051	χ2 (2) = 213.09, *p* < 001, Cramer's *V* = 0.23
Number of students in classes	242 32.4% *N* = 746	275 25.4% *N* = 1081	498 22.4% *N* = 2224	1207 25.1% *N* = 4051	χ2 (2) = 30.15, p < 0.001, Cramer's *V* = 0.09
Number of second-degree students for supervision	170 22.8% *N* = 746	312 28.9% *N* = 1081	331 14.9% *N* = 2224	949 20.1% *N* = 4051	χ2 (2) = 92.83, p < 0.001, Cramer's *V* = 0.15
Number of doctoral students for supervision	111 14.9% *N* = 746	140 13.0% *N* = 1081	276 12.4% *N* = 2224	892 13.0% *N* = 4051	χ2 (2) = 3.01, p = 0.222, Cramer's *V* = 0.03
Time for student consultation (face to face or virtual hours)	164 22.0% *N* = 746	308 28.5% *N* = 1081	204 9.2% *N* = 2224	413 16.7% *N* = 4051	χ2 (2) = 213.74, *p* < 0.001, Cramer's *V* = 0.23
Days to be present at the institution	49 6.6% *N* = 746	124 11.5% *N* = 1081	139 6.3% *N* = 2224	413 7.7% *N* = 4051	χ2 (2) = 29.55, p < 0.001, Cramer's *V* = 0.09
Other, please specify	46 6.2% *N* = 746	118 10.9% *N* = 1081	213 9.6% *N* = 2224	392 9.3% *N* = 4051	χ2 (2) = 12.23, p = 0.002, Cramer's *V* = 0.05

Source: APIKS-IDB

Table 9.10 Respondents' views on raising external funding for their institute in Estonia, Finland and Sweden (1 = not at all, 5 = to a very high extent)

Raising substantial amount of external funds	Estonia		Finland		Sweden		Total	
	N	%	N	%	N	%	N	%
Not at all	70	10	84	9.2	143	7.1	279	8.2
2	66	9.4	98	10.8	166	8.3	330	9.1
3	93	13.3	159	17.5	311	15.5	563	15.5
4	166	23.7	267	29.3	453	22.5	886	24.5
Very much	306	43.7	302	33.2	939	46.7	1547	42.7
Total N	701		910		2012		3623	

Source: APIKS-IDB
Note: χ2 (8) = 54.83, *p* < 0.001, Cramer's *V* = 0.09

Tables 9.9 and 9.10 describe teaching (Table 9.9) and research (Table 9.10). Their task is to show how the functions of teaching and research determine how time is spent in academic work for these functions.

In the case of the responses to institutional expectations regarding the number of hours in the classroom, 42.1% of the Swedish respondents say that they have 'regulatory expectations', while among Estonians it is as much as 72.9%. Second, there are significant differences in the variable 'Time for student consultation'. In total, 16.7% of respondents express expectations, 28.5% of Finnish respondents and only 9.9% of Swedish respondents (22.0% of Estonian respondents). Third, the most

significant differences are in the variable number of second-degree students (master's students) for supervision. In this case, too, Swedish respondents differ from the other two reference countries, with only 14.9% of them reporting it as a 'regulatory expectations' variable, with others accounting for 22.0% (Estonia) or 28.5% (Finland). Overall, Swedish respondents have the lowest 'Yes' for all variables except for the 'other' proportion of respondents. In all these three cases, effect size (Cramer's *V*) is 0.15 or higher.

In Table 9.10, association between country and 'raising substantial amounts of external funds' is weak although it is statistically very significant. In Sweden and in Estonia, almost half of the respondents considered that institutional-level goals were set to raise the substantive amount of external funding. In Finland, only one-third of the respondents considered that these goals are set at the institutional level. This is influenced by the fact that in Finland, these goals are clearly set less in universities of applied sciences than in universities.

Conclusions

When we started the analysis for this chapter, we assumed that there would be large differences in the amount of research and teaching between research universities and university colleges or universities of applied sciences. Both higher education sectors traditionally clearly address both functions to a different extent, and the chapter tried to explore whether the teaching and research roles have changed over time. Finland's results indicate that no significant changes have taken place regarding workload in teaching and research. This is despite the fact that extensive university and universities of applied sciences reforms were implemented in Finland from 2010 to 2014. The dual system is still the foundation, but the two systems have actually converged.

The first research question was to analyse the extent to which the teaching-research nexus has changed in Finland both at universities and at universities of applied sciences from 2008 to 2018. The data do not show that universities address mostly research and universities of applied sciences teaching. Rather, both institutions traditionally address both functions to a clearly different extent, and in the chapter, we explored whether the teaching and research roles have changed over time. Indeed, research, development and innovation seem to be growing but with fewer scholars. In universities, the number of scholars working in research has increased overall, and the number of those working in teaching has decreased.

Our second question was to compare the 2018 findings in Finland to the notions of the relationships between teaching and research reported by academics at universities and at more strongly teaching-oriented institutions in Estonia and Sweden. In Estonia, Finland and Sweden, there are tensions between the institutional human resources, teaching and research strategies and RDI investments in society. Our analysis indicates the work in Finnish and Estonian universities of applied sciences and Swedish university colleges is a large-scale movement between diverse

teaching, projects with industry and government, networking and RDI assignments. In Finland, the number of academics emphasising research has increased in both sectors from 2008 to 2018. In all three reference countries, most respondents in both higher education sectors considered that research activities reinforce teaching. These are functions of universities driven by strategies, external stakeholders' growing role, launch of evaluations and governmental agencies' demand for accountability, efficiency and effectiveness (Geschwind et al., 2019a). The results from three reference countries indicate the different higher education systems will converge, and academic work consists of much the same factors even though higher education sectors differ.

In the third research question, we examined the expectations of those involved in academic work in three reference countries and different-level institutions. Academics seem to work more hours in all these countries than the average hours of all professions in society.

Based on the results from the Finnish APIKS survey, it is obvious in universities of applied sciences that the academic workload is based primarily on teaching, and in universities, research dominates the work. It is clear that in countries with a large number of universities of applied sciences, respondents' research emphasis is lower than in other countries. It is a characteristic of the Finnish higher education system that in universities of applied sciences, the workload is based primarily on teaching and in universities, research dominates the work content. Differences can be seen both between higher education systems and within each higher education system.

Academic tasks in Estonian, Finnish and Swedish higher education are diverse and are linked to teaching, research, development and innovation in all types of higher education. Internationalisation, changes of work content and work fragmentation are leading to the construction of new types of career. The knowledge society framework defines the role of research and societal impact of higher education in all these three reference countries.

In Finland, the proportion of untenured, short-term contract staff is high, and therefore the segregation of working conditions and the labour market is a risk to the attractiveness of the sector. Based on CAP 2008 and APIKS 2018 data, it is clear that Finland's two higher education systems are converging in terms of the teaching-research nexus.

Finland has a strong goal to educate half of the age group for a higher education degree by the 2030s. Therefore, the teaching work in universities has also increased and will continue to increase. However, there are no factors in the APIKS data for these three reference countries and in either sector that would substantially increase the number of academics that focus only on teaching. In all higher education types, research, development and innovation reinforce teaching. There are institutional expectations in research that support teaching in all types of higher education institutions. Based on the APIKS data, it appears that the three reference countries share common trends in the nexus between teaching and research in higher education teaching-research nexus.

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Chapter 10
Exploring the Changes in the Teaching and Research Nexus in Korean Academics Between 1992 and 2018

Soo Jeung Lee and Hyejoo Jung

Abstract This study aims to examine how teaching and research have been related to each other in Korean university systems over the past 30 years and how they are similar to and different from those of other major countries, such as Canada, Germany, and Japan. The Carnegie International Survey on the Academic Profession in 1992, the Changing Academic Profession survey in 2008, and the Academic Profession in the Knowledge Society survey in 2018 were used in this study. The main findings reveal that Korean higher education is a hybrid of the Humboldtian and post-Humboldtian patterns. The characteristics of the Humboldtian model are described in dual mission statements and professors' integrated roles. Most Korean academics viewed positively that teaching and research are compatible. The characteristics of a post-Humboldtian pattern are shown in the differentiation of resources and new types of academic staff, such as research- and teaching-focused professors. In the changing environment surrounding universities, the pattern of linking teaching and research has changed in South Korea.

Keywords Teaching · Research · Teaching and research nexus · Academic profession · South Korea

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F. Huang et al. (eds.), *Teaching and Research in the Knowledge-Based Society*, The Changing Academy – The Changing Academic Profession in International Comparative Perspective 23, https://doi.org/10.1007/978-3-031-04439-7_10

Introduction

Teaching has been the primary mission of universities since their emergence in the medieval era (Shin, 2011), and the research function was added in universities following Wilhelm von Humboldt's idea in the early nineteenth century. After Humboldt proposed the "unity of teaching and research," the teaching and research nexus became one of the central topics in higher education (Schimank & Winnes, 2000). It was first implemented at Humboldt University of Berlin in 1810, and then many other universities in Germany and other countries followed. Humboldt asserted that research and education are inseparable and stated that the essence of college might be shown with the only way to teach freely through solitary research (Harland, 2016). The patterns of the teaching and research nexus have been developed in accordance with how to merge or differentiate teaching and research activities (Gottlieb & Keith, 1997; Schimank & Winnes, 2000). Schimank and Winnes (2000) demonstrated three different patterns of teaching and research relationships in European university systems: (i) the Humboldtian pattern, (ii) a post-Humboldtian pattern, and (iii) a pre-Humboldtian pattern. First, the Humboldtian pattern is well known as a German model institutionalizing the combination of teaching with research in the role of a professor. Moreover, teaching and research are jointly financed with block grants from the government, and most universities have a dual mission of teaching and research. Second, a post-Humboldtian pattern is a model differentiated by roles, organizations, and/or resources for teaching and research. The United Kingdom, the United States, and Canada are typical examples (de Weert, 2004). In the United Kingdom, the Research Assessment Exercise—which has changed to the Research Excellence Framework since 2014—was initiated in 1986, and the block grants are dedicated only to research. As a result, research performance has become a more crucial factor for gaining funding than teaching in universities. Furthermore, there is a differentiation at the level of organizations (i.e., research- and teaching-focused universities) and roles of professors (i.e., research- and teaching-focused professors). It is also represented by the US and Canada model, which is structured by an undergraduate program focused on teaching and graduate schools for the research function and has activated research-oriented universities (de Weert, 2004; Gottlieb & Keith, 1997). Third, a pre-Humboldtian pattern is characterized by its split institutes according to their function. A case in point is the French model differentiated by institutes, which are divided into universities as higher education and public research institutions as science systems. Schimank and Winnes (2000, p. 406) pointed out that "with respect to the Humboldtian pattern, these debates have not yet brought about major changes in some countries, whereas in others a movement towards the post-Humboldtian patterns can be seen." In the meantime, the teaching and research nexus was generally implanted into European systems and then imitated in Asia, including South Korea (Gottlieb & Keith, 1997). However, we do not know how teaching and research are related to each other in Asian university systems. Are there similarities and differences between Asian and Western university systems? How have Asian university systems changed the teaching and research nexus over the past few decades?

As a university is part of the general socioeconomic and political fabric of a given society and era, each higher education system has its own characteristics of how teaching and research are interrelated. In this study, we focus on the Korean higher education system that was influenced by the German higher education model through the Japanese colonial period and then by the American higher education model. This study aims to explore how teaching and research are integrated in South Korea, which has dramatically developed on the basis of government-driven policies and already reached universal access in higher education since the late 1990s. First, we provide an overview of national initiatives that have affected the main characteristics of the teaching and research nexus in South Korea. Second, we examine how academic perceptions of the teaching and research nexus have changed over the past 30 years in Korean. In particular, we analyze how Korean academics differently perceive the teaching and research nexus by gender, academic rank, and discipline. Third, we examine how the teaching and research nexus in South Korea is similar to and different from that of other main countries such as Canada, Germany, and Japan.

National Initiatives for Teaching and Research in South Korea

Korean universities have quickly shifted from educational institutions primarily for teaching to institutions balancing teaching and research through funding initiatives (Shin & Lee, 2015). The Korean government began to increase the support provided to universities targeting university research in the 1990s (Ministry of Science & ICT, 2017). To develop the global competitiveness of core research areas and foster outstanding research groups, leading research centers such as the Science Research Center, Engineering Research Center, and Regional Leading Research Center have been established since 1990. One of the famous research funding projects is the Brain Korea 21 (BK21) project, which was established in 1999. The BK21 project is a national project to nurture masters- and doctorate-level manpower who would be supporting the creation of new knowledge and technology. It aims to reinforce research-oriented universities, promote global competitiveness, and nurture high-quality manpower. The first phase of the BK21 project lasted for 7 years from 1999 to 2005, followed by the second phase from 2006 to 2012 and the third phase from 2013 to 2020. The fourth phase was implemented in November 2020 to strengthen the capabilities of outstanding graduate schools and foster future academic generations. A total of 438 project groups from 72 universities were selected in the first phase, 568 project groups from 74 universities in the second phase, 522 project groups from 65 universities in the third phase (MOE, 2019), and 562 project groups from 68 universities in the fourth phase (MOE, 2020). The number of Science Citation Index (SCI)-level journal articles published by faculty members participating in the BK21 project increased significantly from 4392 in 1999 to 24,968 in 2017 (MOE, 2019). The BK21 project is a long-term and successful project aimed at

enhancing the research capabilities of Korean universities and strengthening the competitiveness of graduate schools (Shin, 2009).

In addition, the Korean government initiated other major research projects. For example, the National Research Laboratory in 1999, National Core Research Center in 2003, and Global Research Laboratory in 2010 were established to further develop the research capabilities of universities and research institutes (Ministry of Science & ICT, 2017). The World-Class University project was initiated in 2008 and merged with BK21 Plus in 2013. The Humanities Korea project was implemented to lay the foundation for the globalization of university research institutes of humanities in 2007, and the Humanities Korea Plus project was introduced in 2017. The Social Science Korea project began in 2010 for academic research in the field of social sciences. These projects were mainly designed to improve the research competitiveness of Korean universities (Shin & Lee, 2015).

In the late 2000s, the Korean government began to pay more attention to strengthening the educational capabilities of undergraduate programs and enhancing the learning capabilities of university students. In 2008, the government promoted the University Education Capacity Enhancement (UECE) project as a general support project aimed at strengthening the overall educational capabilities of universities (Yun, 2018). The UECE project began with reflection that the previous financial support projects focused on strengthening the research capabilities of universities and neglected to strengthen the education capabilities of undergraduate programs (Ministry of Education, Science, and Technology, 2008). It is a performance-oriented funding project that uses a formula consisting of performance indicators and educational condition index factors to enhance the education capabilities of universities, and it seeks the autonomy and efficiency of financial management by way of block grants. The UECE project was applied on a yearly basis from 2008 to 2013. A total of four-year universities and junior colleges were reviewed and 64 four-year universities and 72 junior colleges were finally selected (Byoun, 2018).

The Advancement of College Education (ACE) project was promoted to discover and spread advanced models for various undergraduate programs and enhance the competitiveness of university education from 2010 to February 2019. The ACE project aims to focus on "good teaching universities" and "characteristic and competitive leading universities" to create and set up advanced models of undergraduate education with curriculum development and educational environment improvement (Lee, 2017). For this purpose, the Korean government selected a certain number of universities each year and supported them for 4 years. In 2017, the ACE project was upgraded to ACE Plus (ACE+), and 10 universities were newly selected, with a total of 42 universities participating. The ACE project led to the establishment of a core competency-based education system in university education. The universities participating in this project ran core competency-based education programs and conducted the Korea Collegiate Essential Skills Assessment (K-CESA). The K-CESA was developed by the Ministry of Education and Korea Research Institute for Vocational Education and Training in 2010 to measure the basic job skills of university students, encourage human resources to meet social changes and corporate needs, and diagnose the core skills and competencies of university students.

Previous version (2018)	Reorganized version (2019 ~)	Section
PoINT (National Universities Innovation)	the National University Promotion Project	National universities
ACE+ CK PRIME CORE WE-UP	University Innovation Support Project	General financial support
LINC+	LINC+	Special-purpose support
BK+	BK21	

Fig. 10.1 Reorganization of university financial support projects (*Note.* ACE+, Advancement of College Education Plus; CK, Creative Korea; PRIME, the Program for Industrial Needs-Matched Education; CORE, Reinforcement of College Humanities Competency; WE-UP, Fostering women's engineering; LINC+, Leaders in Industry-University Cooperation Plus; BK+, Brain Korea 21 Plus. Source: Pack (2018))

In addition, the Korea National Survey of Student Engagement and National Assessment of Student Engagement in Learning have been conducted since 2011 (Byoun, 2018). The University for Creative Korea (CK) project lasted from 2014 to 2018. This project was designed to lay the foundation for the characterization of universities centered on strengths, considering the needs and characteristics of local communities. In 2014, 338 project groups from 106 universities were selected for the CK project.

The Ministry of Education reorganized and simplified the university financial support projects to enhance the autonomy and quality of universities in 2019. These projects are mainly divided into four types of financial support at national universities: (i) the National University Promotion Project, (ii) the University Innovation Support project, (iii) Leaders in Industry-University Cooperation Plus (LINC+), and (iv) the BK21 project. In order to strengthen the public role of national universities, the National Universities Innovation (PoINT) project has been expanded to the National University Promotion Project. The University Innovation Support project is a general financial support project, and five projects, including the ACE+ and CK projects—which are subdivided by types—have been integrated. The University Innovation Support project mainly focuses on teaching in universities, LINC+ aims to foster university-industry cooperation, and the BK21 project drives the enhancement of research competitiveness of universities (Fig. 10.1).

University Mission and Academic Role in Teaching and Research

Article 28 of the Higher Education Act states the purpose of universities: "to develop students' personality, to teach and research the profound theories of science and arts necessary for the development of the State and human society, and methods of

application thereof, and to contribute to the State and human society." This includes teaching and research as primary missions of universities. First, the teaching function of universities aims to build up the character of students and to educate people to work effectively and think critically in a society. However, this function has become more complex and diverse, ranging from general education for undergraduate programs to advanced doctorate programs (Altbach, 2008). Second, the research function of universities is dedicated to the advancement of knowledge and training of scholars. Faculty members are committed not only to conducting basic research but also to doing applied and developmental research related to practical goals, commercial products, and national development.

Amid changes in the environment surrounding universities, academic roles and perceptions of teaching and research are changing. The research performance-based evaluation and university ranking systems make universities and faculty members more interested in research activities. The research function of universities has become increasingly important in enhancing their competitiveness and reputation.

Massification is the dominant force in higher education and influences governance, curriculum, faculty, and student demographic information (Altbach, 2008; Shin & Harman, 2009). South Korea has achieved universal access to higher education with a tertiary enrollment rate of more than 50% (Shin & Harman, 2009). The number of 4-year universities was 191, and the tertiary education attainment rate in the age group 25–34 years was 70% in 2019 (MOE & KEDI, 2020). With massified higher education, various tertiary institutions such as junior colleges, polytechnic colleges, technical universities, and graduate school colleges emerged, with different goals, students, academic staff, and facilities. Junior and polytechnic colleges mainly focus on vocational education, whereas graduate school colleges only run graduate school programs. Among 4-year universities, prestigious universities are being transformed into research universities, and most universities focus mainly on teaching but often have some interest in research in Korea.

There has also been an expansion of academic staff along with the increase in the number of non-tenure-track faculty members and the diversification of types. There are research-focused professors, teaching-focused professors, lecturers, and adjunct professors with specialized academic roles, whereas tenure-track faculty members do both teaching and research. Currently, teaching workloads have increased in massified higher education systems, and complaints about teaching quality have also grown at the same time. In addition, research performance is becoming important in evaluating professors' promotion and gaining research project funding. It may lead to conflicts between teaching and research. Many academics believe that research and teaching produce synergy when they are integrated within the role of a professor and in a university (Shin, 2011), but reality might be controversial. With the changing environment surrounding universities, patterns of teaching and research relationships have changed in the last few decades.

Data and Analytical Strategy

The data in this study were collected from the Carnegie International Survey on the Academic Profession in 1992, the Changing Academic Profession (CAP) survey in 2008, and the Academic Profession in the Knowledge Society (APIKS) survey in 2018. Table 10.1 presents the population and response rate for these three surveys in Korea. The data were collected through stratified sampling for the Carnegie survey and through random sampling for the CAP and APIKS surveys. The sample broadly represents the population of full-time faculty members who are affiliated with 4-year universities in Korea in terms of their gender, rank, and discipline.

Table 10.2 presents the descriptive statistics for the samples of Korea in this study. Between 1992 and 2018, the proportion of male professors among respondents decreased from 87.0% to 71.5%, whereas that of female professors increased from 13.0% to 28.5%. In addition, the proportion of junior professors increased from 28.4% to 31.6%, and that of professors majoring in hard disciplines increased from 46.1% to 54.5%.

The empirical part was divided into two sections. The first section covered how Korean academic perceptions of the teaching and research nexus have changed over the past 30 years, comparing three research projects from the Carnegie survey in 1992, CAP survey in 2008, and APIKS survey in 2018. The second section examined the similarities and differences between Asian and Western university systems by comparing Korea to other major countries, such as Canada, Germany, and Japan. The Korean higher education system was influenced by the German higher education model through the Japanese colonial period while the Canadian higher education model was influenced by the British model during the colonial era. The German higher education model represents the Humboldtian model while the Canadian higher education model is one of typical models of a post-Humboldtian pattern (de Weert, 2004). We used the CAP and APIKS surveys to perform comparative research because Canada did not participate in the Carnegie survey. The sample information used for the international comparative study is provided in Table 10.3.

We examined academic preferences between teaching and research, workloads, research performance, and perceptions of teaching and research relationships. First, academic preferences were examined in terms of teaching or research preferences, as measured by the question "regarding your own preferences, do your interests lie primarily in teaching or research?" Of the four choices of responses given, we consider "primarily in teaching" and "in both but leaning toward teaching" to indicate

Table 10.1 Population and response rate

	1992	2008	2018
Population	26,365	52,763	66,795
Sample	3295	6827	12,714
Response	902	900	847
Response rate	27.37%	13.18%	6.66%
Survey method	Paper survey	Online survey	Online survey

Table 10.2 Sample demographic information

		1992	2008	2018
Gender	Female	116 (13.0%)	166 (18.4%)	237 (28.5%)
	Male	777 (87.0%)	734 (81.6%)	594 (71.5%)
Rank	Senior	643 (71.6%)	572 (63.6%)	579 (68.4%)
	Junior	255 (28.4%)	328 (36.4%)	268 (31.6%)
Discipline	Soft	486 (53.9%)	489 (55.4%)	385 (45.5%)
	Hard	416 (46.1%)	393 (44.6%)	462 (54.5%)
Total		902 (100.0%)	900 (100.0%)	847 (100.0%)

Table 10.3 Sample information used for international comparative study

	Canada	Germany	Japan
CAP (2008)	1152	594	1408
APIKS (2018)	2966	1664	2124

Note. Canadian and Japanese samples represent the population of full-time faculty members, including senior and junior academics, while German sample includes only senior academics in this study

teaching preference, and "primarily in research" and "in both but leaning toward research" to indicate research preference.

Second, academic workloads were measured by the average working hours per week during class session. The workloads were divided into three types: (i) teaching, (ii) research, and (iii) other academic activities. Teaching workloads included preparing instructional materials and lesson plans, developing and implementing classroom instruction, advising students, reading and evaluating student work, and so on. Research workloads covered reading literature, writing, conducting experiments, doing fieldwork, and so on. Other academic activities included administrative work and services within academia, such as committee work, paperwork, activities in academic associations, and reviews.

Third, research performance was divided into journal article and book publications. Journal article publications were measured by the number of total domestic and international academic journal article publications in the past 3 years. Book publications were measured by the number of scholarly books authored or co-authored and scholarly books edited or coedited in the past 3 years. The three questionnaires used for data analysis are slightly different, and in the case of 2018, journal indicators were combined for analysis. Table 10.4 shows questions and/or statements of the three questionnaires used in the analysis.

Fourth, academic perceptions of teaching and research relationships were divided into positive and negative relationships. The positive relationship was examined by the questionnaire item "your research activities reinforce your teaching" and measured on a 5-point Likert scale ranging from "1" (strongly disagree) to "5" (strongly agree). The negative relationship was explored by the questionnaire item "teaching and research are hardly compatible with each other" and measured on a 5-point Likert scale. The CAP and APIKS survey responses were compared because the Carnegie survey did not ask for the questionnaire items.

Table 10.4 Questions and/or statements of the three questionnaires used in the analysis

	1992	2008	2018
Journal	(1) Articles published in an academic book or journal	(1) Articles published in an academic book or journal	(1) Articles published in an academic book, (2) articles published in an academic journal
Book	(1) Scholarly books you authored, (2) scholarly books you edited	(1) Scholarly books you authored or co-authored, (2) scholarly books you edited or co-edited	(1) Scholarly books you authored or co-authored, (2) scholarly books you edited or co-edited

Findings

Changes in the Teaching and Research Nexus in Korea

Table 10.5 presents the changes in the teaching and research preferences of Korean academics during the last three decades from 1992 to 2018. This study found that Korean professors prefer research to teaching. The proportion of professors who prefer research increased significantly from 55.7% in 1992 to 68.0% in 2008 and 64.5% in 2018.

Looking at the differences in academic perception by gender, academic rank, and discipline, it was found that male professors preferred research than female professors did, whereas junior professors and professors majoring in hard disciplines preferred research than did senior professors and professors studying soft disciplines. Among these groups, significant statistical differences were found in academic rank and discipline in 1992, discipline in 2008, and gender and discipline in 2018.

Table 10.6 presents the changes in the average working hours per week during class session over the past 30 years. Overall, Korean academics spend more time teaching than doing research, but teaching hours per week decreased from 23.05 h per week in 1992 to 21.08 h per week in 2008 and 19.02 h per week in 2018, whereas research hours per week did not change much over the past three decades. Interestingly, service and administrative work hours per week steadily increased from 11.23 h in 1992 to 14.02 h in 2008 and 17.56 h in 2018. In particular, junior professors were found to spend more time in teaching and research than senior professors, whereas senior professors spent more time in service and administrative work. In 2018, female professors and professors majoring in soft disciplines spent more time teaching, whereas male professors and professors majoring in hard disciplines spent more time doing research.

Table 10.7 presents the changes in the research performance of Korean academics and a summary of the *t*-test analysis. Most of the Korean universities put emphasis on a larger number of journal article publications to raise their world university ranking. In this context, the number of journal article publications has steadily increased over the past 30 years. As provided in Table 10.7, academics studying hard disciplines publish more journal articles, whereas those studying soft

Table 10.5 Teaching and research preferences by gender, academic rank, and discipline in Korea

		1992 (*N*, %)		2008 (*N*, %)		2018 (*N*, %)	
Factor		Teaching	Research	Teaching	Research	Teaching	Research
Gender	Female	54 (47.8)	59 (52.2)	96 (33.9)	109 (66.1)	100 (42.2)	137 (57.8)
	Male	334 (43.9)	427 (56.1)	231 (31.5)	502 (68.5)	195 (32.8)	399 (67.2)
	χ^2	0.606		0.364		6.490*	
Rank	Senior	298 (47.5)	330 (52.5)	192 (33.6)	379 (66.4)	213 (36.8)	366 (63.2)
	Junior	91 (36.1)	161 (63.9)	95 (29.1)	232 (70.9)	88 (32.8)	180 (67.2)
	χ^2	9.378**		2.000		1.249	
Discipline	Soft	225 (47.4)	250 (52.6)	179 (36.7)	309 (63.3)	151 (39.2)	234 (60.8)
	Hard	166 (40.7)	2242 (59.3)	106 (27.0)	286 (73.0)	150 (32.5)	312 (67.5)
	χ^2	3.972*		9.224**		4.181*	
Total		391(44.3)	492 (55.7)	287 (32.0)	611 (68.0)	301 (35.5)	546 (64.5)

Note. Teaching or research preference is the percentage of professors who answered that they prefer to teach or do research when asked, "Regarding your own preferences, do your interests lie primarily in teaching or research?"
*$p < .05$; **$p < .01$; ***$p < .001$

disciplines publish more books. Male and senior academics publish more journal articles compared to female and junior academics.

Table 10.8 presents academic perceptions of teaching and research relationships in Korea. In this study, academic perception of the teaching and research nexus was divided into positive and negative relationships. The positive relationship was examined by the questionnaire item "your research activities reinforce your teaching," and the negative relationship was explored by the questionnaire item "teaching and research are hardly compatible with each other" and measured on a 5-point Likert scale ranging from "1" (strongly disagree) to "5" (strongly agree).

As provided in Table 10.8, Korean academics viewed positively that research reinforces teaching and recognized that teaching and research are compatible with each other. However, junior professors' views on "research reinforces teaching" have declined slightly over the past decade, whereas their views on "education and research are incompatible" have increased slightly. Academics majoring in soft disciplines tend to have a more positive perception of the teaching and research nexus than those in hard disciplines.

Comparison of Countries on Changes in the Teaching and Research Nexus

We compared Korea to other major countries, such as Canada, Germany, and Japan. Figure 10.2 shows the changes in teaching and research preferences in Canada, Germany, Japan, and Korea during the decade from 2008 to 2018. We found that more than half of academics in each country prefer research to teaching. In detail, more than two-thirds of academics in Canada, Japan, and Korea except Germany

Table 10.6 Workloads per week by gender, academic rank, and discipline in Korea

		1992 (mean, *SD*)			2008 (mean, *SD*)			2018 (mean, *SD*)		
Factor		Teaching	Research	Other	Teaching	Research	Other	Teaching	Research	Other
Gender	Female	22.93 (10.37)	14.19 (8.75)	9.50 (7.24)	20.80 (9.46)	16.76 (9.69)	14.19 (9.64)	21.05 (12.53)	15.23 (11.49)	17.80 (12.91)
	Male	23.08 (11.18)	17.50 (11.06)	11.47 (10.21)	21.14 (10.23)	18.42 (11.11)	13.98 (9.32)	18.52 (9.44)	17.99 (12.40)	17.25 (12.51)
	t-test	−0.132	−3.555***	−1.812*	−0.394	−1.754	0.249	2.818**	−2.959**	0.567
Rank	Senior	22.26 (10.73)	16.86 (10.54)	11.64 (10.68)	18.95 (9.95)	15.71 (10.31)	15.78 (11.61)	18.74 (9.34)	17.03 (11.41)	17.93 (12.17)
	Junior	24.99 (11.75)	17.62 (11.63)	10.19 (7.43)	22.39 (11.54)	16.30 (10.68)	12.33 (10.65)	20.21 (12.53)	17.22 (13.64)	16.76 (13.63)
	t-test	−3.307**	−0.939	2.128*	−4.487***	−0.817	4.547***	−1.719	−0.197	1.241
Discipline	Soft	23.37 (11.02)	16.77 (10.87)	11.51 (10.51)	22.31 (10.22)	17.41 (10.67)	14.04 (9.42)	21.20 (10.53)	15.74 (10.78)	18.37 (13.53)
	Hard	22.67 (11.20)	17.47 (10.83)	10.89 (9.06)	19.65 (9.84)	19.07 (11.13)	14.10 (9.41)	17.54 (10.13)	18.21 (13.09)	16.88 (11.86)
	t-test	0.937	−0.948	0.855	3.879***	−2.230*	−0.089	5.135***	−3.008**	1.687
Total		23.05 (11.10)	17.09 (10.85)	11.23 (9.88)	21.08 (10.09)	18.11 (10.88)	14.02 (9.37)	19.20 (10.47)	17.09 (12.15)	17.56 (12.66)

Note. Other covers administrative work and services within academia (committee work, paperwork, activities in academic associations, reviews, etc.) and other academic activities

*$p < .05$; **$p < .01$; ***$p < .001$

Table 10.7 Research performance across gender, academic rank, and discipline in Korea

		1992 (*N*, %)		2008 (*N*, %)		2018 (*N*, %)	
Factor		Journal	Book	Journal	Book	Journal	Book
Gender	Female	4.24 (4.73)	0.72 (1.39)	10.78 (12.10)	1.98 (2.71)	11.67 (10.21)	1.76 (2.33)
	Male	6.27 (7.46)	1.47 (2.76)	10.60 (11.08)	1.63 (2.71)	14.62 (16.34)	1.61 (2.88)
	t-test	−3.825***	−3.774***	0.179	1.496	−3.114**	0.696
Rank	Senior	6.53 (8.06)	1.63 (2.94)	11.02 (12.31)	1.95 (3.15)	14.73 (16.63)	1.64 (2.53)
	Junior	4.78 (4.20)	0.72 (1.32)	9.98 (9.16)	1.25 (1.61)	11.67 (9.64)	1.71 (3.17)
	t-test	4.146***	5.296***	1.439	4.405***	3.346**	−0.300
Discipline	Soft	4.57 (5.24)	1.58 (3.05)	7.64 (6.17)	1.95 (2.39)	11.09 (11.46)	1.78 (2.17)
	Hard	7.72 (8.66)	1.18 (2.08)	14.41(14.67)	1.39 (3.06)	15.97 (16.83)	1.57 (3.14)
	t-test	−6.301***	1.934	−9.550***	3.022**	−4.963***	1.123
Total		6.03 (7.20)	1.38 (2.63)	10.64 (11.27)	1.70 (2.71)	13.76 (14.83)	1.66 (2.75)

Note. The number of journal article or book publications in 1989–1991, 2005–2007, and 2015–2017
*$p < .05$; **$p < .01$; ***$p < .001$

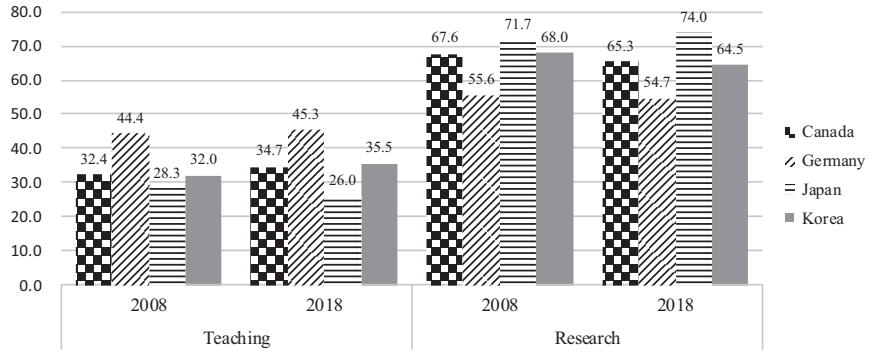
Table 10.8 Perception of teaching and research nexus across gender, academic rank, and discipline in Korea

		2008 (mean, *SD*)		2018 (mean, *SD*)	
Factor		Positive	Negative	Positive	Negative
Gender	Female	4.08 (0.79)	2.36 (0.94)	4.10 (0.82)	2.53 (1.00)
	Male	4.15 (0.75)	2.23 (0.96)	4.14 (0.76)	2.28 (0.98)
	t-test	−1.148	1.562	−0.655	3.283**
Rank	Senior	4.15 (0.73)	2.22 (0.97)	4.19 (0.71)	2.29 (1.00)
	Junior	4.13 (0.79)	2.33 (0.93)	4.01 (0.92)	2.49 (1.00)
	t-test	0.320	−1.773	2.772**	−2.693**
Discipline	Soft	4.20 (0.73)	2.22 (0.94)	4.20 (0.74)	2.30 (1.00)
	Hard	4.07 (0.78)	2.31 (0.98)	4.08 (0.81)	2.40 (1.00)
	t-test	2.596*	−1.409	2.264*	−1.510
Total		4.14 (0.75)	2.26 (0.96)	4.13 (0.78)	2.35 (1.00)

*$p < .05$; **$p < .01$; ***$p < .001$

prefer research to teaching. However, the percentage of Canadian, German, and Korean academics who said they preferred teaching increased slightly in 2018 compared to 2008. In contrast, for Japanese academics, the percentage of teaching preference decreased slightly from 28.3% in 2008 to 26.0% in 2018, and the percentage in favor of research increased from 71.7% in 2008 to 74.0% in 2018.

Table 10.9 presents that academics in Japan and Korea decreased their share of teaching workloads measured by hours per week in 2018 compared to 2008, while



Note. The values are in percentages.

Fig. 10.2 Teaching and research preferences in selected countries from 2008 and 2018 (*Note.* The values are in percentages)

Table 10.9 Share of teaching and research hours per week in selected countries from 2008 and 2018

	Teaching (hours per week, %)		Research (hours per week, %)	
Countries	2008	2018	2008	2018
Canada	19.98 (40.4)	20.08 (43.0)	15.89 (31.2)	13.53 (28.1)
Germany	20.95 (43.9)	21.50 (49.1)	14.10 (26.6)	10.62 (22.4)
Japan	20.29 (40.7)	17.13 (36.6)	16.71 (31.9)	17.31 (35.8)
Korea	21.08 (40.3)	19.20 (36.6)	18.11 (33.6)	17.09 (31.6)
Total	19.10 (39.5)	15.14 (36.7)	16.51 (32.8)	15.57 (37.2)

Note. The percentage of teaching or research hours is the proportion of time for teaching or doing research in the total faculty workloads per week during class session, including teaching, research, service, administrative work, and other academic activities

academics in Canada and Germany increased their share of teaching workloads. Only Japanese academics increased the percentage of research hours per week among the total working hours, whereas academics in other countries decreased it slightly.

Figure 10.3 shows interesting results compared to Table 10.9. As given in Table 10.9, the research hours per week of Canadian and Korean academics decreased in 2018 compared to 2008, but their journal article publications increased significantly from 6.24 in 2008 to 10.72 in 2018 for Canadian academics and from 10.64 in 2008 to 13.76 in 2018 for Korean academics.

Table 10.10 presents academic perceptions of teaching and research relationships. The positive relationship was measured in the proportion of respondents who responded 4 and 5 to the questionnaire item "your research activities reinforce your teaching." The negative relationship was measured in the proportion of respondents who answered 4 and 5 to the questionnaire item "teaching and research are hardly compatible with each other."

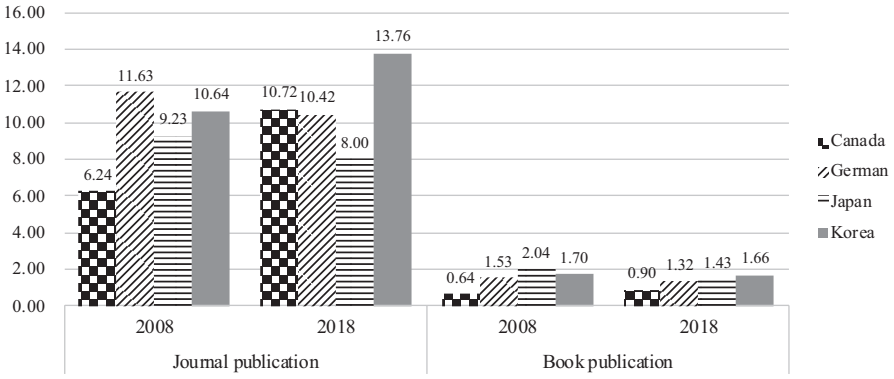


Fig. 10.3 Research performance in selected countries in 2008 and 2018 (*Note.* Journal article or book publication represents the total during the 3 years between 2005 and 2007 and 2015 and 2017)

Table 10.10 Teaching and research relationships in selected countries from 2008 and 2018

	Positive relationship (*N*, %)		Negative relationship (*N*, %)	
Countries	2008	2018	2008	2018
Canada	861 (83.1)	2182 (77.5)	214 (19.9)	627 (21.2)
Germany	446 (81.1)	1247 (79.6)	196 (34.8)	679 (41.5)
Japan	1083 (79.1)	1016 (50.1)	693 (50.8)	1017 (48.1)
Korea	769 (85.4)	707 (85.2)	101 (11.3)	122 (14.4)
Total	3493 (79.7)	7782 (67.6)	1401 (31.0)	4209 (32.5)

In 2008, most academics in Canada, Germany, Japan, and Korea recognized that research reinforces teaching, but in 2018, Japanese academics perceived it as relatively low. In particular, only half of Japanese academics recognized that research reinforces teaching.

In terms of the negative teaching and research relationship, the percentage of respondents who answered that they agreed with the questionnaire item "teaching and research are hardly compatible with each other" increased from 2008 to 2018, except for Japanese cases. Most Canadian and Korean academics perceived that teaching and research are compatible with each other, but German and Japanese academics did not. Interestingly, 41.5% of German academics and 48.1% of Japanese academics recognized that teaching and research are hardly compatible with each other.

Discussion and Conclusion

The findings of this study show that Korean higher education is a hybrid of the Humboldtian and post-Humboldtian patterns. The characteristics of the Humboldtian model can be described in dual mission statements, professors' integrated roles, and

joint funding of teaching and research (Schimank & Winnes, 2000). Among these three main factors, Korean higher education presented dual mission statements and professors' integrated roles for teaching and research. First, the Higher Education Act states that universities contribute to teaching and research for the development of the state and human society. Most Korean universities have the dual missions of teaching and research. Second, Korean academics postulate that they should do both teaching and research. This is also evident in their perceptions of the teaching and research nexus. Most Korean academics viewed positively that research reinforces teaching and recognized that teaching and research are compatible with each other. The proportion of Korean academics who positively agreed with the survey item "your research activities reinforce your teaching" was the highest, but the percentage of Korean academics who agreed with the survey item "teaching and research are hardly compatible with each other" was the lowest among other academics in Canada, Germany, and Japan.

The characteristics of a post-Humboldtian pattern can be shown in a differentiation of resources and roles for teaching and research. The university financial support projects in Korea are divided according to their purpose. The University Innovation Support project targets the improvement of teaching in universities, whereas the BK21 project drives the enhancement of research competitiveness in universities. There has also been an expansion of academic staff along with an increase in the number of research- and teaching-focused professors since 2003. In terms of differentiation of institutions, top-tier universities are being transformed into research universities with the help of the BK21 project, whereas most universities mainly focus on teaching but often have some interest in research.

In the changing environment surrounding universities, the pattern of linking teaching and research has changed. With massified higher education, various types of institutions such as junior colleges, polytechnic colleges, technical universities, and graduate school colleges have emerged. The types of academic staff have also diversified, including research-focused professors, teaching-focused professors, lecturers, and adjunct professors with specialized academic roles. With the research performance-based evaluation and university ranking system, universities and faculty members are more interested in research than in teaching to enhance their competitiveness and reputation. This study found that more than half of academics in Canada, Germany, Japan, and Korea prefer research to teaching. Especially in Korea, the proportion of professors who prefer research has increased significantly over the past three decades. Most Korean academics have the perception that research and education are compatible with each other, but junior academics' positive view on the teaching and research nexus has decreased slightly over a decade.

Teaching and research are the main functions of universities in our society, and the unity of teaching and research is a core value that most professors still hold. However, universities are under pressure to cope with increased numbers of students and societal demands, and they have been reactive and competitive (Altbach, 2008). The changing environment and context affect the teaching and research nexus in universities and academic roles. We think that various types of institutions and academics coexist and that they link teaching and research in different ways. It

remains to be seen how teaching and research are linked together or independently exist in an institution or among academic staff or between institutions and academic staff.

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Chapter 11
Reconsidering the Role of Research in Teaching-Oriented Higher Education System: The Case of Russia

Anna Panova and Maria Yudkevich

Abstract Russian higher education system is characterized by a focus on teaching and operates under institutional separation from research system, inherited from the Soviet period. The post-Soviet period also contributed to the development of teaching in the system of higher education. It was only at the end of 2000s that the government began to introduce instruments aimed at the targeted development of research in this sector (reform of postgraduate studies, targeted programs, changes in the faculty remuneration schemes). In this chapter we analyze the changing role of teaching and research, both at the level of faculty and at the level of universities and the whole system. We examine the remuneration scheme prevalent in the sector and the incentives it creates. We analyze the consequences of implementing different policy instruments. Teaching remains the primary activity in terms of both preference and time spent. At the same time, incentives for research activity have changed, primarily at those universities that have been affected by the government's targeted program. The reforms in general led to an increase in the number and quality of publications.

Keywords Research and teaching nexus · National reforms in higher education · Universities · Research institutes · Path dependency

The chapter was prepared within the framework of the HSE University Basic Research Program. We would like to acknowledge the assistance of Anastasia Byvaltseva.

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F. Huang et al. (eds.), *Teaching and Research in the Knowledge-Based Society*, The Changing Academy – The Changing Academic Profession in International Comparative Perspective 23, https://doi.org/10.1007/978-3-031-04439-7_11

Reconsidering the Role of Research in Teaching-Oriented Higher Education System: The Case of Russia

One of the key features of Russian higher education system is its long-standing separation from research. Indeed, in Russia back from the Soviet times there was a separation of higher education institutions (HEIs) that were predominantly focused on training professional for the need of economy and non-teaching research institutes of Russian Academy of Sciences. While several comprehensive universities existed in the country, most of HEIs until the collapse of the Soviet Union in early 1990s were sectoral institutions serving the needs of some particular industry branches in trained professionals. In the 1990s, the market for higher education emerged in Russia with the birth of private sector and transforming many former sectoral HEIs into comprehensive universities in form but not in their missions. Indeed, at that time teaching was the key activity: It took most of the faculty time, it allowed to earn extra income (via teaching at several institutions and private tutoring), and it secured faculty position and promotion. So, the system was indeed a teaching-oriented one, and rather few universities were engaged in research and supported at the institutional level. Only for the late 2000s the situation started to change gradually with the government support of increasing the role of research in higher education sector.

In our chapter we start with a brief overview of the current state of the higher education system accompanied by the reference to a historical context (for detailed description see Kuzminov & Yudkevich, 2021). It allows us to explain the specific role of teaching and research in today's Russian HEIs and to discuss the organization of teaching and research at the level of individual faculty and also at the institutional level. Then we use both data of APIKS (APIKS, 2020) and also of faculty survey of Monitoring of Educational Markets and Organization (MEMO, years 2010–2017) to study the time allocation, preferences between teaching and research, teaching attitudes, and research productivity of individual faculty and also to highlight the heterogeneity of these parameters across different institutions. For institutional characteristics, we use the Monitoring of University Efficiency run by the Ministry of Education (MUE, 2019). We explain the role of research productivity and teaching quality in faculty remuneration and show how this salary practices create incentives both at the individual and institutional levels. Moreover, we analyze the results of the reforms considering the academic training system.

We also discuss the role Russian University Excellence Initiative (RUEI) (2012–2020) and other smaller forms (such as institutional grants) of government support aimed to bring research into universities and to improve the global competitiveness of leading Russian universities at the global academic market. We show that substantial effect does indeed exist both in quantitative and also qualitative aspects and that the initiative also affected the relationships and power distribution between organizations of formerly separated sectors – ones of higher education and

research. So, it allows us to discuss the institutional barriers as well as prospects and potential consequences of their deeper integration. In this part of the chapter, we refer to our recent research based on the bibliometric data collected for institutions under consideration. Such a data allows us to make a sound qualitive analysis of different aspects of research output.

Introducing research into higher education picture has increased the differentiation in the system increasing the gap between leading research universities and mass-scale HEIs. What should be the role or research (if any) in later ones? Should they have research ambitions or should be better concentrated on high-quality teaching? What might be the optimal government policy in this regard? We address these important questions in the concluding part of the chapter.

Russian Higher Education: Brief Overview of the System

The Russian higher education system is represented by a considerable variety of universities both public and private. At the beginning of the academic year 2018–2019, there were 741 universities in total, two thirds of which (496) were public and one third (245) were private (Education in Figures, 2021). The most part of the budget money goes to public universities, which provide students with education of a higher quality and have more proficient faculty. With a very few exceptions, research universities are public which is in a sharp contrast, for example, with the US system. Private universities are smaller – less than 10% of the total student body are enrolled at the universities of such type. Faculty from private universities constitute quite a small part – around 5% – of Russian faculty body. Talking about research in general, it is mostly carried out in the public sector. Faculty in private universities are mainly focused on teaching and are rarely involved in research work. Despite the fact that private universities in post-Soviet Russia have endured for almost 30 years, they are still considered as an auxiliary rather than equivalent type of educational institutions relative to public universities.

The Russian higher education system is characterized by mass enrollment of the youth. While the average percentage of young people between the age of 25 and 35 with tertiary education for OECD countries is 45%, in Russia it is 62% (OECD, 2021). In this regard, Russia is similar to Canada (63%) and Japan (61%). Among the post-Soviet countries, Russia outperforms other post-Soviet countries participating in APIKS: Lithuania (55%), Kazakhstan (50%), and Estonia (43%) (OECD, 2016, 2021). The number of students at Russian universities has been around 4.5–4.7 million in recent years, which is a little less than 300 people per 10,000 population. This figure approximately corresponds to the analogous indicators of the late 1990s and is noticeably lower than the peak values of this index (over 500 people per 10,000 population), which occurred in 2006–2009.[1]

[1] Calculated based on Indicators of Education, 2020, 2007

Faculty in Russian Universities

In the academic year 2018–2019, 94.5% (232,020) of Russian faculty worked at public universities (Indicators of Education, 2020). In terms of the absolute size of the faculty body, Russia is only smaller than several countries, such as India, China, Brazil, the USA, and Germany. At the same time, Russia has the maximum faculty to students. Nowadays, there are approximately 11 students per each university faculty, while in the USA this figure is 14 students, 18 in China, and 25 in Brazil (Kuzminov & Yudkevich, 2021). However, such a small number of students per faculty is accompanied by an extremely heavy teaching load, which is associated with an excessive classroom load typical for universities' educational programs. Russia, as well as Kazakhstan, is prominent due to a heavy teaching load compared to other countries taking part in the APIKS project. According to the survey data (APIKS, 2020), Russian faculty spend 24 hours a week on teaching activities. The importance of teaching is also evident in the way Russian faculty allocate their time between teaching and research. In 2018, the share of academic time devoted to teaching was 0.69. In comparison to faculty from other countries participating in APIKS, Russian faculty spend a considerably greater part of their academic time on teaching than on research activities; the same trends can be observed in Kazakhstan. In contrast, such post-Soviet countries as Latvia and Estonia are closer to the average for all participating countries – 0.60. Moreover, according to APIKS data, almost two-thirds of Russian faculty are more interested in teaching than in research. Again the same high level of teaching orientation is observed in Kazakhstan. At the same time, Estonia and Latvia have lower levels of teaching orientation. Among the European countries, Portugal is most similar to Russia in its level of teaching orientation. Thus, Russian higher education can be classified as one of the most teaching-oriented. It is worth to mention that 76% of Russian faculty claim that their research activities reinforce their teaching. In Lithuania, the proportion is somewhat similar. In other post-Soviet countries, the proportion is a bit lower: in 2012, the average share was around 71%. Furthermore, 57% of Russian faculty disagree with the statement that teaching and research are hardly compatible with each other. Russia is only slightly behind Canada and Kazakhstan, where 59% of faculty disagree with this statement. Quite low is the share of those faculty who believe that the quality of research activities (48%) and the quality of teaching activities (41%) are taken into account when personnel decisions are made in their universities. In terms of these indicators, Russia does not differ much from Estonia and Lithuania, while in Kazakhstan faculty more often indicated that the research and teaching quality are taken into consideration in hiring and promotion.

The current situation in the higher education sector reflects the path dependency, the legacy of the Soviet Union, where the higher education sector was separated from the research sector. The major role of Soviet universities was devoted not to the research production but to the training of future professionals. However, in modern Russia, starting from the late 2000s, the government policy toward the public higher education sector was aimed at strengthening the research component. This

was embodied in various aspects, such as changes in the faculty remuneration principles, targeted support of a group of leading research-oriented universities, and reforms targeting the organization of doctoral education.

Another substantial characteristic inherited from the Soviet period and relevant to the research activity of Russian faculty is the high level of inbreeding, the dominance of the "one university career." Similar situation is reported in Spain, Ukraine, Portugal, and China (Altbach et al., 2015; Tavares et al., 2017). Around 60% of faculty members received their higher education degree at the university where they are working currently (MEMO, 2017). The percentage of such faculty in leading universities has been even higher until recently. The practice of hiring their own graduates is common partly due to the virtual absence of an academic labor market and the lack of academic mobility among students. Most of the postgraduates at leading universities have been students at the same university (Bekova & Dzhafarova, 2019). The situation has begun to change in the last decade, although it is still characterized by an extremely low mobility level. The literature gives no definite estimate of the impact inbreeding has on academic productivity. Using the data on Russian faculty, it has been shown that there are no significant differences in publication activity between inbreeders and non-inbreeders, although a substantial divergence in absolute productivity can be seen while considering the entire career (Alipova & Lovakov, 2018; Lovakov et al., 2019). The practice of hiring their graduates, attracting them to postgraduate studies, and low mobility, in our opinion, are also reflected in the way faculty conduct their research. Compared to other countries participating in the APIKS project, Russian faculty are less inclined to cooperate and collaborate with colleagues while doing research work. However, it should be noted that the level of cooperation with postgraduates and colleagues from their university among Russian faculty is close to the average for the countries taking part in the APIKS project. Going beyond their discipline or university is less common among Russian faculty. Thus, less than one third of Russian faculty collaborate with international colleagues, which is the lowest level among the APIKS countries. Russia also holds a rather low position compared to other countries in terms of the following indicators: collaboration with colleagues outside their discipline (50%) and collaboration with scholars/researchers at other institutions in the country (58%). In terms of the level of peer cooperation, Russia is in many ways similar to Kazakhstan. However, in terms of cooperation with PhD students and international academics, there are significant differences. Thus, the level of cooperation with PhD students is significantly higher in Russia, while the level of cooperation with international colleagues is higher in Kazakhstan. In other post-Soviet countries, the level of cooperation is higher than in Russia. Overall Russian faculty are characterized by a notable "local" orientation (they are locals in terms of Gouldner (1957) and Baker and Zey-Ferrell (1984)).

For research practices in universities to change fundamentally, an institutional transformation must take place, which could ultimately change faculty incentives and practices. In the post-Soviet period, Russian faculty were provided with an access to grant funding from various sources. Numerous foreign foundations began to come to Russia, and state research foundations were being established as well.

These foundations played an important role in maintaining research activities. In Russia, the major motivation for applying for grants is so far related to the low basic funding for research activities (Streltsova, 2017). In 2009, the general reform of remuneration principles was introduced, which led to Russian universities changing their remuneration system. The new contract type implied the transition from flat unified tariffs to performance-based incentive payments (both in teaching and research) for every faculty member. The structure of such a contract was independently designed by each university. Some universities have introduced these payments as salary bonuses (set for an annual basis), while at some universities these money rewards have taken the form of lump-sum payments for one or a set of publication that meet certain criteria (e.g., published in Q1/Q2 WoS or Scopus indexed journals). This type of incentive payments for publishing in top journals is also used now in the numbers of counties, including China (Wang et al., 2011). According to MEMO-2015 data, most university rectors indicated the presence of teaching and research bonuses at their universities. At the same time, according to MEMO-2017 data, only 45% of faculty members at public universities noted the existence of any research allowances, and only 20% of respondents were the recipients of such allowances, while the presence of bonuses for teaching intensity or quality was noted by 59% of respondents and 47% of them were the recipients. Thus, allowances for teaching activities are more common. CAP-2012 and MEMO-2017 data show that research activities have a positive impact on faculty members' salaries (Prakhov, 2019; Prakhov & Rudakov, 2021).

In addition to the remuneration system reforms, the government was also engaged in the implementation of the targeted programs, the purpose of which was to support certain groups of universities. These programs contributed to a segment of leading universities being formed in the public sector. This group of universities is characterized by fairly stringent selection criteria, high quality of education, and a strong student body. Moreover, faculty members' deeper involvement in scientific research is a key feature of these universities. There are around 40 leading universities in the system, and every university from this segment is involved in various state support programs: the program of federal universities, the program of national research universities, and the program of increasing the competitiveness of the leading universities – Russian university excellence initiative (RUEI). It is worth pointing out that excellence initiatives had become an important policy instrument in a number of countries since the beginning of the twenty-first century (Salmi, 2016). Russian federal programs have begun to emerge since the late 2000s. The last implemented governmental initiative is the RUEI (2013–2020), aimed to internationally promote Russian universities and increase their global competitiveness both in education and science. In 2008, about 15% (638,000) of the student body were enrolled at leading Russian universities, and about 20% (50,000) of the faculty body worked there.[2]

A comparison made using CAP and APIKS data reveals that features of research activity, such as faculty involvement and results themselves, significantly differ

[2] Calculated according to the data of the MUE-2019 and the Indicators of Education, 2020

between leading and general HEIs. Since the start of the RUEI, the dynamics has been different in two types of universities: the proportion of research-oriented faculty members in the group of RUEI has increased (from 42% to 43%), while it has decreased (from 36% to 32%) in HEIs of mass segment. Time distribution is also different for two groups of universities as faculty members from general HEIs allocate more of their academic time to teaching than faculty from participating HEIs (in 2008: 0.65 for RUEI universities, 0.71 for non-RUEI universities).

One more difference between leading and general HEIs lies in personnel policy. Based on CAP and APIKS data for 2012 and 2018, a comparison of the way faculty members perceive personnel policy indicates that the focus on research quality while making personnel decisions has increased for RUEI universities. Furthermore, according to MEMO-2015 data, incentive payments for teaching and research are more common for leading HEIs, namely, RUEI universities and national research universities (NRUs) (Prakhov, 2020). As noted above, research activities are positively correlated with salaries (Prakhov, 2019; Prakhov & Rudakov, 2021), although the details may differ due to a university's status. Leading universities pay close attention to publications in highly ranked journals while considering faculty salaries. One more crucial factor is the fact that general HEIs pay bonuses for scientific activity in general, while leading universities pay attention to the quality of results. Leading HEIs are ready to stimulate not just research activity but publications in high-quality journals. Finally, the value of an incentive allowance is higher at leading universities (Prakhov, 2020).

Significant differences in research productivity can be observed as well. According to APIKS data, statistically significant differences in publication activity between RUEI and non-RUEI universities are observed mainly in the number of articles published in international peer-reviewed journals. Faculty from RUEI universities published an average of 4.32 articles over 3 years, while faculty from other HEIs published only 1.13 articles. Although, in general, Russian faculty do not actively cooperate with others and the level of inbreeding is high, faculty members from RUEI universities are more active and cooperate with others more often in their research activities.

Thus, leading universities create incentives for research activities, and the faculty are more research-oriented. In response to incentives that come from universities' administration, faculty members show greater research productivity and a higher level of scientific cooperation. Adjustments on the individual level have also led to significant changes on the institutional level: dynamics of publications by RUEI universities considerably differs from the research results produced by those universities that were comparable in size and quality of research activity before the program launch, and there is even a stronger contrast to other HEIs (Lovakov et al., 2021; Matveeva et al., 2021; Matveeva & Ferligoij, 2020). RUEI universities have increased not only the number of publications but also their quality. RUEI universities have been exceeding the general publication trend of Russian universities since the first year of the program, and they are still doing so. RUEI universities have increased the share of publications in Q1 journals during the program. The project has also made a considerable impact on research cooperation. RUEI universities

have significantly surpassed other Russian HEIs in the number of papers written in large collaborations: this is, among other things, due to the inclusion of a bunch of universities in international collaborations in high-energy physics. Every year there are hundreds of publications with a large number of authors, which is typical for many large countries, including China (Adams et al., 2019). RUEI universities are now more often interacting with each other, other HEIs, and the RAS institutions. Furthermore, RUEI universities have intensified scientific collaboration not only on the national but also on the international level. This group of HEIs is now more frequently cooperating with foreign institutions in the segment of high-quality publications. The RUEI has also made a positive external impact on the higher education system as a whole: compared to universities from other regions, those general HEIs that are situated in the regions with RUEI universities have significantly increased the number of publications and involvement in academic networks.

Grant Mechanisms for the Science Support

Since the early 1990s, Russia has been actively developing the grant system. Such state foundations as the Russian Foundation for Basic Research (RFBR 1992–2020) and the Russian Foundation for Humanities (RFH 1994–2016) have been established. The RFBR was founded as a part of urgent measures to preserve the scientific and technological potential of Russia. In addition, Russian researchers have gained access to foreign research foundations. Given a drastic reduction in the targeted state science funding, grants have begun to play a crucial role in support research activities both in universities and the RAS institutes. In fact, grants served a role of maintaining research teams. The principles of financing science with the help of the grant system significantly differed from the principles established in the Soviet times, when budget money was centrally allocated for specific purposes, and the share received by universities for science was minimal. In Soviet times the structure of research activities did not assume any individual initiative. Research teams and individual researcher were not financed, while organizations were. Administration played an important role in the distribution of funds among employees. The grant system made it possible for faculty and researchers, regardless of administration interests, to develop their research by submitting to competitions, winning grants, and receiving approval from the academic community. Thus, the grant system fostered academic freedom. Apart from supporting specific research, the grant system was aimed at spreading scientific knowledge: there were grants for publishing and translating books/textbooks and for organizing conferences and travel grants for trips to conferences. Grants for young researchers played an important role. Given the new market conditions, these grants were necessary to attract and retain the most talented young people in scientific and educational sectors. Scientific foundations made no distinction between faculty and research staff of research institutes, allowing research teams from different organizations to apply.

Thus, this facilitated the beginning of integration between the sectors of higher education and science. Markusova with coauthors (2012) demonstrated a positive effect of competitive science funding. The higher education sector, and primarily the group of leading universities, benefited from the development of the grant system and publication activity, and the international visibility level increased (Markusova et al., 2013; Mindeli et al., 2014). From 2009 to 2011, there had been a 1.2-fold rise in the number of university publications supported by foundations (Mindeli et al., 2014). One of the effects of the grant system is associated with the increased international visibility: at leading universities, citations of the articles supported by foundations are higher than those of the articles that were not supported (Mindeli et al., 2014). The share of articles published jointly by the members of research sector and higher education sector has increased significantly (Markusova et al., 2013).

Nowadays the largest state science foundation is the Russian Science Foundation (founded in 2013; since 2020 it includes the RFBR and since 2016 it includes the RFH). This foundation was no longer needed for the immediate rescue of science but for the promotion of Russian science internationally. Its objectives include, among other things, the financing of larger research projects. Russian HEIs actively participate in the grant system: the top ten organizations in terms of the number of applications to the RSF competitions in 2019 were exclusively leading universities, there was only one research institute in the top ten organizations with the maximum number of grants being received, and all other organizations were leading universities (RSF, 2019).

A fundamental role in the grant support of science was also served by the project of creation and maintenance of international laboratories – the mega-grants program. The objective of the program is a creation of globally competitive scientific laboratories under supervision of international world-class researchers. The key competition condition was the fact that international laboratory supervisors had to spend at least 4 months a year at a Russian university, which ensured close work with Russian colleagues, as well as with the youth – including postgraduate and undergraduate students.

Since 2010, 272 laboratories have won the competition, 201 of which have been established in universities. Working with the world's leading scientists, Russian researchers were to adopt the best research practices and integrate into the international academic community. Sterligov with coauthors (2020) showed that between 2014 and 2017, articles supported by foundations (RFBR, RSF, mega-grants) and published in leading world journals were significantly more likely than the Russian average to be written in international collaborations. At the same time, within the framework of the mega-grants program, the percentage of articles written in international collaboration reached more than 90%.

Most of the state measures concerning science funding are aimed at transitioning to a greater role of competitive funding and moving away from state assignment. The share of R&D expenditures in the higher education sector financed by grants from the foundations supporting science, technology, and innovation has grown

significantly in recent years: from 20% in 2015 to 40% in 2018.[3] Support from other competitive sources has also increased from 19% to 24%.[4] According to responses of Russian faculty in APIKS survey, the share of their own universities in funding their individual research activities is about one third. At the same time, 55% of faculty indicated that the university does not finance their research activities at all; the share of such faculty in other countries is lower. The share of national foundations in funding research activities of Russian faculty is minimal compared to other countries – 14%. In such countries as Estonia, Taiwan, Chile, and Sweden, the average contribution of national foundations to the funding of faculty's research activities is significantly higher and it exceeds 40%.

Training Future Academics

It is difficult to access the current situation with faculty members, their attitudes, and performance results without understanding how the system of academic staff reproduction is arranged now. Doctoral education plays an important role in shaping perceptions of the academic profession. The experience gained during postgraduate studies varies from country to country. Based on the APIKS survey, about a half of Russian faculty had an employment contract for teaching or research during their studies. This is quite a high percentage, but in such countries as Germany and Estonia, this share reaches 73% and 67%, respectively. Sixteen percent of Russian faculty were employed at a research institution during the study period. For APIKS countries this is not such a low percentage; however in Slovenia and Sweden, it is 53% and 77%, respectively. In general this distribution might be a marker of the structure of doctoral education and the distribution of PhD students between research and higher education sectors. In Russia courses in teaching methods are widespread during doctoral education; 35% of faculty reported that they received training in instructional skills or learned about teaching methods. This is one of the highest proportions among the APIKS countries: in Sweden it is also 35% and in Taiwan it is 48%. At the same time, compared to other countries, Russia PhD students are at a lower level of involvement in research projects with faculty or senior researchers. Only 41% of Russian faculty stated mentioned such an experience.

The system of training professional personnel for research activities in Russia has inherited many of the features of the Soviet doctoral education and has not actually been reformed until 2013. In the Soviet period, academic work was characterized by high attractiveness and social prestige, which allowed the academic sector to engage better workers. On the contrary, in the post-Soviet period, the situation changed dramatically: decreasing salaries, lowering faculty's social status, and deteriorating working conditions have caused both a brain drain and a significant

[3] Calculated on the basis of data from Science and Technology Indicators in the Russian Federation, 2017, Science Indicators in the Russian Federation, 2020

[4] Calculated on the basis of data from Science and Technology Indicators in the Russian Federation, 2017, Science Indicators in the Russian Federation, 2020

decline in the attractiveness of working in academia. Since the mid-1990s, the system has become more and more massive. In 1990, there were a total of 1232[5] organizations training 63,000 PhD students. The maximum of trained PhD students was reached in 2010: 157,000 PhD students were being educated in 1568 organizations. Despite the separation of the higher education sector and the scientific sector, in Soviet times, the training of scientific personnel was also provided by research institutes, where about 40% of PhD students were educated (Kobzar & Roshchin, 2020). In the post-Soviet period, the organizational structure of the training system began to change. In 1995, not more than 18% of PhD students were being trained in research institutes, and since 2008, their share has not exceeded 10–12%. At the same time, the share of research institutes among postgraduate training organizations has decreased not so dramatically: from 66% in 1992 to 51% in 2018. A boost in mass was mainly at the expense of the higher education sector. Thus, scientific personnel training has become the prerogative of universities. For a long time, the mass nature of the training system was combined with a lack of proper state regulation, which affected the quality of doctoral training. Some PhD students were undergoing training and submitted theses not to continue their academic career but only to obtain the status associated with a degree.

The Russian government was concerned about the quality of the scientific personnel training system, and therefore, it began planning the reforms in the early 2010s. As a result, the Federal Law No. 273 concerning education in the Russian Federation was adopted in 2012, and the Government Decree No .842 concerning the awarding of academic degrees was adopted in 2013. Transition from the mentoring model to the educational programs model began (Maloshonok & Terentev, 2019). The same transition occurred a few years earlier in Estonia, Lithuania, and Kazakhstan. Postgraduate studies have become the third level of education; the number of training courses that Russian PhD students need to take has increased. The format of postgraduate studies has become more regulated. In 2018, the number of organizations that trained PhD students actually returned to the level of the 1990s and amounted to 1223, while the number of PhD students did not reach the level of the 1990s, although it decreased to about 91,000. At the same time, the rules for awarding degrees were tightened up, and the requirements for the dissertation council members were getting more stringent as well. However, the following situation has remained: education and training of PhD students are provided by organizations, such as HEIs and research institutes, while the final decision on eligibility and awarding a degree to an applicant is made by the Higher Attestation Commission (HAC).[6] According to the HAC data, the number of thesis defense has decreased from 21,000 per year in 2013 to 10,000 in 2017. Between 2014 and 2018, the percentage of PhD students who defended their theses as a percentage of those who completed postgraduate studies has dropped significantly, from 18% to 12%, and

[5] Data from the Federal State Statistic Service was used in this section.

[6] The Higher Attestation Commission is a state agency that has existed since the Soviet times. The Commission provides a unified state policy in the field of state certification of researchers or faculty; it is responsible for the development of unified rules and confirms the awarding of academic degrees.

has become lower than the late-Soviet level. There has been a drop in the higher education sector as well, from 19% to 13%. The science sector has remained more stable, but it initially had a lower percentage of PhD students who defended their theses, which has decreased from 12% to 10% during this period. In general, such trends were a consequence of stricter regulations.

However, the fact that the rules have become stricter is not the only factor responsible for the low share of PhD students who defended their theses. Such reasons as the imperfect system for selecting PhD students, their poor motivation, low level of training, and insufficient funding can be highlighted as well (Kobzar & Roshchin, 2020; Maloshonok, 2016; Maloshonok & Terentev, 2019; Roshchina, 2016). Even leading universities have not yet managed to create a system that would allow them to select students motivated for further academic practice. Postgraduate studies are generally perceived as an opportunity to improve one's career prospects in the labor market outside academia. Less than 40% of PhD students are interested in an academic career even with universities participating in the RUEI. Many PhD students are forced to combine studies and non-academic work due to a very low level of scholarships. This has a certain impact on both the quality of learning and the motivation to submit the final thesis. Some PhD students have careers outside academia by the end of postgraduate studies and, therefore, have no incentives for submitting their dissertation.

Apart from general changes in the system of academic staff training, some modifications have been introduced to the segment of leading universities exclusively. Since 2016, several leading HEIs have been granted the right to award academic degrees by the Russian government. These universities have been given the autonomy in awarding degrees; therefore, they had to establish their own rules, requirements to the quality of an applicant's scientific work. By 2020, 25 universities have the right to award their degrees, 13 of them are participants of the RUEI. In 2018, around 38% of all postgraduates (43% of PhD university students) were studying at leading universities (calculated on the basis of MUE-2019 data). Requirements for applicants at leading universities are significantly more demanding than at other HEIs. Quite often there are international scholars in degree-awarding commissions at universities with the right to award degrees.

Anyway, the system of PhD training is still to be transformed to better serve the needs of academic profession both in university sector and sector of research institutes, to improve the quality of training and assure the conditions for PhD students to concentrate on their PhD studies and research to become a significant force for development of research agenda in universities and research organizations.

Some Reflections and Future Trends

The Russian higher education system can be characterized by an extremely high degree of state participation. State funds are the major source of funding for public universities in terms of their teaching as well as research activities. Moreover, the

state maintains strict control over HEIs, both by setting detailed "rules of the game" for all participants at the higher education market and by permanent monitoring of their implementation. Therefore, the position of research at universities is largely determined by the extent to which the science development is among the priorities of the state policy as well as by this policy regarding the role allocated to HEIs in the production of scientific knowledge. The last decade has been the time when science has been included in such priorities (articulated at the level of nationwide projects), and one of the instruments of its development has been the revision of the role of universities in this process. Accordingly, recent trends at Russian universities functioning are associated with transition from the purely teaching mission to the research mission of HEIs, which has been undertaken and consolidated. In particular, the criteria for financing universities' research activities and the structure of faculty remuneration have been modified. At the moment a group of leading universities has been formed; these HEIs can be classified as research universities.

In addition, dense interaction between the higher education and academic sectors has been facilitated. Competitive funding, including the system of grants and targeted projects such as RUEI, has led to universities and faculty body interacting more actively with other HEIs, the scientific sector representatives, as well as international researchers. This happens due to their desire to achieve better results. The level of science internationalization at universities has increased as well.

However, the focus on certain indicators while determining the amount of funding for universities and faculty remuneration often leads only to the formal fulfillment of minimum requirements and sometimes to dishonest behavior. Not only real research activity but also its imitation have been intensified. Since 2012, there has been not only an increase in the number of publications in Q4 journals but also an increase in the number of publications in predatory journals and in translation plagiarism. The practice of a paid inclusion as a coauthor is being spread, as well as the attribution of an additional affiliation for a fee (RAS, 2020; Marina & Sterligov, 2021). Quite often this happens due to an insufficient qualification level of faculty members along with a desire to receive higher remuneration or to gain promotion for which large numbers of publications are required. This is the evidence of insufficient efficiency in spending public funds, since, as a result, the science quality is suffering and unfair practices are being spread, which can also affect the quality of teaching.

Furthermore, despite the efforts of the state and universities, faculty body of HEIs is changing and adapting to the adjustments very slowly. Substantial share of Russian faculty (64%) still has a preference for teaching and is very suspicious of the recent changes in university policies related to strengthening the role of the research component; many faculty members consider research to be a burden.

This situation raises the question of whether it is a reasonable strategy to develop a research component at all universities. Perhaps HEIs outside the group of leading universities should focus more on improving the quality of teaching and focus more on their role. A teaching excellence program could contribute to this and reduce the pressure that forces non-research HEIs and faculty to imitate research activities in the absence of the necessary qualifications. To further develop research activities, a

number of measures that will make the state policy more effective have to be introduced. First of all, a more careful approach to the design of remuneration schemas is needed. Not only has the quantity of publications be controlled but also their quality. Sanctions for dishonest behavior are to be imposed. Nowadays all the contracts are universal; faculty are required both to teach and to do research. There might be a need for contract differentiation, that is, for contracts with a greater research or teaching component, implying unique conditions, incentives, and career paths. This would enable faculty members to choose more appropriate careers for themselves depending on their preferences and abilities. A number of universities have already introduced diverse career tracks. Secondly, it is necessary to train faculty body, to create a system of faculty professional development, which will allow its members to conduct research at the proper level and will promote cooperation between faculty of different Russian institutions as well as international collaboration. Thirdly, restructuring of postgraduate studies needs to be continued. Appropriate conditions must be created for young and qualified employees, who are interested in academic careers and have competitive education and research potential, to come to universities. Fourth, it is necessary to develop special programs for strengthening cooperation between the higher education and scientific sectors; this would help to enhance science in the higher education sector and lead to the accumulation of research experience by faculty body, formation of consortia engaged in basic research, and contribution to the practical implementation of these results.

Decisive actions by the state and the group of leading universities could facilitate the development of science in HEIs that are not included in institutional university development programs. In our opinion, the development of mobility programs, including the development of the postdoc institution, could help to raise the human and social capital of young faculty members, to gain experience of research and cooperation with others. This institution is now appearing in a number of Russian leading universities. Interaction of universities with regional industry could foster R&D. HEIs would receive funding from local industry solving its problems. The development of the program of university partnerships between leading and mass segment HEIs could help to integrate local faculty into the Russian academic community and provide a stronger research environment for them.

Undoubtedly, all these reforms will have to overcome the consequences of the institutional separation of the educational and research sectors. The way this will be done and the new landscape of the research and education system in Russia will to a large extent determine faculty's micro-practices, their incentives, opportunities, and performance at different stages of their academic careers.

Conflict of Interest We have no conflict of interest to disclose.

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Chapter 12
Teaching and Research Nexus in the Turkish Higher Education System: Comparative Perspectives with Eastern and Western Examples

Baris Uslu

Abstract More than doubling the number of institutions in the last decade, the Turkish higher education system has displayed highly contradictory conditions for developing the teaching and research nexus (T-R-N). While Turkey has been posited among research-focused systems, academics have found themselves in a work environment heavily teaching-loaded. Here, rather than focusing only on the national structure, a multinational comparison can assist to better understand the outcomes of the rapid expansion and research-focused trends in terms of potential contradictions regarding the T-R-N in Turkish academia. Therefore, this research examines the T-R-N perceptions of academics and the influence of personal, professional, and institutional characteristics on their perceptions comparing Turkey with the Eastern and Western case countries. This research was designed in the cross-national survey model. Adding the data of Germany and South Korea through the Academic Profession in Knowledge-based Society (APIKS) survey, the T-R-N approaches in these three countries were compared using cross-tabulation with chi-square tests and binary logistic regression. The analyses revealed that gender, career level, discipline, teaching/research preferences, and teaching time spent are the influential factors for the T-R-N perceptions and implementations of academics in the case countries, while "Research and Development (R&D) spending per academic staff" is the prominent factor at the national level comparisons.

Keywords Teaching and research nexus · Cross-national comparison · Turkish higher education system · German higher education system · South Korean higher education system

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F. Huang et al. (eds.), *Teaching and Research in the Knowledge-Based Society*, The Changing Academy – The Changing Academic Profession in International Comparative Perspective 23, https://doi.org/10.1007/978-3-031-04439-7_12

Introduction

While teaching and research are seen as the traditional duties of higher education institutions (HEIs), each higher education system (HES) mainly aims to provide a well-structured vocational and developmental training for its students. To generate such comprehensive and effective training programs, academics have to harmonize essential knowledge and up-to-date research results together in their courses. However, the professional tendency of academics toward the "teaching and research nexus (T-R-N)" is naturally shaped by the dominant approach to teaching and research in their national system, i.e., their country-specific higher education (HE) structure.

Since the nineteenth century, the Humboldtian idea of what a university is has largely influenced teaching and research approaches in global academia. This mainly underlines the potential contribution of research advancement on development of the teaching process (Nybom, 2003). Some colleagues (Calikoglu et al., 2020; Teichler, 2010; Shin et al., 2014) also argued that "while research and teaching cannot be complete without another, participating in either research or teaching will contribute to the enrichment of the other part" and outlined this symbiotic relationship as the basis of T-R-N. However, the need for more entrepreneurial mindsets in the modern world to empower a knowledge-based social and innovation-oriented economic structure has deeply affected the teaching-research relationship in many countries (Geschwind & Broström, 2015).

On the other hand, to enrich the T-R-N in HE programs, the "research-informed teaching" concept still constitutes the primary approach, including various formats, i.e., research-led teaching, research-oriented teaching, research-tutored teaching, research-based teaching, and teaching-led research (see Healey, 2005). While this understanding of research-informed teaching has found a response in the small number of teaching-research balanced HESs around the world, it is not an easy task to establish such a balance relatively in teaching- or research-focused HESs (Shin et al., 2014). Not surprisingly, similar to many developing HESs, academics also display a high-level leaning toward research productivity in Turkish universities (Calikoglu et al., 2020). However, Turkey presents a unique case of a fast-growing HES with (i) a relatively high "student/academic staff" ratio and (ii) a burdensome teaching load for university teachers (Gür et al., 2018). In this regard, the opinions of academics who work in Turkish universities can provide valuable insights about which factors shape the T-R-N understanding in such a contradictory structure of a research-focused but teaching-loaded HES.

For example, Turkey expanded the number of its universities from 33 to 77 by establishing 44 new universities between 1992 and 2005 and then tripled them with 130 new universities and 4 new vocational schools[1] afterward (https://www.yok.

[1] In Turkey, vocational schools are mostly parts of universities, except these four "private vocational schools." Yet each vocational school provides "short-cycle tertiary education" (for 2 years) at the ISCED 5 level (code 55, vocational education) (ISCED, 2011).

gov.tr/universiteler/universitelerimiz). Similarly, more than doubling the number of HE students (around 1.59 million) in 2000–2001, in 2017–2018, 3,887,682 students were attending on-campus programs at 182 universities and 4 vocational schools, in addition to the 86,473 students in distance programs and 3,586,216 students in open (higher) education programs (https://istatistik.yok.gov.tr). Notwithstanding this huge student population (7,560,371), just 158,098 academics (134,689 in public and 23,409 in private HEIs) were employed (https://istatistik.yok.gov.tr). On the other hand, as a result of 6.01% of students in master's and 1.26% in doctoral programs (https://istatistik.yok.gov.tr), most of the academics had relatively high teaching loads in the taught programs of the first cycle[2] rather than research-based programs of the second and third cycle of HE in Turkey.

In one of the rare studies on T-R-N in Turkey, through the examples of five faculties of education, Smirnova and Dos (2020) investigated the satisfaction of undergraduate students about their training program as well as their expectations related to the research−/practice-based teaching structure of the curriculum. They highlighted the huge gap between undergraduate students' perceptions and expectations on teaching nexus with research and practice components in their program while suggesting the combination of 30% teaching, 35% research, and 35% practice for the curriculum development. Focusing on the opinions of academics rather than students, Calikoglu et al. (2020) also examined academics' main activities and orientations through the results of a survey in the international project, "Academic Profession in the Knowledge-based Society (APIKS)" (see Aarrevaara et al., 2021). They concluded that while academics in Turkish universities had generally leaned toward research, their T-R-N perceptions were influenced by gender, title, and discipline and also institutional variables (i.e., public-private university distinction and the age of their institutions).

However, none of the studies mentioned above clearly respond to how the national composition of the HES influences the T-R-N approach in Turkish academia. On this point, a multinational comparison can assist a better understanding of the outcomes of the rapid expansion and research-focused trend in terms of potential contradictions regarding the T-R-N in the Turkish HES. As a bridge between Asia and Europe, Turkey's unique location provides an interesting case allowing us to compare Turkey with Eastern and Western perspectives together. Therefore, the purpose of this research is to examine the T-R-N perceptions of academics and the influence of personal, professional, and institutional characteristics on their perceptions, comparing Turkey with case in Eastern and Western countries. For this purpose, the research questions are:

1. Is there any relationship between the T-R-N perceptions of academics and their teaching/research-related preferences in Turkey and Eastern and Western case countries?

[2] In line with the definition of the European Higher Education Area, associate and bachelor's degrees are the first cycle, master's programs the second cycle, and doctoral programs the third cycle of HE (https://www.ehea.info/page-three-cycle-system).

2. How does the distribution of academic teaching and research practices differ comparing their T-R-N approaches in Turkey and Eastern and Western case countries?
3. What are the personal, professional, and institutional factors influencing the T-R-N implication of academics comparing Turkey with the conditions in Eastern and Western case countries?

Analytical Considerations

The related literature includes many studies which clearly emphasize the bilateral relationship between research and teaching. For example, Leal and Marquina (2014) stated that "the dialectics between both functions [teaching and research] can be observed when research feedbacks into teaching and gives its fundamentals and updates it" (p. 246), while teaching generates new research areas (e.g., medical education, business education, etc.) and brings forth new research questions for disciplines, particularly through master's and doctoral research training (Taylor, 2008). However, the intensity of the T-R-N connection in any HES is influenced by highly different factors (see Fig. 12.1).

First, considering the globalized structure of the modern world, it is natural to see global competition in any areas contributing to the welfare of nations. In particular, as Marginson (2021, p. 7) explained within "an arms race in innovation between competing nations" (one of four drivers of Global Science), the development dynamics of knowledge economy force nations to invest more in innovative research to be able to empower their competitiveness in science and technology at a global level. Another driver in Marginson's (2021) study, the narrative of "a world market of competing institutions ('World-Class Universities')," underlines many global trends in HE. As Salmi (2009) outlined, to be called a "world-class university," universities in each country aim initially to enhance their research reputation and then consider teaching environment. Thereby, modern universities encourage (even force) their academic staff to obtain external funds and publish articles in prestigious journals (Uslu, 2017). Further, universities primarily seek ways to attract high-quality researchers (and also students) from all over the world, "which in turn suggests that it possess a strong international brand" (https://www.topuniversities.com/qs-world-university-rankings/methodology). On this point, it could be a different topic to examine the T-R-N perceptions of domestic and international academics in any nation. Nonetheless, it would be better to count international academics within the academic population in a related country when comparing the T-R-N perception of academics from different countries as the main approach in this study.

Investigating various HESs, Shin and Cummings (2014) outlined the system-level model of teaching and research as a combination of input, throughput, and output components with environmental factors (p. 383). This comprehensive model includes different national characteristics such as resources (e.g., finance, facility,

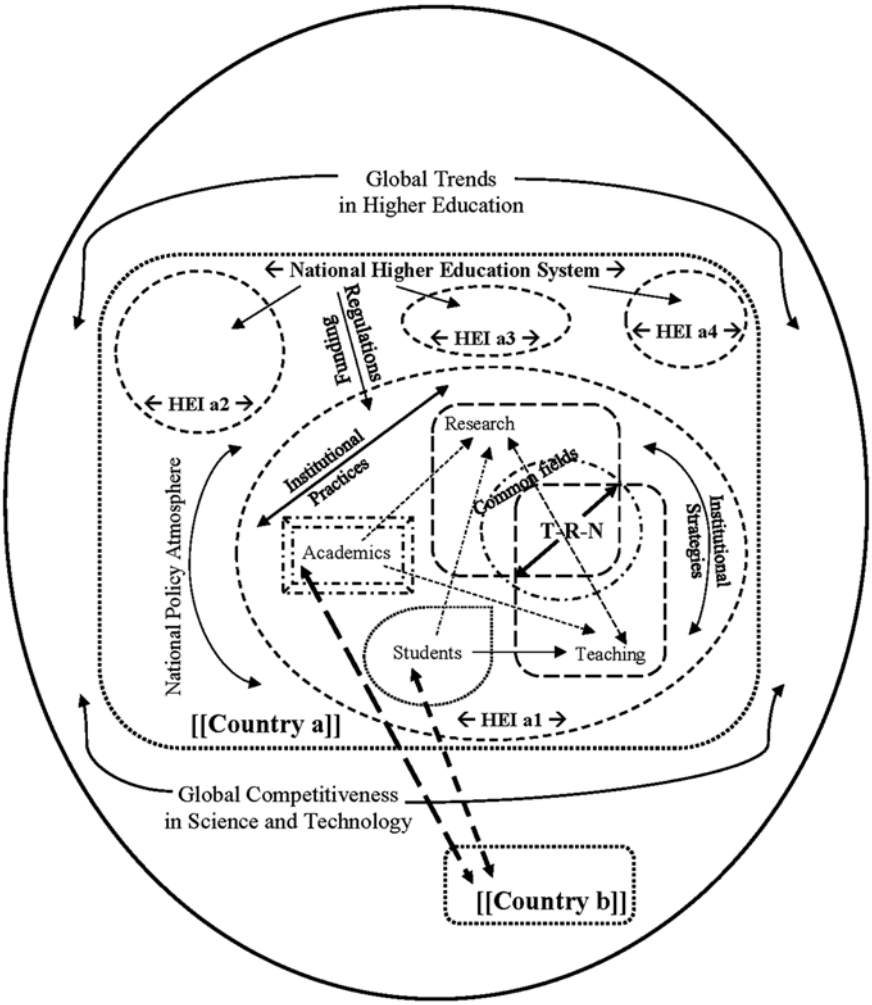

Fig. 12.1 Analytical frame of T-R-N for international comparison (**HEI* higher education institution)

equipment, within inputs), human components (e.g., academics, students, staff, within inputs), social demands (e.g., massification, knowledge society, within environments), and management reforms (e.g., new public management, within environments). These factors clearly underline the potential impact of policy atmosphere and funding stream (both for research and HE) as well as human resources on the T-R-N structure in the related HES. On the other hand, even though the comparative evaluation of recent HE, science, and technology policies can provide a good basis to discuss the differentiation of T-R-N approaches in various countries, it is not easy

to take the policy environment in any particular country directly as a research variable when comparing with other case countries. Another aspect, especially the size-independent data of research and development (R&D) investment and HE spending and "students per academic," is an opportunity to compare the reflections of financial and human resource factors on the T-R-N implementation of academics in various countries.

In another study, Taylor (2007) proposed a model for institutional management of T-R-N integrating ideological factors (e.g., institutional mission, beliefs, and values) and environmental factors (e.g., differential funding arrangements, assessment, and accountability) (p. 882). With the combination of these factors, the emerging leadership and institutional culture result in the passive or active management of T-R-N in the related institution. While the reflection of institutional strategies (in the form of research and/or teaching orientation) is clearly part of potential research variables related to the T-R-N approach, the components of passive-active management (e.g., curriculum development, research encouragement or stimulation, quality assurance or assessment, and strategic and operational planning of resources and staff development, in particular) provide a well-structured theoretical background to discuss the institutional differentiation of T-R-N intensity.

In addition, Zhang et al. (2020) tested a theoretical model focusing on the intermediary relations among research orientation (using the word "agenda"), research and teaching self-efficacy, and teaching styles (p. 77). While these variables offer some important clues related to potential outcomes in terms of T-R-N belief and implementation, they also underline the inevitable impact of demographic variables on academics' T-R-N approach. As the combination of personal and professional factors, these demographic variables can assist in better understanding how gender, family responsibilities, teaching and research time budget, teaching level, position title, discipline, and contract conditions influence academics' T-R-N beliefs and implementation in different countries.

Accordingly, to be able to properly compare the perceptions of academics about T-R-N in the Turkish HES with other countries, this research will combine highly diversified variables. While accepting "R&D spending per academic," "HE spending per student," and "students per academic" as environmental (or national) factors, the research will also include likely institutional variables, as follows: types of HEIs, institutional orientation toward teaching and research, resource allocation, and appointment/promotion strategies. It is to be expected here that various personal (e.g., gender, age, family responsibilities) and professional (e.g., having a doctoral degree, senior/junior positioning, discipline, contract status, research-teaching time, program level of teaching) features may also be counted as research variables. In contrast to all these potential independent variables, the research-teaching preferences of academics, their T-R-N beliefs and implementation, as well as the teaching style and research orientation they have adopted can be seen as the prominent dependent variables in this comparative research.

Case Selection Approach

To develop an internationally comparative research design, there are basically two essential requirements: (i) having a common dataset and (ii) suitably selected case countries (Altbach, 1998; Teichler, 1996). In line with the first criterion, this study benefitted largely from the multinational data of APIKS research (APIKS, 2020) and derived data partially from OECD and national statistics. Parallel to the unique location of Turkey between Asia and Europe, in addition to Turkey, this research will also include one case country from the East and another from the West.

As Seawright and Gerring (2008) explained, "most similar" or "most different" cases are two distinctive strategies to define the best potential country cases for multinational comparison. Considering the fast-growing structure and research-focused composition of the Turkish HES (Calikoglu et al., 2020), it would be better to select the most similar cases to Turkey in order to evaluate the influence of national circumstances on the T-R-N approaches comparatively in HESs having similarly rapid massification and research expansion experience.

Looking at the typology of HESs clustered by Shin and Cummings (2014, p. 389), Argentina, Germany, and Finland are among the research-focused APIKS countries from the West. While other APIKS countries from Europe also display a high research preference (Postiglione & Kim, 2020), they have a relatively smaller HES. At this point, among research-focused APIKS countries from the West, only Germany has a similar size with Turkey (e.g., 82.66 million population in 2017 while 80.31 million in Turkey) (https://stats.oecd.org/). Despite the visible divergence of its HEIs, around 2.85 million students were being educated at universities, universities of applied sciences, and colleges of art and music in Germany in 2017–2018 (https://www.destatis.de/). For the same academic year, this is the closest student number among European countries to Turkey, which had 3.89 million students in on-campus programs (https://istatistik.yok.gov.tr). Interestingly, German HEIs employed around 240,000 full-time academic staff (including roughly 46,000 professors) (https://www.destatis.de/) while around 158,000 academics including 76,616 professors (including assistant, associate, and full professors) (https://istatistik.yok.gov.tr). Beyond these quantitative proximities, Germany has also implemented the Excellence Initiative since 2005 to empower their universities' research profiles and has started to call German universities which have received extra funds through this initiative as "Excellence Universities" (Müller & Schneijderberg, 2020). The recent policy of research universities in Turkey, which includes supporting ten selected (and five candidate) universities with extra funds to improve their ranking performance (https://www.yok.gov.tr/), is quite approximate to the Excellence Initiative in Germany.

Compared with the roughly 80 million Turkish population in 2017, huge differences are seen among the Eastern cases of APIKS countries, for example, a population of over 100 million in both Russia and Japan, but less than 60 million in Kazakhstan, Malaysia, South Korea, and Taiwan. Therefore, it would be better to look for an Asian country employing a research-focused policy, such as with

Germany and Turkey. In this respect, South Korea presents a good case with its Brain Korea 21 (BK21) project (Lee et al., 2020). This national policy was launched in 1999 and, since then, by providing funds to the South Korean universities, aims to foster research-oriented universities having world-class graduate schools and high-quality scholars (Moon & Kim, 2001). Another similarity, South Korea has had experience of huge massification in its HE: the number of students increased from 539,000 in 1980 to 3.44 million in 2017 (https://kess.kedi.re.kr/). To cater this student population, 90,902 academics (teaching faculty, as named by KESS) were employed in South Korean HEIs (https://kess.kedi.re.kr/).

While all these three HESs experienced fast-growing student population and reached relatively same level (more than 3 million), the number of academics in each system is highly different. This also makes a different level of student/staff ratio and has potentially brought a variety in terms of teaching load and research time for academics in Germany, Turkey, and South Korea. Here, unlike German (https://www.destatis.de/) and South Korean HESs (https://kess.kedi.re.kr/), Turkish HES has the student population in online programs (calling "open education") more than the number of students in on-campus programs (https://istatistik.yok.gov.tr). Such a huge addition naturally increases the student/academic ratio in Turkey far above Germany and South Korea (see Table 12.1). Moreover, Germany and South

Table 12.1 Distribution of sample from Germany, Turkey, and South Korea and their national conditions[a]

Variable		Germany	Turkey	South Korea
Gender	Female	1896 (39.2%)	905 (50%)	237 (28.5%)
	Male	2938 (60.8%)	904 (50%)	594 (71.5%)
Career level	Senior	939 (15.5%)	1315 (72.7%)	847 (100%)
	Junior	5123 (84.5%)	495 (27.3%)	–
Discipline[b]	STEM	3230 (56.5%)	634 (35%)	345 (41.2%)
	MHS	–	400 (22.1%)	117 (14%)
	SSHA	2483 (43.5%)	776 (42.9%)	375 (44.8%)
Sample (n)		6112	1810	847
R&D spending per staff in higher education institutions (USD)		60,223	45,777	84,244
R&D excluded higher education expenditure per student (USD)		10,436	7857	8400
Students per staff in higher education		7.4	47.82	37.84

[a]STEM, science, technology, engineering, and mathematics; MHS, medical and health sciences; SSHA, social sciences, humanities, and arts

[b]The percentages for the sub-groups of each variable were calculated after extracting the missing data

Korea have a high number of vocational colleges,[3] whereas vocational colleges are the parts of universities rather than being autonomous institutions in Turkey. This formation of vocational colleges under the university umbrella does not officially allow to train graduate students. Therefore, the postgraduate students' ratio in Turkey is visibly lower than German and South Korean HESs.[4]

Further, the status of academic titles expectedly determines whether academics can work with graduate students. For example, lecturer having PhD degree cannot supervise any master's/doctoral studies in Turkey; only faculty members (including assistant, associate, and full professors) can participate in graduate programs (Uslu et al., 2021). Academics must earn their tenure through national tenure scheme in Turkey to become an associate professor and then can be promoted to full professorship after their 5-year tenure achievements. However, being rarely, academics with PhD degree can be hired to full professorship (W3 level) in Germany even if they do not have tenure [habilitation] achievement (Hüther & Krücken, 2018). While South Korean HES has a similar title structure with Turkey, they tend to assume only full professors as senior academics (see Table 12.1). In this respect, it is hard to reach a common definition of senior-junior academics. Nonetheless, it appears that the APIKS Dataset accepted all academics having professorial titles within senior academics (APIKS, 2020). This basically means that assistant/junior, associate, and full professors are counted in the senior group for all three HESs while lecturers, research assistants, and doctoral/postdoctoral researchers are within the junior group. In the current research, another unity is about the institutions of APIKS participants. Only German dataset includes participants from "other" types of HEIs in addition to universities; thus, the dataset of Germany was limited with the participants from universities, as in the case of Turkish and South Korean datasets.

Regarding the financial aspects, measuring "expenditure by tertiary institutions as a share of GDP" and "expenditure on R&D in tertiary institutions," the "U21 Ranking of National Higher Education Systems" report also evaluated the resource components in these three countries with similar scores: #18, Germany (66.7); #19, South Korea (65.8); #21, Turkey (61.6) (Williams & Leahy, 2018, p. 11). On the other hand, in 2017, GDP per capita in Germany (52,953 USD), South Korea (40,957 USD), and Turkey (28,193 USD) show different levels of economic development (https://stats.oecd.org/). If we take into account the following comment in the same U21 report: "for low-income countries, especially those with a large student-age population, a high share of GDP [for tertiary education] may not

[3] In 2017/2018: Germany had 215 "university of applied sciences [Fachhochschulen]," including 93 private institutions (https://www.destatis.de/); South Korea had 138 junior colleges, including 129 private ones (https://kess.kedi.re.kr/); Turkey had only 4 private vocational colleges (https://www.yok.gov.tr/universiteler/universitelerimiz).

[4] In 2017/2018: the ratio of master's degrees was 28.2% and of doctorate degree 5.5% in the total number of HE students in Germany (https://www.destatis.de/); the ratio of graduate students (including both master's and doctoral programs) was 9.5% in South Korea (https://kess.kedi.re.kr/); the ratio of master's and PhD students was 7.27% in Turkey (https://istatistik.yok.gov.tr).

translate into high expenditure per student" (Williams & Leahy, 2018, p. 10), then these countries also display a highly different picture in terms of size-independent rates of educational expenditure per student and R&D spending per staff in the HE sector (https://stats.oecd.org/). As a result of all similarities and differences explained above, among the APIKS countries, Germany and South Korea still present potentially most suitable Eastern and Western cases to compare the influence of personal, professional, and institutional variables on academics' T-R-N perceptions in Turkey with their colleagues from the other countries having a similarly massified and research-focused HES but displaying a different level of economic development.

Method

This research was designed as a survey model and followed a cross-national comparison pattern. A survey design allows researchers to describe quantitatively the trends, attitudes, or opinions among a population by studying a sample (Creswell, 2009). To be able to compare the current conditions influencing academics' T-R-N perceptions and implementations in similar research-focused HESs, the researcher examined the survey results of academics from Germany, Turkey, and South Korea. The APIKS survey was the data collection instrument and simultaneously applied to academics in the APIKS countries between 2017 and 2019 (see details: Aarrevaara et al., 2021).

Data Sources and Sampling

The survey data of Germany, Turkey, and South Korea were accessed through the first version of APIKS International Database (APIKS IDB v1) (APIKS, 2020). While the data of South Korea included only academics working in universities, the data of Germany also included academics employed in other types of HEIs (n = 1171). However, the data of Turkey included a limited number of respondents from outside HEIs (such as from schools, governmental institutions, hospitals, and a national TV station; n = 12). Therefore, to ensure unity among these countries' data, the researcher retrieved the survey responses of academics only working in universities in Germany, Turkey, and South Korea (see Table 12.1). Parallel to the research questions, only the data related to the selected variables of T-R-N (perceptions and implementations) and potential (personal, professional, and institutional) factors were included in the dataset of this research. In addition, as size-independent signs of national conditions, benefitting from OECD Statistics (https://stats.oecd.org/), "R&D spending per staff in HEIs," "R&D excluded HE expenditure per students," and "students per staff in HE" (dividing the related national statistics (https://www.destatis.de/; https://kess.kedi.re.kr/; https://istatistik.yok.gov.tr)) were added to the dataset.

Data Analysis

In this study, two statistical techniques were implemented, following the research questions. First, cross-tabulation (with chi-square test) was employed to comparatively examine the T-R-N perceptions of academics in Germany, Turkey, and South Korea. For the next step of the analysis, the researcher categorized academics into two groups, "reinforcing teaching activities by their research" and "non-reinforcing teaching activities by their research," by combining their response to the criteria "Your research activities reinforce your teaching," as follows: non-reinforcing (1, Strongly disagree; 2, Disagree) and reinforcing (4, Agree; 5, Strongly agree). After this categorization, using the sub-group percentages for a more accurate analysis (considering the differentiation among country sample sizes), the leaning of academics toward teaching and research, their time budget for teaching and research, and the teaching level they taught were compared with the same technique (cross-tabulation and chi-square test) in each group of the T-R-N "reinforcing" and "non-reinforcing" academics. The researcher then calculated the percentages of the sub-groups of country samples to examine the differences between the usage of various teaching activities, within the T-R-N reinforcing and non-reinforcing groups, separately employing cross-tabulation and chi-square test. For all these cross-tabulations explained above, 0.05 was taken as the significance level for chi-square test results.

In the final part, the researcher re-organized the data of each selected country, first eliminating all missing data for the related variables. The "3 = Half-Half" respondent academics for the 5-point Likert-type questions were also eliminated. Then, the remaining academics' responses were categorized for each related question separately and coded, for example, "negative" vs. "positive" T-R-N perceptions, or "less" vs. "much" stronger teaching-orientation in the institution, in addition to the ready categorization of career level (senior or junior), discipline (STEM, MHS, or SSHA), contract status (full-time, part-time, according to the duty, or other), having a PhD degree (yes or no), teaching level (undergrad or postgrad), and gender (female or male). However, the researcher could not take age (as missing question in the German data) and family responsibility (because of different coding in the German data beyond three options in the APIKS Survey) into consideration as the research variables.

Nonetheless, the researcher also calculated the mean of the teaching and research budget for academics in Germany, Turkey, and South Korea altogether (for teaching, $\bar{X}$ =12.81 h per week; for research, $\bar{X}$ =16.22 h per week) and then categorized academics in "lower" or "higher" time groups, according to the means. Lastly, the researcher categorized academics from "low," "mid," and "high" profile countries according to "R&D spending per staff member in HEIs," "R&D excluded HE expenditure per student," and "students per staff" in these three countries. At the end of this data categorization, considering two sub-groups of dependent variables (negative or positive T-R-N beliefs and reinforcing or non-reinforcing T-R-N connection), binary logistic regression was performed to explore the significant predictors

of academics' T-R-N perceptions and implementations through the case countries. Again, a significance level of 0.05 was taken as the line for statistical significance in logistic regressions.

Findings

This research comparatively analyzed the T-R-N approaches in Germany, Turkey, and South Korea. The results of the analysis were then presented following the sequence of research questions. Combining the results regarding the first research question, Table 12.2 summarizes the differences among T-R-N perceptions of academics from the case countries as well as the differences in their T-R preferences, weekly T-R times, and the level of their teaching.

As can be seen in Table 12.2, considering "disagree" sides with the negativity in the term "incompatibility," academics' perceptions regarding the T-R compatibility show a significant positiveness in favor of academics from South Korea compared to their colleagues from Germany and Turkey. However, looking at the number of academics in T-R-N reinforcing groups in each country, there are more academics in T-R-N reinforcing groups than academics having a positive approach to the T-R compatibility. Moreover, academics' weekly teaching and research times (for in-session period of their universities) do not significantly differ either for the T-R-N reinforcing or non-reinforcing groups of academics in the case countries, while the mean of research time is less than teaching time for academics in Turkey and South Korea, unlike Germany. Here, it is also important to query the differentiation in academic teaching activities and research orientations in these three countries. In this regard, the following two tables display the general differences between the teaching activities and research orientations for the T-R-N reinforcing and non-forcing groups of academics in Germany, Turkey, and South Korea (see Tables 12.3 and 12.4).

According to Table 12.3, both for the T-R-N reinforcing and non-reinforcing groups, academics in South Korea significantly use two student-centered methods, "individualized instruction" and "face-to-face interaction with students outside of class," more than their colleagues in Germany and Turkey. In addition, academics from these three countries present a similar picture for another student-centered teaching approach, project-based learning, at least for the T-R-N non-reinforcing group. Another interesting result in Table 12.3 seems related to technology-oriented teaching in Germany, Turkey, and South Korea. First, it is important to remember that the APIKS data were collected before the COVID-19 pandemic. During this period of time, Turkey and South Korea had a remarkable number of students in distance/open education programs (https://kess.kedi.re.kr/; https://istatistik.yok.gov.tr), although the researcher could not reach any specific number for the student population of open/distance HE programs in Germany. When we look at the "ICT-based/computer-assisted learning" section, German academics use this teaching approach more frequently in their classes.

Table 12.2 Academics' T-R-N perceptions, T-R approaches and time budgets, and teaching levels in Germany, Turkey, and South Korea

Variable		Germany			Turkey			South Korea		
Perception		Disagree	Half-Half	Agree	Disagree	Half-half	Agree	Disagree	Half-Half	Agree
Incompatibility of T-R*		2355 (39.7%)	1631 (27.6%)	1942 (32.7%)	895 (49.4%)	447 (24.7%)	468 (25.9%)	530 (62.6%)	195 (23%)	122 (14.4%)
Leaning T/R	Sub-group	Teaching	Research		Teaching	Research		Teaching	Research	
	Reinforcing¥	761 (23.6%)	2457 (76.4%)		262 (27.7%)	685 (72.3%)		247 (34.9%)	460 (65.1%)	
	Non-reinforcing¥¥	236 (32.2%)	498 (67.8%)		115 (38.2%)	186 (61.8%)		14 (45.2%)	17 (54.8%)	
Time budget	Sub-group	Teaching time	Research time		Teaching time	Research time		Teaching time	Research time	
	Reinforcing†	12.74 h	17.31 h		19.18 h	13.20 h		19.47 h	17.27 h	
	Non-reinforcing††	11.74 h	17.42 h		18.70 h	9.97 h		18.26 h	15.45 h	
Teaching level	Sub-group	Undergraduate	Postgraduate		Undergraduate	Postgraduate		Undergraduate	Postgraduate	
	Reinforcing$^{\beta}$	2703 (87.1%)	2706 (87.1%)		882 (93.1%)	709 (74.9%)		680 (96.3%)	581 (82.3%)	
	Non-reinforcing$^{\beta\beta}$	611 (86.5%)	531 (75.2%)		282 (93.7%)	184 (61.1%)		29 (93.5%)	19 (61.3%)	

*$p < 0.05$ → in terms of positive approach to T-R compatibility, South Korea > Germany; South Korea > Turkey

¥$p > 0.05$ & ¥¥$p > 0.05$ → no significant difference between the percentages of teaching or research leaning academics within the sub-groups of T-R-N reinforcing academics and T-R-N non-reinforcing academics

†$p > 0.05$ & ††$p > 0.05$ → no significant difference between the mean time budgets of weekly teaching and research (in session period) for the sub-groups of T-R-N reinforcing academics and T-R-N non-reinforcing academics

$^{\beta}$ $p > 0.05$ & $^{\beta\beta}p > 0.05$ → no significant difference between the percentage of academics teaching in undergraduate or postgraduate levels within the sub-groups of T-R-N reinforcing academics and T-R-N non-reinforcing academics

Table 12.3 Comparison of academic teaching activities in Germany, Turkey, and South Korea

	T-R-N reinforcing group				T-R-N non-reinforcing group			
Teaching activities	Germany	Turkey	South Korea	χ^2	Germany	Turkey	South Korea	χ^2
Individualized instruction	16.9%	22.5%	64.3%	58.17*	12.1%	14.6%	51.6%	51.17*
Project-based learning	–	–	–	–	26.9%	27.2%	51.6%	18.24*
Practice instruction/ laboratory work	36.9%	56.6%	56.5%	10.39*	40%	59.1%	45.2%	7.77*
ICT-based learning/ computer-assisted learning	–	–	–	–	18.9%	15.6%	3.2%	13.08*
Distance education	1.3%	17.6%	13%	16.02*	0.3%	14.3%	16.1%	16.89*
Face-to-face interaction with students outside of class	54.6%	73.6%	92.4%	35.29*	43%	62.5%	80.6%	30.69*

* $p < 0.05$

Table 12.4 Comparison of academic research orientations in Germany, Turkey, and South Korea

	T-R-N reinforcing group				T-R-N non-reinforcing group			
Research orientations	Germany	Turkey	South Korea	χ^2	Germany	Turkey	South Korea	χ^2
Basic/theoretical	65.7%	39.5%	56.4%	13.85*	59.2%	34%	62.1%	18.93*
Applied/practically oriented	58.8%	78%	81.2%	14.33*	52.5%	76.2%	58.6%	12.62*
Commercially oriented/intended for technology transfer	13.4%	17.7%	26.4%	5.59*	–	–	–	–
Based in one discipline	42.2%	17.2%	35.1%	15.46*	39.3%	23%	21.4%	9.73*

* $p < 0.05$

Table 12.3 also shows significant differences between academics from Germany, Turkey, and South Korea considering the percentage of "practice instruction/laboratory work" in their teaching, both for the T-R-N reinforcing and non-reinforcing groups. However, this result arises from an important research limitation. While the Turkish sample included flat rates for the three major disciplinary cohorts, the South Korean sample also included academics from the field of medical and health sciences (MHS). However, the German sample did not include any participants from the MHS areas (see Table 12.1). Taking the practical nature and intensity of laboratory-based training in the MHS-related programs into consideration, there would be a high possibility of seeing no significant difference for academic practice/laboratory adaptation to their classes if the German sample included academics from the disciplinary cohort of MHS.

In general, Table 12.4 shows a significantly higher percentage of academics leaning toward basic/theoretical and discipline-based research in Germany. In contrast, academics display more a practical and applied research orientation in Turkey and South Korea. Moreover, when we re-observe the percentage of survey participants from the field of MHS, which are among the most practical research areas, it is not surprising to have a higher percentage of academics (both in T-R-N reinforcing and non-reinforcing groups) showing a tendency to do applied/practically oriented research in Turkey and South Korea. While 22% of survey participants in Turkey and 14% in South Korea have worked in MHS, having no one from these areas in the German sample might statistically have resulted from this relatively low percentage in the applied/practical research incline, at least among survey participants from Germany. Another result here is the significant difference (only for the T-R-N groups) between the percentage of academics focusing on technology production and research commercialization in favor of academics from South Korea. As well as these country-specific differentiations regarding teaching and research implementations of academics, it is also important to evaluate the influence of various factors on the beliefs and actions of academic personnel (see Table 12.5) in order to understand more about the sources of variations in their T-R-N perceptions and implementations.

The findings in Table 12.5 provide highly divergent scenarios for Germany, Turkey, and South Korea in terms of the significant factors related to academics' T-R-N perceptions and implementations. Interestingly, none of the personal, professional, and institutional variables create a difference in the T-R-N perceptions of academics from Germany and South Korea; and only career level is a significant factor in Turkey (in favor of senior academics). This is actually not a surprising result when we consider the seniority categorization in the APIKS IDB v1.0.[5] While the South Korean data only included the senior group, the junior group in Germany includes lecturers as well as doctoral/post-doctoral researchers (APIKS, 2020). However, the junior group in Turkey included only lecturers who primarily have only teaching duties and are not expected officially to be research-active (Uslu et al., 2021).

Looking over academics' T-R-N implementations, the gender and teaching time budget are the influential factors in Germany while academics' discipline and teaching/research preference for Turkey case. On the other hand, two different factors influence the academics' T-R-N implementation in Turkey. First, the disciplinary divisions in this research surprisingly revealed that academics from SSHA more strongly integrate research components into their teaching activities compared to their colleagues from STEM areas as well as MHS fields, in which T-R-N implementation was the least frequent among academics from all these three disciplinary cohorts. Second, academics' teaching/research preference has an influence on their T-R-N implementations, and there is a significant difference in favor of the research-leaning academic cohort.

[5] The categories consist of "senior (occupying professorial roles) (e.g., including W3, W2, and W1 Junior professorship in Germany and full, associate, and assistant professorship in Turkey and South Korea)" and "junior (the others)."

Table 12.5 Regression of research variables and T-R-N approaches in Germany, Turkey, and South Korea

Country →	**Germany**		**Turkey**		**South Korea**	
Variable	**T-R-N perception**	**T-R-N implementation**	**T-R-N perception**	**T-R-N implementation**	**T-R-N perception**	**T-R-N implementation**
Gender	–	$\beta = 6.577$	–	–	–	–
Career level	–	–	$\beta = -0.919$	–	–	–
Discipline	–	–	–	$\beta = -0.451$	–	–
Teaching/research leaning	–	–	–	$\beta = -0.752$	–	–
Teaching time	–	$\beta = -3.547$	–	–	–	–
Model summary	$p = 0.112$	$\chi^2 = 36.007$**; $R^2 = 0.629$	$\chi^2 = 30.044$*; $R^2 = 0.096$	$\chi^2 = 37.603$**; $R^2 = 0.127$	$p = 0.402$	$p = 0.509$
Country →	**Germany-Turkey-South Korea**					
Variable	**T-R-N perception**			**T-R-N implementation**		
R&D spending per staff in higher education institutions	$\beta = 0.699$			$\beta = -1.211$		
R&D excluded higher education expenditure per student	$\beta = -0.577$			$\beta = 0.442$		
Model summary	$\chi^2 = 202.736$; $R^2 = 0.043$			$\chi^2 = 160.047$; $R^2 = 0.043$		
Country →	**Germany-Turkey**		**Turkey-South Korea**		**South Korea-Germany**	
Variable	**T-R-N perception**	**T-R-N implementation**	**T-R-N perception**	**T-R-N implementation**	**T-R-N perception**	**T-R-N implementation**
R&D spending per staff in higher education institutions	$\beta = -0.456$	$\beta = -0.328$	$\beta = 0.410$	$\beta = -0.990$	$\beta = 1.276$	$\beta = -1.653$
Model summary	$\chi^2 = 50.679$*; $R^2 = 0.012$	$\chi^2 = 17.346$**; $R^2 = 0.005$	$\chi^2 = 54.695$*; $R^2 = 0.038$	$\chi^2 = 156.730$**; $R^2 = 0.128$	$\chi^2 = 178.244$*; $R^2 = 0.048$	$\chi^2 = 122.076$**; $R^2 = 0.043$

* $p < 0.05$ → for "perceptions", Germany: $n = 4297$; Turkey: $n = 1363$; South Korea: $n = 652$
** $p < 0.05$ → for "implementations", Germany: $n = 3972$; Turkey: $n = 1248$; South Korea: $n = 738$ (only includes teaching active academics)

Despite a large variation among the case countries (in the form of the pole position of South Korea in R&D spending per staff, of Germany in R&D excluding HE expenditure per student, and of Turkey in the students/staff ratio), Table 12.5 presents a relatively clear picture of the influence of prominent national features on the T-R-N perceptions and implementations of academics. Whereas the "students per staff" ratio is not a significant factor either in ternary or dual comparisons of case countries, "R&D spending per staff" and "R&D excluded HE expenditure per student" are influential on academics' T-R-N perceptions and also implementations. Although dual comparisons could not reveal the pairs of countries which were the sources of difference(s) because of the low-level influence of expenditure per student (≈0.001 variation of academics' T-R-N implementations), triad analysis in which this factor was added alone ($\beta = -0.085$) showed that higher expenditure on students positively contributes to the T-R-N approaches of academics. Even so, among the national factors in this research, "R&D spending per staff" is the main variable influencing academics' T-R-N perceptions and implementations.

Discussion

This study focused on the T-R-N approaches in the Turkish HES comparing two exemplifying countries. Counting the location of Turkey as between Asia and Europe, South Korea and Germany were identified from the Eastern and Western parts of the world as the most similar cases among research-focused APIKS countries. While comparing the teaching activities and research orientations of academics, including personal, professional, institutional, and national factors, 18 variables were also examined in terms of their influence on academics' T-R-N perceptions and implementations in these countries.

First, this study revealed that more academics employ research-reinforced teaching than the number of academics having a positive approach to the T-R compatibility in each of the case countries. This is not a surprising result when we consider the larger population of research-active academics in these three countries. Naturally, rather than their T-R-N beliefs, the research-focused institutional environment is a more influential factor directing academics to enrich their teaching with their research expertise (Shin & Cummings, 2014), whether their main preference is teaching or research in their career (see "Leaning T/R" in Table 12.2). The analysis results also evinced that academics spend more time on teaching than research in Turkey. This generates the perception that the Turkish HES is a teaching-focused rather than a research-focused system. When we take the following appointment and promotion criteria into account: (i) academics need at least one published article for assistant professorship (although universities can increase their criteria), or (ii) a maximum of 4 points from teaching experience and at least 96 points from publications (articles, books, book chapters), citations, and project involvement to be able to apply to the national tenure scheme (Uslu et al., 2021), it is obvious that a strictly research-focused career path awaits academics in Turkish universities.

As another factor forcing the research-focused evolution in Turkish academia, based on their research performance (a combination of publications, citations, projects, and patents), the government has already selected ten research universities (and five candidate research universities) since 2017 to support with extra funds and appointment quota in order to improve the visibility of Turkish universities in international rankings (https://www.yok.gov.tr/). While the government announced that they will continue to select more research universities, many universities embraced being a research university as their vision (e.g., the researcher's institution (COMU, 2021)). From previous examples of "unfair competition" criticism from China (Huang, 2015) and Russia (Matveeva et al., 2019), one can say that such a policy does not have enough potential to create an overall quality increase for the entire system of Turkish HE. Nonetheless, it seems a more meaningful policy for Turkey to strengthen universities in line with the primary research and workforce needs of their region, as was started in 2020. With this policy, as an important step, the Council of Higher Education, Turkey (YÖK), selected 15 universities from 7 different geographical regions of Turkey and, with extra staff appointments and research funds, has supported research development of these universities in the regionally prioritized fields (https://www.yok.gov.tr/).

On the other hand, in comparison with South Korea and Germany, particularly the greater research time than teaching time of academics against a very low level of students per staff in Germany, it was revealed that it is an urgent matter to rise the number of academic staff in Turkish universities. It is obvious that a comparatively lower "students/staff" ratio (see Table 12.1) means more research time for academics in Germany, while academics are likely to have to deal with a larger teaching load in Turkey and South Korea. Another potential factor influencing academics' research and teaching time budget might be the population of part-time academics in these three countries. German academia employed 146,111 temporary staff (against 239,200 full-time staff in 2017 (https://www.destatis.de/)), while this temporary staff ratio is only around 2% in the Turkish sample (Calikoglu et al., 2020) and similarly limited for South Korea (Lee et al., 2020). It seems that part-time positions, largely for junior staff without a PhD degree (Teichler, 2008), help senior academics in order to decrease their teaching load and to save more time for their research in Germany, in comparison with Turkey and South Korea.

Nonetheless, as Özoğlu et al. (2016) argued, the 100+ young universities established after 2005 (as a result of the national policy "to establish at least one university in each city") especially need a large number of new faculty members. Considering the limited attractiveness of Turkey for foreign academics in terms of salaries and social rights (Uslu et al., 2021), it is a better option for Turkey to focus on training the next generation of its own academics. In this regard, the existing policy of the 100/2000 program, aiming at 2000 PhD graduates from 100 prioritized areas, is a promising national initiative. However, the authorities should seriously increase the number of graduates targeted in this initiative and expand the disciplinary areas, currently mostly from STEM and MHS, by adding some highly specialized fields of SSHA, such as philosophy, management, traditional arts, etc.

Beyond generating more research time for the expanding academic population to empower T-R-N approaches among academics, the R&D budget of their institutions provides an important advantage, as in the case of South Korea. Therefore, the Turkish government has to increase the R&D budget of universities as much as they can to form a more supportive research environment. In particular, comparing the higher fund limits and duration in Germany (no maximum limit up to 6 years of DFG funds, https://www.dfg.de/en/index.jsp) and South Korea (between 200,000 and 400,000 USD up to 3–10 years of NRF funds, https://www.nrf.re.kr/eng/index), Turkish authorities should seek ways to increase both the time and financial limits of research funds, for example, just 90,000 USD for 3 years in the TÜBİTAK-1001 program,[6] the most prestigious academic fund in Turkey. As a result of such potential increases in academic population and research support, academics can access suitable facilities to enrich their research endeavors as well as have more time to further improve their research-informed teaching activities.

If we review the results of the other case countries in the research, it seems that South Korea also has a similar problem with a relatively high "students/staff" ratio, resulting generally in less research time than teaching time for academics. Therefore, it is important to continue to further improve the existing national initiatives for doctoral education such as the Brain Korea 21 project (and a couple of similar initiatives, see Shin, 2012). As can be seen through the comparison of the "R&D spending per staff" rates in the case countries, South Korea is still in good condition to support research activities, even for their expanding academic population. Further, having the highest R&D spending rate among three case countries, academics in South Korea use student-centered teaching activities (i.e., "individualized instruction," "face-to-face interaction with students outside of class," and "project-based learning") more than their colleagues in Germany and Turkey. Comparatively, there are two possible explanations, one for Turkey and one for Germany. First, academics in Turkey have to teach in highly crowded classes (Calikoglu et al., 2020; Uslu, 2019); thus, they cannot find a suitable environment to employ such student-centered teaching techniques. Against the reduced teaching time in the German academia, from looking at the website of any academic staff (especially professors) at one of the large universities in Germany, one can easily see the hierarchical structure for students to visit their university teachers, starting with getting an appointment from the secretariat of the related professorship (chair). Therefore, German academics may not find enough time within their shorter teaching time budget to generate an individualized approach in their classes, while students are possibly struggling with the strict procedure to access their teachers outside classes.

This research also showed that academics from South Korea and Turkey are familiar with distance education methods because of the high number of students

[6] 720,000 Turkish Lira maximum (https://www.tubitak.gov.tr/en/funds/academy/national-support-programmes/content-1001-the-scientific-and-technological-research-projects-funding-program), calculated at the exchange rate of 1 US $ = 8.0037 Turkish Lira on March 26, 2021, the deadline for the spring term of the TÜBİTAK-1001 program (https://www.tcmb.gov.tr/kurlar/kurlar_tr.html).

attending distance/open education programs (https://kess.kedi.re.kr/; https://istatistik.yok.gov.tr). On the other hand, German academics benefit more from technology-enhanced teaching materials in their classes compared with their colleagues in Turkey and South Korea. This can be the result of the high ratio of "HE expenditure (R&D excluded) per student" in Germany, compared to Turkey and South Korea (see Table 12.1). Expectedly, a higher investment for students can create more opportunities to develop technological facilities in German universities, in contrast to less investment in techno-physical infrastructure, particularly in Turkish universities (except personnel salaries, around a quarter of their total budget (Gür et al., 2018; Özoğlu et al., 2016)).

When focusing on academics' research orientation, this study concludes that academics in Germany primarily pursue "basic/theoretical" and "discipline-based" research in Germany. In contrast, academics in South Korea and Turkey prioritize more practical and applied research. Not assertively, but the chair system in German universities may lead to the continuity of pronounced borders between disciplines when we consider the prominent role of chair-holding professors to train doctoral students as the next generation of academics. Nonetheless, recent changes such as the establishment of the tenure-track system in many universities may bring about visible differences toward interdisciplinary research approaches in Germany (Hüther & Krücken, 2018). As another point related to research orientations, comparing their colleagues from Germany and Turkey, technology transfer for research commercialization purpose is highly favorable among academics in South Korea. This obviously relates to the countries' funding regimes and research priorities. While Germany supports various research areas altogether, as in the example of their "Excellence Initiative," including research fields from immunology to African studies or metallurgy to archeological arts (https://www.dfg.de/en/research_funding/programmes/excellence_initiative/index.html), South Korea and Turkey present a different perspective. For instance, through their Brain Korea 21 project, South Korea have prioritized PhD programs to train researchers in largely STEM and medical fields since 2000. Focusing on knowledge-based economic development, they have also supported many universities to empower their research profile at international level (Shin, 2012), which has resulted in 19 South Korean universities being among the 75 universities in the Reuters' list of Asia Pacific's Most Innovative Universities in 2019 (https://graphics.reuters.com/ASIA-UNIVERSITY-INNOVATION/0100B02G03Z/index.html).

Likewise, the Turkish government developed very similar policies mentioned above, the 100/2000 PhD Scholarship Program (indicating 2000 doctoral students in 100 prioritized areas where nearly 90 areas were selected from STEM and MHS fields), the Research University Scheme (to give extra support to ten selected and five candidate universities for better performance in international university rankings), and regional development universities (to supplement support for 15 universities in major areas of research in their region) (Uslu et al., 2021). All these policies began just after 2015; therefore, considering the outcomes of South Korean experiences, one can say that academics in Turkey will focus on innovative research more and more in coming years to contribute to research commercialization in Turkish universities.

On the other hand, despite their many universities having good records in the Reuters' list of Europe's most innovative universities (https://graphics.reuters.com/EUROPE-UNIVERSITY-INNOVATION/010091N02HR/index.html), there is still room for German universities as a whole to further improve their research commercialization efforts. Looking at their place in the global clusters of research efficiency (by articles, citations, patents, and R&D investments) (Uslu, n.d.), the German HES particularly needs to focus on innovative production in technology-oriented fields. When we think of the presence of globally prestigious technical universities (especially in the Excellence Initiative scheme) and many "universities of applied sciences" and also the developed industrial structure of Germany all together (Hüther & Krücken, 2018), the German HES displays great potential to enhance technology-oriented research commercialization at the system-wide level. Nevertheless, comparing the R&D spending record of South Korea, without diminishing support for other fields, German authorities should still seek alternative ways to increase their R&D investment to be able to further support the applied research initiatives of academics, particularly in the technology-oriented disciplines. In another aspect related to the German HES, no need to say anything about relatively low level of participation in distance/open education activities by academics in Germany. Because of emergency conditions of the COVID-19 pandemic starting 2020, not only in Germany but also every part of the world, universities had to increase their technical capacity to provide online courses to their students (Uslu, 2021).

In addition to the comparative results discussed above, to respond to the last research question, this study also examined the personal, professional, institutional, and national factors influencing the T-R-N implications of academics in the case countries. There appears no personal, professional, or institutional factor influencing T-R-N implementations of South Korean academics; however, gender and teaching time budget influence the research-reinforced teaching effort of academics in Germany. The researcher could not access the ratio of female academics in South Korea; yet, this ratio was 44.42% in Turkey in 2017 (https://istatistik.yok.gov.tr). Although the percentage of female academics in Germany (45.93% of full-time personnel (https://www.destatis.de/; https://www.hrk.de/)) was higher than Turkey, only 10.41% of these female academics occupied professorial positions. This basically means that female academics in Germany mostly occupied teaching-oriented positions, resulting in less research time (Aiston & Jung, 2015). Interestingly, whereas having a teaching-only position potentially generates handicap in terms of T-R-N implementations (see also the Turkey case below), spending more time on teaching can be somewhat advantageous for academics occupying teaching-research hybrid positions, at least in the German case. The related APIKS question about teaching time not only includes in-class teaching time but also includes the teaching preparation period; hence, indicating more teaching time may be a sign of more opportunities for academics to enrich their teaching with research outcomes during the preparation of teaching tasks. Yet, it still seems a critical issue for Germany to increase the ratio of female academics in senior positions. In this regard, various programs (e.g., Dorothea Schlözer Postdoctoral Programme, Lise Meitner Excellence Programme, The Leibniz Programme for Women Professors, Women in

Research Fellowships) are already in place to support more female scientists in Germany; no doubt, such programs are important initiatives to assist in increasing the ratio of female academics at senior positions in the coming years.

Looking at Turkey's case, discipline is one of the influential factors for the academics' T-R-N implementation in favor of academics from SSHA comparing their colleagues from STEM and MHS fields. When considering the practical nature of medical training (Becher & Trowler, 2001) and the quickly expanding disease and treatment topics together, it is very usual to include essential knowledge in courses rather than research integration. A similar case of practicality orientation can also be seen in STEM areas, and individual creativity is another important criterion in these areas to be able to design and develop new technologies and innovations (Stains et al., 2018). Therefore, it is again possible that academics in STEM areas more often prefer introducing fundamental knowledge during their classes than prioritizing research outcomes in their teaching plans. Further, the teaching/research preferences of academics is another factor influencing their T-R-N implementations in Turkey. As in the study by Calikoglu et al. (2020), compared to academics occupying teaching-focused positions, it is an expected result for academics in research-oriented positions to have more research-based materials and experience to enrich their teaching activities, including more research components.

As explained above, in terms of national factors, "students per staff" ratio influences the intensity of academics' research-reinforced teaching activities indirectly through high teaching loads for academics and possibly preferring theoretically oriented teaching methods in highly crowded classrooms. However, "students per staff" ratios do not directly influence the T-R-N implementations of academics in these three case countries. As another national indicator, "(R&D excluded) HE expenditure per student" is an influential factor to empower the T-R-N approaches of academics in all of Germany, South Korea, and Turkey. One possible explanation may be that higher financial investment in student learning can create better opportunities for academics to enrich their courses with research-related activities such as simple research trials for students, designing laboratory experiments more often, or studying with a higher number of student assistants. Yet already, among the national factors examined in this study, "R&D spending per staff in HE" is the most influential variable both for the T-R-N perceptions and implementations of academics in each of case countries. Here, confirming the assumption in Taylor's (2007) study on mutually benefitting funds for research-informed teaching (pp. 875–876), more positive approaches to T-R-N among academics from the countries with higher R&D spending records revealed the necessity of funding opportunities for academics, not only to carry out more comprehensive and innovative research projects but also to adapt their growing expertise and experience to research-based teaching activities.

At the end, the discussions above are based on the comparison of T-R-N approaches in three case countries – Germany, Turkey, and South Korea. Consequently, this study showed that academics have more positive perceptions in South Korea, having the highest R&D spending record. Moreover, while academics in South Korea use student-centered teaching methods and pursing applied/practical

research more often, academics in Germany (with the highest ratio of "expenditure per student") benefitted more frequently from educational technologies in their classes. On the other hand, this research has several sampling limitations not allowing to compare the influence of some variables (i.e., absence of MHS areas in Germany and of junior staff in South Korea) on the T-R-N perceptions of academics. In this regard, further studies focusing separately on each country may assist to observe the influence of different country-specific variables (including the missing ones in this research) on the teaching and research situation in a related country. In addition, instead of the similar research-focused systems in this study, new comparisons, especially with teaching-research balanced systems, can also provide different perspectives with which to evaluate the T-R-N approach in any of the case countries.

Acknowledgments The APIKS Research was supported by TÜBİTAK (Project No: 117 K917) and COMU-BAP (Project No: SBA-2017-1093) in Turkey.

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Chapter 13
Conclusion: What We Know About the Teaching-Research Nexus in the Knowledge-Based Society

Ulrich Teichler, Timo Aarrevaara, and Futao Huang

Abstract The international comparative research "The Academic Profession in the Knowledge-Based Society" (APIKS) indicates that the belief among academics in a creative teaching-research nexus by no means has vanished. The "unity of teaching and research" had been considered to be a key concept of the "modern" university since the beginning of the nineteenth century, but actually had been realized differently across countries, institutional types, and academics' socio-biographic characteristics – ranging from a clear conceptual dominance of research towards a clear practical dominance in teaching. According to the APIKS comparative survey undertaken in 2017/2018, academics noted – as compared to the academics surveys in two predecessor surveys – a growing political and managerial pressure in many, but not all, countries to pay increasing attention to research. This had some impact on their preferences, their time budget, impact of higher education, and on the visible results of their work, but has not called into question the conviction of the academic profession on the part of the majority of academics. A close link between research and teaching is desirable for the quality of academic work, can be strived for successfully, and is likely to be realized without major conflicts.

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F. Huang et al. (eds.), *Teaching and Research in the Knowledge-Based Society*, The Changing Academy – The Changing Academic Profession in International Comparative Perspective 23, https://doi.org/10.1007/978-3-031-04439-7_13

Do Empirical Findings Challenge Our Views?

The decision to refer to the teaching and research nexus in the title of the final chapter of a volume on teaching and research in higher education signals certainly that this nexus still is an imperative all over the world. However, this nexus often is not clearly visible, and it varies in different parts of the world. Moreover, the title of this chapter suggests that the move towards a setting, what tends to be called "knowledge society" or "knowledge-based society", might be a strong reason for modifying the traditional relationships between teaching and research in higher education.

The authors of all chapters of this volume, addressing teaching and research in the higher education system of an individual country in comparative perspective, first, discuss the extent to which similar traditions across countries or specific traditions of a few countries or a single country have led to relative robust features of the relationships between teaching and research for a long time. Second, they turn to the vivid international debate on assumed similar changes in higher education in recent decades towards a stronger steering of the academic profession and towards an increased emphasis on research possibly challenging the traditional teaching-research nexus, and they show the extent to which this almost global discourse has played a role in their country as well as the extent to which alternative views, possibly reflecting the specific situation in their country, were important. Third, they analyse the actual academics' views and activities in those respects on the basis of the national questionnaire surveys undertaken in the framework of the international comparative research project "The Academic Profession in the Knowledge-Based Society (APIKS)".

Traditions: Common Ideas and Varied Thrusts

In looking back to the nineteenth century, the authors of most chapters explicitly refer to Humboldtian concept: Wilhelm von Humboldt called it even the "unity of research and teaching", when he formulated the "idea" of the University of Berlin, which was founded in the early nineteenth century. This concept is generally assumed to have been the most powerful one in characterizing "modern" higher education – i.e. a more or less common thrust across countries.

All chapters of this volume show that the Humboldtian concept of expecting most members of the academic profession to be more or less equally involved in the generation of new knowledge, notably through research, and in the dissemination of knowledge, notably through teaching, has gained an enormous popularity. However, substantial differences had remained between countries. Comparative analyses of the history of higher education had already shown convincingly that linkages between teaching and research had been viewed differently in the nineteenth and twentieth century in those countries, which often had served as models for other

countries. For example, British universities continued to pay more attention to teaching and learning processes than German universities. French higher education emphasized teaching exclusively in the most highly reputed sector of the higher education system, i.e. the Grandes Écoles. In the USA, a close linkage of teaching and research often was viewed as appropriate for the sector of graduate education, but not for undergraduate education. These countries also differed substantially according to the extent to which public research promotion was provided to higher education or to institutions outside higher education, e.g. public research institutes. Two of the chapters of this volume also referred to the Soviet model of separating teaching and research through a functional divide between teaching-oriented higher education institutions and research-oriented academies.

Scholars involved in the three major international comparative research projects on the academic profession – this volume is part of the results of the third project, as will be explained below – tried to examine whether the interplay of concepts favouring or challenging a close teaching-research nexus and the interplay of following common approaches or reinforcing specific national traditions has eventually led to a select number of "models" of the teaching-research nexus, which continued to put their footprint to some extent on the views and activities of the academic profession up to the early years of the twenty-first century. The Japanese higher education researcher Akira Arimoto identified three models of the relative weight of teaching and research in the academics' views and activities, as it was already explained in the introductory chapter of this volume:

- The "German model", which turned out – according to the findings of the comparative projects – to be typical for Germany and Japan, set a clear priority for research: Academics expressed a strong preference for research, spent much time on research, and were quite active in publishing research results. The strong research thrust, however, was not viewed to contradict the idea of a beneficial teaching-research nexus. Rather, it was expected to serve research-linked teaching and learning in various respects.
- The "Anglo-Saxon model" was much closer to the Humboldtian concept in striving for a balance between teaching and research and a cross-fertilization of teaching and research in the academics' views and activities.
- The "Latin American model" put a strong emphasis on teaching and learning. Substantial involvement in research was expected from and supported only for a small minority of academics. Actually, the third model was called "Latin American" by Arimoto, because some Latin American countries participated in the comparative projects along various economically advanced countries. Certainly, a similar dominance of teaching and learning could have been observed at that time as well in many mid-income and low-income countries of other continents as well.

The authors of most chapters of this volume point out that the traditions of the relationships between teaching and research in an individual higher education system cannot be fully explained by worldwide popular concepts or model such as

those discussed above. Rather, specific circumstances, specific policies, and specific developments in higher education have played a role as well.

For example, the chapter addressing higher education in Japan shows that links between teaching and research vary less in Japan according to the academics' status and according to the types of higher education institutions than in Germany. Additionally, the chapter referring to Finland illustrates the strong divide of concepts and practices in various countries between the traditional universities and the strongly teaching-oriented non-university higher education institutions which emerged in many countries since the 1960s in response to the rapid expansion of students. Further, the chapter focusing on Canada underscores enormous differences of the teaching-research nexus among the Anglo-Saxon countries – thus challenging the view that they present a common type. Finally, the chapter informing about higher education in Argentina points out that academics themselves are the main drivers towards a strong research role, whereas the regulatory context continues to opt for a dominant teaching role.

A Global Challenge of the Teaching-Research Nexus

The authors of all chapters of this volume are convinced that we experience a substantial change of the "zeitgeist" – the spirit of the age – globally in recent decades as regards the conditions for academic work. This is formulated, for example, as a question by the authors of the chapter on Portugal: "Is there a rupture with the teaching-research nexus ideal, promoting changes in the social division of academic labour?"

The authors of various chapters also suggest that the widespread efforts to loosen the links between teaching and research within the academic job roles are not based on the intention to strengthen equally the quality of teaching and learning as well as the quality of research, but put emphasis primarily on research. The authors of the chapter on Portugal called it "hypervalorization of research over any other activity in academia".

Different keywords are named to depict the changing environment, which affects academics, whereby such changes already became key themes of discourse in some countries in the 1980s, in others in the 1990s, and finally in others not before the first decade of the twenty-first century. These keywords address social contexts of higher education, perceived "global" trends, and new higher education policies and strategies as well as new trends in higher education development, for example, "globalization", "knowledge society", "knowledge economy", "New Public Management", "impact of neo-liberal politics", "the managerial university", "growing impact awareness", "competitive higher education", "post-Humboldtian higher education", etc. A climate seems to have emerged around and within higher education, which calls for or even places pressures on:

- First, stronger targeted expectations and pressures as regards the performance and the achievements of higher education (reinforced through evaluation, etc.)
- Second, a stronger emphasis to be placed on visible economic impact of higher education ("knowledge economy", utilitarian thrusts of research, "technology transfer", "employability", etc.) and partly on visible social impact ("third mission", "diversity management", etc.)
- Third, an increase of incentive mechanisms and sanctions (e.g. competitive research funding, strongly assessment-linked promotion and remuneration of academic staff) and the promotion of a competitive environment in higher education
- Fourth, support for a growing vertical diversification of the higher education systems (privileged conditions for "world-class universities", reinforcing "rankings", etc.)
- Fifth, a prime emphasis to be put on the enhancement of research
- Sixth, supporting steps towards a bifurcation of the functions of higher education (more research outside higher education, a growing divide between research-intensive and teaching-dominated higher education institutions, an increasing bifurcation of the work tasks of the individual academics, etc.)

Not surprisingly, the authors of the individual chapters of this volume differ in characterizing this scene: How much they underscore worldwide or national developments of the "climate" in higher education, how much they emphasize general contextual trends or targeted policy options, whether they pay more attention to details of the scene of "governance" or to details of the academic job roles and working environments, and how far they consider the changes observed or looming as potentially supportive for or as potentially endangering the creativity in academia.

For example, the authors of the German chapter point out that three clear measures were taken in the first decade of the twenty-first century to steer academics more closely according to the dominant policy and strengthen the role of research: a shift from "block funding to competitive third-party funding", specific support for high-quality research and for a few exceptional universities through the so-called Excellence Initiative, and the introduction of an achievement-oriented remuneration system of university professors. The authors of the Canadian and Japanese chapters also observe an increase of measures to steer academics' priorities, but they point out that measures were taken to enhance both teaching and research. Finally, the peculiar Argentine case – already referred to above – is noteworthy: While most universities officially expect scholars to be exclusively in charge of teaching, the Argentine scholars followed more closely the international trend, and they actually reported that they spend – even under these conditions – on average more time on research than on teaching.

Methodological Opportunities and Drawbacks of a Comparative Research Project

This volume draws from the decision taken by more than 100 scholars from more than 20 countries (or other societal units, such as Hong Kong) to cooperate in analysing the conditions, the views, and the activities of the academic profession. National surveys were conducted with a jointly developed questionnaire – in most cases in 2017 and 2018. This provided the opportunity for more detailed international comparison of the scholars' views and activities than of most other thematic areas of higher education.

This project "The Academic Profession in the Knowledge-Based Society (APIKS)" benefits from the fact that two similar surveys have been already undertaken: The "Carnegie Survey", coordinated by the US Carnegie Foundation for the Advancement of Teaching, undertaken in 1992, and comprising more than a dozen countries, and the "The Changing Academic Profession (CAP)" survey, undertaken in 2007 and 2008, comprising almost 20 countries, and subsequently supplemented by surveys in a few additional countries in Europe and Asia. A substantial number of questions were reiterated or phrased similarly in all three surveys – thus making it possible to examine changes of academics' views and activities over time. Each of the three projects was prepared through various workshops in order to reflect the voices of all the participants in the conceptual framework and in the formulation of the questions. Various workshops followed, after the surveys had been conducted, and an international data set could be made available, in order to agree on common guidelines for the data analysis and interpretation of major themes. Thus, the major findings of the previous project, the CAP project, could be presented in an overview volume with comparative data as well as in five thematic volumes with – mostly country-based – essays on governance, teaching and learning, academics in advanced and emerging countries, internationalization, and biographies and careers. The results of the CAP project eventually were in the centre of altogether more than 700 publications. Such impressive results could be realized, because the key persons were willing to cooperate intensively over a period of more than a decade.

These analyses were undertaken in the framework of international collaborative research projects. As already stated, scholars from different systems – countries or other political units – and from different disciplines and conceptual backgrounds spent between three and five intensive workshops together before each of the surveys in order to reach a widely shared conceptual basis and in order to develop jointly a widely common research design. In contrast to projects more or less steered by a few chair persons, the research thrusts eventually chosen in the projects on the academic profession do justice to a substantial extent to the characteristics of the individual countries and to the self-understanding of the participating scholars. This awareness of the manifold experiences underlying such a research project and of the varied preferred research thrusts led to the decision not to enforce a 100% identical survey in all countries. For example, some country teams added, subtracted, or

modified some questions. Different decisions were taken as regards the inclusion or exclusion of certain junior staff categories. Some countries excluded small subsectors, e.g. very small private higher education sectors in predominantly public higher education systems. Finally, some authors preferred to analyse their national case through specific methodological thrust. The drawback of such a wealth of varied thrusts, of course, is a lack of comparable data presentation and analysis.

As already pointed out in the introduction of this volume, an APIKS workshop addressing the findings on teaching and research was already realized in March 2019, i.e. soon after the termination of most surveys. Key reports presented at the conference soon were published in Higher Education Forum – a journal edited by the hosting institution of the workshop, the Research Institute for Higher Education, Hiroshima University (Japan). Thereafter, scholars of those countries, for which final data sets were already available early in 2019, were invited to write reports focusing on teaching and research in their own country with a comparative thrust – either through an explicit data comparison with select reference countries or through summative statements or through literature reference.

This procedure was opted for in order to be able to make the findings on the teaching and learning visible not too much later than the actual respective joint discourse. But it turned out to be an experiment of research methodology: To what extent would similar conceptual and operational thrusts be chosen by the scholars of the various countries, if their parallel analyses on the academic profession in their own country in comparative perspective were not highly regulated?

Actually, the research teams of the 11 countries contributing to this analysis of teaching and research have made quite a substantial number of different choices in the project participation, in the date collection, and in the data analysis:

- Only 3 of the 11 countries have participated in all the 3 surveys. Data were available for 1992, 2007/2008, and 2017/2018 for Germany, Japan, and the Republic of Korea. Five other countries participated in the second and third surveys: Argentina, Canada, Finland, Portugal, and Malaysia. Three countries were included in the third survey only: Lithuania, Russia, and Turkey.
- Most countries aimed at surveying a representative selection of academics employed at least half time at institutions of higher education and teaching within programmes leading at least to a bachelor level. But some countries excluded some institutions, e.g. small minorities of private institutions, and some categories of junior academic staff.
- The findings are discussed in an international perspective. While only data of the target country are presented in four chapters, seven chapters present findings on three countries on average – actually chosen as possibly been similar, or possibly be contrasting, occasionally as neighbour countries, and finally in some instances as being widely viewed as a typical model (notably Germany as the country of the Humboldtian tradition). Thus, altogether information is provided on about 20 countries.

Teaching and Research in Academics' Views and Activities: The Major Findings

Expectations and Pressures

A single chapter of this volume focusses on the conditions of academic work as perceived by the academics. The chapter on higher education in Canada examines responses to eight questions in this respect. Four refer to teaching: whether academics feel encouraged to improve teaching skills, whether adequate training provisions exist for teaching quality, whether teaching is regularly evaluated by senior administrative staff, and whether teaching quality plays a role in personnel decisions. The other four address doctoral training and research: whether the number of doctoral students supervised is important, whether research is regularly supervised by senior academic staff, whether academics are expected to raise substantial amounts of external funds, and whether research quality plays a role in personnel decisions.

In comparing the findings of the second and the third international comparative study of the academic profession, the authors of the chapter on Canada conclude that the "institutional oversight" has grown according to most of these criteria. In contrast to the widespread view that emphasis placed on research has increased more or less worldwide, however, "oversight" on teaching seems to be almost as strong in Canada nowadays as on research, and that "oversight" on teaching seems to have risen within a decade almost as much as on research. Also expectations and pressures as regards research are only moderately higher at Canadian institutions highly active in graduate education and research than at institutions partly or predominantly involved in undergraduate education. Thus, this analysis focusing on oversight suggests that the idea of a beneficial nexus between teaching and research clearly has persisted in Canada.

Some other chapters also address the academics' notions of expectations and pressures articulated by their own institutions or by other forces. For example, the chapter focusing on Finland suggests that the recent increase of part-time employment and of short-term employment is linked to a stronger expectation to put emphasis on research.

Preferences for Teaching, Research, and Teaching-Research Linkages

Strong emphasis put on research in the current scenery of higher education policy could be responded possibly by a strong or even stronger interest in research on the part of the academics. A few chapters of this volume actually raised the question of how the academics wish to be located themselves as regards the teaching-research nexus. In all the three comparative surveys, academics were asked about their

preferences: whether their interests lie (a) primarily in teaching; (b) in both teaching and research, but leaning towards teaching; (c) in both, but leaning towards research; or (d) primarily in research.

Actually, 18% of the respondents on average across the countries included in the 2017/2018 survey, for which information is provided in this volume, stated a clear preference for research. As in some chapters, the responses to (a) and (b) as well as those to (c) and (d) are presented as aggregates; we note altogether a preference or a leaning towards research on the part of 57% of the respondents.

The same question had been raised in the two previous comparative surveys. A time series analysis faces the problem that the composition of countries participating in the surveys had changed If we assume that the overall pool of countries included did not change substantially, we note an increase of academics being dominantly interested in research from 11% in 1992 to 15% in 2007/2008 and eventually to 18% most recently. In looking at both those clearly preferring and leaning towards research, we observe an increase from 52% to 59% in the latter period, but thereafter a moderate decline to 57%. Indeed, such a recent decline from 68% to 64% is reported for the Republic of Korea and from 47% to 43% in Malaysia.

Altogether, the proportion of academics stating that they are interested in both teaching and research, while leaning either more to teaching or research, had been more than three quarters on average in the second survey. According to the few countries, for which respective information is provided regarding the third – the most recent – survey, this proportion seems to have fallen moderately, actually, to 72%. Yet, most academics have not moved towards a mono-functional preference, but rather prefer the continuation of a teaching-research linkage.

Time Spent on Teaching and Research

Most chapters of this volume provide information about the time academics spend on teaching and research. A comparison of the findings across countries, however, turns out to be difficult, because data are reported occasionally only for periods when classes are in session and occasionally both for the periods when classes are in session and not in sessions; in some instances, no information is provided whether data refer to the periods when classes are in session or in aggregate for the whole year. As far as the basis of the data is clear, we note that the time spent annually on research and research-related activities – according to the academics' estimates – was in one country on average as low as about seven tenth of the time spent on teaching and teaching-related activities, and it was in some other countries also somewhat lower on research than on teaching. In contrast, academics of one country referred to in this volume spent on average about one and half times as much on research as on teaching, and academics in a few other countries spent slightly more on research than on teaching.

Data presented confirm the expectation that academics at highly reputed and research-oriented universities spend more time on research than those at not so highly ranked institutions and at non-university institutions. Moreover, junior staff in some countries were more strongly involved in research and in some countries, in contrast, to a lesser extent than senior staff. Finally, we note a similar divide between countries as regards the activities of academics employed part-time. In some countries, they spend a smaller proportion of their work time on research, and in some other countries, they spend a larger proportion of their time on research than those employed full-time.

As far as information is available for some countries from the prior two comparative surveys on the academic profession, we note consistently a moderate increase of the proportion of work time spent on research in recent years: less than ten per cent in some cases and even than five per cent in other cases.

Academic Productivity

Some chapters of this volume addressed the academic productivity – predominantly in terms of publications. Respondents in APIKS were asked how many of the ten different categories of "scholarly contributions" they had completed in the past three years. According to the information provided in three articles of this volume, academics of nine countries, for which information was provided for 2017/2018, varied in having published – on average – between 4 and 14 book or journal articles within three years.

Among the countries participating in all the three comparative surveys, academic productivity increased most impressively in the Republic of Korea: The average number of articles published increased from 6 in the early 1990s to 11 in the early years of the twenty-first century and finally to 14 according to the most recent survey. For a comparison between Germany and Japan, a "productivity index" was employed in order to aggregate the responses to the above-named categories; actually, a moderate increase was reported for German academics both from 1992 to 2007/2008 and from 2007/2008 to 2017/2018. In contrast, the surprising finding is presented that academic productivity of Japanese scholars increased only moderately from 1992 to 2007/08, but declined by 18% in recent years, whereby this decline was most striking on the part of scholars at research universities: even 31%.

In most of the countries, for which respective information is provided in this volume, senior academics publish more than junior academics. Even though the assumption was stated that junior academics might be more strongly affected by the rising expectation to focus on research, senior academics remain obviously in a better position to complete manuscripts and to get them published.

The Nexus

The actual nexus between teaching and research in the academics' activities was addressed directly in two questions of the comparative survey. First, academics were asked whether they consider their research activities reinforcing teaching. In 2007/2008, three quarters of the respondents on average per country noted such kind of benefit of research for teaching (scale points 1 and 2 on a scale from 1 = strongly agree to 5 = strongly disagree), whereby the responses varied by country from 64% to 85%. In this volume, two chapters addressed this question and referred altogether to the responses given in 2017/2018 in nine countries. As more than 80% perceived such a benefit, it seems justified to conclude that the contribution of research to teaching has not suffered from an increased emphasis on research. Actually, the chapters provided information on responses at both points in time for two countries: Academics in Germany viewed such reinforcement much more frequently in 2017/2018, whereas academics in Malaysia viewed it slightly less frequently than in 2007/2008.

Second, academics were asked about the extent to which they agree to the view "Teaching and research are hardy compatible with each other". Such a tension had been stated in 2007/2008 by about half of the academics in Japan, by more than 40% of academics in China, and also by about one third of academics in Germany. Altogether, however, it was perceived by less than a quarter on average across countries, thereby only by slightly more than one tenth of academics in the USA and in the Republic of Korea and even less frequently by Latin American scholars. Actually, the perception of such a tension was stated almost as frequently by academics in Japan and by academics in Germany in 2017/2018 as it had been ten years earlier.

Various chapters of this volume addressed the teaching-research nexus also in the interpretation of the questions discussed above. At universities traditionally more or less equally in charge of teaching and research, academics tend to see their views and activities both as regards teaching and regards research as an interpretation of the desirability and of the reality of the teaching-research nexus. Obviously, academics at these institutions have moved in many countries to a strong role of research while still appreciating a teaching-research nexus.

Some chapters of this volume – notably those addressing Finland, Germany, and Japan – paid emphasis to the role research plays at institutions of higher education considered to be exclusively or primarily in charge of teaching as compared to the institutions considered to be in charge of both teaching and research. They suggest that there is a stronger divide of the academics' views and activities in those countries, in which a clear two-type institutional structure exists (e.g. Finland and Germany), than in countries with a softer functional divide (e.g. Japan and Sweden): Academics at teaching-oriented institutions of the latter countries tend to be more similar to those with a strong research role than those of the former countries. But even in the former countries, research seems to play an increasing role recently in predominantly teaching-oriented institutions.

A Mix of Expected and Surprising Findings: The Results of Complex Analyses

All chapters of this volume analyzed a more complex picture of the academics' views and activities than merely at describing the total survey responses. Various multivariate approaches had been employed to assure more refined information – notably on institutional variations and sub-groups of scholars. As one might expect, a concluding chapter cannot do justice to the wealth of information presented in the various chapters of this volume, but certainly can underscore some major lines.

First, several chapters aim at specifying the linkages between the major thematic areas addressed, i.e. between the expectations and pressures to which the academics are exposed, the academics' preferences and interests, the distribution of work time, and the publication output. By and large, the findings support the formulated hypotheses. If academics note strong expectations or pressures to strengthen their research role, they are more likely to be interested, active, and successful in research. If academics are strongly interested in research, they are more likely to be active and productive in research. If academics spend more time on research, they are likely to publish more. But a close look to the chapters has to be recommended, because the findings are not that consistent. There are noteworthy exceptions. In spite of the global rhetoric, there are substantial differences by country. Altogether, academics surveyed in 2017/2018 seem to be similar to those surveyed in the previous two studies in one respect: Academics as rule do not follow easily the dominant fads and fashions of higher education policies and fashions. Emphasis placed on research and on teaching might change moderately over the years, but a teaching-research nexus is appreciated continuously.

Second, detailed information is provided in most chapters about the extent to which teaching and research in higher education differ according to structural features of the higher education system. As a rule, the chapters confirm the assumption that emphasis on research is placed more strongly in the most highly reputed and the most privileged sectors of the higher education system. Also, research emphasis plays a stronger role for the preference, the time allocation, and the academic productivity in the academic disciplines of science and engineering than those of the humanities and social sciences (actually, the individual chapters have opted for various disciplinary groupings, e.g. sciences vs. humanities and social sciences, pure versus applied disciplines, hard versus soft fields, or STEM disciplines versus other fields). But again, the scene is not consistent across countries. Moreover, as far as change over time is examined, there is not a consistent increase of emphasis placed on research according to these two institutional characteristics.

In contrast, countries differ substantially – this had already been shown in the previous two comparative surveys of the academic profession – as regards the research role of junior academics: In some countries, the teaching task of junior academics is higher on average, in some countries similar to, and in others lower on average than that of senior academics. Altogether, it does not become clear, whether

junior academics tend to be more responsive or not to the dominant higher education policies and strategies than senior academics or not.

Third, the analyses also take into consideration the extent of biographical differences. Actually, gender differences are almost exclusively addressed in this framework. In the majority of countries, as one might expect, less than half academics are women, women are more often employed in the less highly reputed sectors of higher education, and women are more often active in the humanities and social sciences than in science and engineering. And, even if these structural factors are controlled, women turn out to be less interested in research, to spend less time on research, and to publish less on average. The gender differences are substantial in some respects and small in other respects within a country, and altogether the situation of women in academia is strikingly different in some countries and in others similar to those of men.

In sum, the findings presented suggest that the widely shared assumptions about teaching and research in higher education are confirmed to some extent, but by no means consistently. We are encouraged to pay attention to details as regards thematic areas, individual countries, individual structural dimensions, and individual socio-biographic dimensions. We are challenged to reflect the overall finding that academics by and large are more cautious in changing their perceptions, values, activities, and their work output than a look on the policy and strategy changes in recent decades would expect us to assume. How do we assess these facts: Are academics the lame ducks in a dynamic environment, or are they persistent rational actors amidst nervous fads and fashions?

The findings reported in this volume show that questionnaire surveys addressing the broad spectrum of academics' views and activities can provide useful information on many facets of the teaching-research nexus in higher education. But as such questionnaire surveys have to cover a broad range of themes through a limited number of questions being asked, we also note limits as well as key issues remaining open. It remains to be examined, for example, whether the growing emphasis placed on research in many countries calls into question the quality of teaching, whether stronger expectations and pressures in favour of research endanger the quality of research, or to what extent steep or moderate functional differences as regards teaching and research between individual higher education institutions or types of higher education are beneficial for teaching and for research. Thus, comprehensive surveys on the academics' views and activities have their merits but certainly have to be supplemented by studies really focusing on teaching, research, and the teaching-research nexus.