The Transformation of Non-traditional Higher Education in Switzerland: Individual and Institutional Ambidexterity in Research and Teaching

Dissertation

Submitted to the Faculty of Business and Economics

TU Dortmund University

Dortmund, Germany

In partial fulfillment of the requirements

for the degree of

Doctor Rerum Politicarum

Submitted by

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June 19, 2024

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Acknowledgements

Completing this dissertation marks the culmination of a five-year journey filled with many challenges, some triumphs, and invaluable support from numerous individuals and institutions. I extend my heartfelt acknowledgments with gratitude and appreciation to those who have played important roles in this endeavor.

First and foremost, I thank my partner Anita for her unwavering support, understanding, and encouragement throughout the entire process of researching and writing this dissertation. Her love and patience have been a driving force behind my pursuit of academic aspirations while balancing the demands of family life. To my twins, whose energy and lightheartedness brought light to even the most exhausting revision sessions, thank you for your love, laughter, and occasional disruptions, reminding me of the importance of balance and perspective in life.

I extend my sincere appreciation to my supervisor, Prof. Dr. Liudvika Leišytė, and her dedicated administrative and academic team at TU Dortmund, whose guidance, expertise, and constructive feedback have been instrumental in shaping this dissertation. Prof. Leišytė's mentorship and human touch empowered me to navigate the complexities of academic research.

I am indebted to the second and third reviewers, Prof. Dr. Uwe Wilkesmann and Prof. Dr. Tessa Flatten, for reading my work, providing comments, and participating in the dissertation committee. In particular, I thank Prof. Wilkesmann for the work invested in writing a review of this dissertation.

I am grateful for the efforts of six anonymous peer-reviewers at three different academic journals whose expertise, comments, and commitment to academic excellence improved the articles building the core of this cumulative dissertation. I am also grateful to the Lucerne University of Applied Sciences and Arts, my employer during the dissertation project, for providing me with resources necessary for the partial completion of this research. Furthermore, I extend my heartfelt thanks to all the individuals who generously contributed

their time and expertise to answer my questions, thereby providing the empirical data for my dissertation.

Finally, I acknowledge with deep appreciation all the friends, family members, and colleagues who provided moral and professional support, encouragement, and understanding throughout the last five years. Your belief in my abilities has been instrumental in making this academic milestone a reality.

Summary

This dissertation examines how former post-secondary institutions of vocational education and training have achieved and are managing organizational ambidexterity in the course of their transformation into higher education institutions (HEIs) with a publicly mandated teaching and research mission. By applying the concept of organizational ambidexterity in the context of non-traditional universities in binary higher education (HE) systems and linking it to Humboldtian and post-Humboldtian configurations of research and teaching at the micro and meso levels, this research contributes to the field of HE research. The application of organizational ambidexterity in published HE research remains rare (Sliż & Dobrowolska, 2023, p. 594).

The focus of this dissertation is on universities of applied sciences (UASs) and universities of teacher education (UTEs), which form one side of the binary HE system in Switzerland and were introduced in the mid-1990s. Their transition from teaching-only institutions to organizations with the legal status of HEIs was accompanied by policymakers' expectations that they would complement the already existing universities by providing practice-relevant education and conducting applied research as different but equivalent HEIs in a reformed HE system. This has led to a form of tension that arises in HEIs when transformational change conflicts with the commitment to historical missions and values (Dee, Leišytė & van der Meulen, 2023).

In theoretical terms, the studied organizations within the newly created HE sector had to develop from institutions with a single task into HEIs with an ambidexterity in research and teaching. Little is known on how ambidexterity is accomplished and managed (Martin, Keller & Fortwengel, 2019). In principle, two configurations of teaching and research activities can lead to ambidextrous HEIs. The Humboldtian configuration relies on individual ambidexterity, i.e., personnel that is resourced and able to do research and to teach. Individual ambidexterity is often seen as essential to achieving organizational ambidexterity in the literature

(Schnellbächer, Heidenreich & Wald, 2019). In contrast, the post-Humboldtian configuration differentiates between research and teaching roles at the individual level (Leišytė, Enders & de Boer, 2009). HEIs with such a configuration do not rely on individual ambidexterity and must therefore find alternative modes and practices to fulfill their teaching and research missions.

In the Swiss context, there has been no empirical study on the necessary post-reform and ongoing development of research capacity, its management in relation to teaching, or the situation of the staff who carry out both research and teaching activities in fulfilling the institutional mission. For this reason, I have conducted three empirical studies, one in co-authorship with my doctoral supervisor, providing insights into the so far under-researched topics described above. The three studies, which constitute the core of this dissertation, have been published as articles in peer-reviewed journals in the years 2021[1], 2022 and 2023.

The first study sought to address the research question regarding the structural conditions for research in the Swiss non-traditional HE sector and the research competence of lecturers, who perceive the institutional expectation to be active in research as well as in teaching. By drawing on the concepts of the Humboldtian model of HE, with its unity of research and teaching at the individual level (Schimank & Winnes, 2000), and organizational ambidexterity, the so-far rather limited empirical knowledge about the human capital aspects and structural conditions of the research mission of non-traditional HE is expanded and some knowledge gaps regarding the responses of HEIs to fundamental, reform-driven changes regarding their purpose and organization are filled. As the Swiss reform included a mandate to conduct applied research to differentiate the new sector from traditional universities (Lepori, 2008), the study contributes to an enhanced knowledge on similar HEIs internationally, which

[1] The online version of the first study was published on April 6, 2021 in the journal Higher Education Policy. The print version was published in the September 2022 issue of the journal. The chapter in this dissertation is a post-peer-review, pre-copyedit version of the article. The final authenticated version is available online at https://doi.org/10.1057/s41307-021-00231-3.

often have the same mandate in their respective HE system (de Weert & Berkens-Soo, 2009). Moreover, the literature review included in the first study improves the comprehension of the application of the ambidexterity concept in HE research.

The first study employs a triangulation of insights derived from the integration of qualitative and quantitative methods. The results of the document analysis indicate that the new HEIs have formally adopted a Humboldtian mission. This is also reflected in survey results indicating that a significant proportion of lecturers perceive an institutional expectation to be similarly active in research and teaching. However, the analysis of the content of the mission statements of UTEs suggests that they are more reactive in this process than UASs. In contrast, UASs are more facilitative of research and have a stronger expectation of their lecturers to be active in research and teaching, i.e., to be ambidextrous. However, it is noteworthy that UTEs appear to provide more conducive structures for functionally ambidextrous lecturers. They organize their daily work with less emphasis on teaching compared to UASs, thereby allowing for a more balanced approach to individual research and teaching activities.

In the second study, I examine the research side of the teaching and research mission through an empirical examination of clusters of lecturers based on variables related to their individual research role. The aim was to determine how the ambidextrous abilities of the Swiss non-traditional HE sector are reflected in the research profiles of its lecturers and to illustrate the outcome of a reform that created a binary HE system and introduced a research mission to the new HEIs. The investigation draws on literature providing conceptual and empirical evidence on the conduct and integration of research in non-traditional HEIs. The application of a two-step cluster analysis represents a methodological contribution to the field of HE research. Despite its potential to produce more reliable and accurate results than traditional clustering methods (Norušis, 2012; Tkaczynski, 2017), it is rarely used.

In the second study I identify two statistically distinct groups of lecturers with regard to their research activities. One group of lecturers exhibits values for the analyzed variables that

suggest that research has a low priority. In contrast, the other group is comprised of productive, competent, and motivated researchers. The study closes with a discussion of the potential implications of such a pronounced distinction between the lecturers, such as the continued need to qualify them for research, intra-institutional tensions, and challenging management issues.

The third study addresses the lecturer-related problems that emerged as a consequence of the non-traditional HE sector's adaptation to its research mandate, while simultaneously striving to provide practice-oriented teaching. It analyzes the solutions that were developed in response and within the bounds of the organizational autonomy of the case study institutions. The study, with its descriptive and explanatory character, aims to enhance the understanding of non-traditional HEIs' institutional responses to policy changes impacting the structure of its staff. It also represents a contribution to the debate on organizational actors in HE, as described by Whitley (2010). In fact, Swiss HEIs enjoy great leeway in legal terms in organizing the work of their employees and can be considered autonomous decision-makers. The findings indicate the combination of measures in the areas of structure, culture, and resources, which according to Pinheiro and Stensaker (2014) have to be controlled in order to successfully change and adapt HEIs and bring about local arrangements that are specific to local contexts.

The study relies on a thematic analysis of semi-structured interviews with 19 directors and one high-ranking executive of business schools and their counterparts in engineering. The findings suggest that the lecturer-related problems linked to pursuing research and teaching under a single institutional umbrella can be subsumed under five problem themes. These include research and teaching competencies and qualifications, difficulties in recruiting, the configuration of individual teaching and research activities, establishing research tracks and risk aversion, and the tension between academization and practice-orientation.

While various solutions in terms of structure, culture, and resources have been developed and implemented, isomorphic tendencies can also be observed. The interview data suggest that the common key to solving many problems may lie in the structuring of human

resources to allow for a post-Humboldtian configuration of research and teaching. This represents some of the first empirical and robust evidence of a post-Humboldtian shift in Swiss HE.

In conclusion, the application of the concept of organizational ambidexterity, originally developed to understand businesses, represents a noteworthy contribution of this dissertation. The findings represent a step toward an improved understanding of the management and establishment of organizational ambidexterity in binary HE. They contribute to the field of HE research by strengthening the empirical knowledge base regarding the increasingly relevant but less studied HEIs outside the traditional university sector, whose teaching and research mission is shaped by the expectation to unite professional and scientific expertise.

The primary limitations of the research presented in this dissertation can be briefly summarized as pertaining to the data and the country-specific sample. Some of the data used are self-reported and were collected via a voluntary survey, which is susceptible to potential self-enhancement (John & Robins, 1994) and a selection bias. Furthermore, the nature of the samples in the studies only permits generalizations after careful consideration and further research.

The findings and their implications indicate that promising future research could explore solutions to organizational ambidexterity in less studied fields, such as social work or the arts, which are often included in non-traditional HE. Furthermore, the role of the third mission in fostering and sustaining organizational ambidexterity and its impact on HE differentiation, warrants comprehensive examination. Finally, a scientific investigation leading to a better understanding of the reasons why organizational actors do not adhere to state incentives promoting a Humboldtian configuration could contribute to the development of improved HE policies.

Zusammenfassung

In dieser Dissertation wird untersucht, wie ehemalige vortertiäre Institutionen der Berufsbildung im Zuge ihrer Transformation in Hochschulen mit öffentlichem Lehr- und Forschungsauftrag organisationale Ambidextrie erreicht haben und handhaben.

Durch die Anwendung des Konzepts der organisationalen Ambidextrie im Kontext nicht-universitärer Hochschulen in binären Hochschulsystemen und die Verknüpfung mit Humboldt'schen und post-Humboldt'schen Konfigurationen von Forschung und Lehre auf der Mikro- und Mesoebene leisten die im Rahmen dieser Dissertation durchgeführten Untersuchungen einen Beitrag zur Hochschulforschung. Die Anwendung des Konzepts der organisationalen Ambidextrie in der veröffentlichten Hochschulforschung ist selten (Sliż & Dobrowolska, 2023, S. 594).

Der Schwerpunkt dieser Dissertation liegt auf den Fachhochschulen (FHs) und den Pädagogischen Hochschulen (PHs), die eine Seite des binären Hochschulsystems in der Schweiz bilden und Mitte der 1990er Jahre eingeführt wurden. Ihre Umwandlung von reinen Lehreinrichtungen in Organisationen mit dem Rechtsstatus von Hochschulen wurde von der Erwartung der politischen Entscheidungsträger begleitet, dass sie die bereits bestehenden Universitäten durch eine praxisrelevante Ausbildung und angewandte Forschung als unterschiedliche, aber zugleich gleichwertige Hochschulen in einem reformierten Hochschulsystem ergänzen würden. Dies hat zu Spannungen geführt, die auftreten, wenn der Wandel in Hochschulen mit der Verpflichtung zu historischen Aufgaben und Werten kollidiert (Dee, Leišytė & van der Meulen, 2023).

Theoretisch mussten sich die untersuchten Organisationen innerhalb des neu geschaffenen Hochschulsektors von Institutionen mit einem einzigen Auftrag zu Hochschulen mit einer Ambidextrie in Forschung und Lehre entwickeln. Es ist wenig darüber bekannt, wie Ambidextrie erreicht und gesteuert wird (Martin, Keller & Fortwengel, 2019). Im Prinzip können zwei Konfigurationen der Lehr- und Forschungstätigkeiten zu ambidexteren

Hochschulen führen. Die Humboldt'sche Konfiguration beruht auf individueller Ambidextrie, d.h. Personal, das über die nötigen Ressourcen verfügt und in der Lage ist, zu forschen und zu lehren. Individuelle Ambidextrie wird in der Literatur oft als Voraussetzung für die organisatorische Ambidextrie angesehen (Schnellbächer, Heidenreich & Wald, 2019). Im Gegensatz dazu unterscheidet die post-Humboldt'sche Konfiguration zwischen Forschungs- und Lehrfunktionen auf individueller Ebene (Leišytė, Enders & de Boer, 2009). Hochschulen mit einer solchen Konfiguration können sich nicht auf die individuelle Ambidextrie verlassen und müssen daher alternative Methoden und Praktiken finden, um ihren Lehr- und Forschungsauftrag zu erfüllen.

Es gibt keine im schweizerischen Kontext durchgeführten empirischen Studien über den nach der Reform notwendigen und immer noch andauernden Aufbau von Forschungskapazitäten, deren Management im Verhältnis zur Lehre und die Situation des Personals, das Forschungs- und Lehrtätigkeiten zur Erfüllung des institutionellen Auftrags ausübt. Aus diesem Grund habe ich drei empirische Studien durchgeführt, eine davon in Co-Autorenschaft mit meiner Dissertationsbetreuerin, die vertiefte Einblicke in die oben beschriebenen, bisher wenig erforschten Bereiche geben. Die drei Studien, die den Kern dieser Dissertationsschrift bilden, wurden in den Jahren 2021[2] , 2022 und 2023 als Artikel in von Experten begutachteten Fachzeitschriften veröffentlicht.

Die erste Studie befasste sich mit der Forschungsfrage nach den strukturellen Bedingungen für die Forschung und der Forschungskompetenz von Dozierenden, welche die institutionelle Erwartung verspüren, sowohl in der Forschung als auch in der Lehre aktiv zu sein. Unter Rückgriff auf die Konzepte des Humboldt'schen Hochschulmodells mit seiner

[2] Die Online-Version der ersten Studie wurde am 6. April 2021 veröffentlicht. Die gedruckte Version wurde in der September-Ausgabe 2022 der Zeitschrift Higher Education Policy veröffentlicht. Die endgültige und authentifizierte Fassung ist online verfügbar unter https://doi.org/10.1057/s41307-021-00231-3.

Einheit von Forschung und Lehre auf individueller Ebene (Schimank & Winnes, 2000) und der organisationalen Ambidextrie wird das bisher eher begrenzte empirische Wissen über die Humankapitalaspekte und strukturellen Bedingungen des Forschungsauftrags nicht-traditioneller Hochschulen erweitert und einige Wissenslücken hinsichtlich der Reaktionen von Hochschulen auf grundlegende, reformgetriebene Veränderungen in Bezug auf ihren Zweck und ihre Organisation geschlossen. Da die schweizerische Reform einen Auftrag zur Durchführung angewandter Forschung umfasste, um den neuen Sektor von den traditionellen Universitäten zu unterscheiden (Lepori, 2008), trägt die Studie zu einem erweiterten Wissen über ähnliche Hochschulen auf internationaler Ebene bei, die in ihrem jeweiligen Hochschulsystem oft den gleichen Auftrag haben (de Weert & Berkens-Soo, 2009). Darüber hinaus verbessert die in der ersten Studie enthaltene Literaturübersicht das Verständnis für die Anwendung des Konzepts der organisationalen Ambidextrie in der Hochschulforschung.

Methodisch nutzt die erste Studie eine Triangulation von Erkenntnissen, die sich aus der Integration qualitativer und quantitativer Methoden ergeben. Die Ergebnisse der Dokumentenanalyse deuten darauf hin, dass die neuen Hochschulen formell eine Humboldt'sche Mission angenommen haben. Dies spiegelt sich auch in den Umfrageergebnissen wider, die zeigen, dass ein signifikanter Anteil der Dozierenden eine institutionelle Erwartung wahrnimmt, in Forschung als auch Lehre aktiv zu sein. Die Analyse des Inhalts der Leitbilder der PHs deutet jedoch darauf hin, dass sie in diesem Prozess reaktiver sind als die FHs. Letztere sind eher forschungsfördernd und erwarten von ihren Dozenten stärker, dass sie in Forschung und Lehre aktiv sind, d.h., dass sie ambidexter sind. Es ist jedoch bemerkenswert, dass PHs förderlichere Strukturen für funktional ambidexter arbeitende Dozierende bieten, indem sie ihre tägliche Arbeit mit einer geringeren Präferenz für die Lehre organisieren als FHs. Das ermöglicht eine ausgewogenere Herangehensweise an individuelle Forschungs- und Lehrtätigkeiten.

In der zweiten Studie konzentriere ich mich auf die Forschungsseite des Lehr- und Forschungsauftrags und untersuche empirisch Gruppen von Dozierenden auf der Grundlage von Variablen, die sich auf ihre individuelle Forschungsrolle beziehen. Ziel war es, herauszufinden, wie sich die ambidexteren Fähigkeiten des nicht-traditionellen Hochschulsektors der Schweiz, Forschung und Lehre zu betreiben, in den Forschungsprofilen der Dozentinnen und Dozenten widerspiegeln. Auf diese Weise lässt sich auch das Ergebnis einer Reform veranschaulichen, mit der ein binäres Hochschulsystem geschaffen und ein Forschungsauftrag für die neuen Hochschulen eingeführt wurde. Die Untersuchung stützt sich auf Literatur, die konzeptionelle und empirische Belege für die Durchführung und Integration von Forschung an nicht-traditionellen Hochschulen liefert. Die Anwendung einer zweistufigen Clusteranalyse in der zweiten Studie stellt einen methodischen Beitrag zur Hochschulforschung dar. Trotz ihres Potenzials, zuverlässigere und genauere Ergebnisse als traditionelle Clustermethoden zu liefern (Norušis, 2012; Tkaczynski, 2017), wird sie nur selten eingesetzt.

Das wichtigste Ergebnis der zweiten Studie ist die Feststellung, dass es nur zwei statistisch signifikant unterschiedliche Gruppen von Dozierenden gibt, wenn deren Forschungstätigkeit betrachtet wird. Während die eine Gruppe Werte für die analysierten Variablen aufweist, die darauf hindeuten, dass die Forschung eine geringe Priorität hat, besteht die andere Gruppe aus produktiven, kompetenten und motivierten Forscherinnen und Forschern. Die Studie schließt mit einer Erörterung möglicher Auswirkungen einer solch klaren Zweiteilung der Dozierenden, wie z.B. der Notwendigkeit, sie weiterhin für die Forschung zu qualifizieren, innerinstitutionellen Spannungen und erschwerten Bedingungen für das Hochschulmanagement.

Die dritte Studie befasst sich mit den Problemen im Zusammenhang mit Dozierenden, die durch die Anpassung des nicht-traditionellen Hochschulsektors an seinen Forschungsauftrag entstanden sind und analysiert die Lösungen, die als Reaktion darauf innerhalb der Grenzen der organisationalen Autonomie entwickelt wurden. Die Studie verfolgt

einen deskriptiven und erklärenden Ansatz, um das Verständnis der institutionellen Reaktionen auf politische Veränderungen zu fördern, die sich auf die Struktur ihres Personals auswirken. Darüber hinaus leistet sie einen Beitrag zur Debatte über organisationale Akteure im Hochschulbereich, wie sie von Whitley (2010) beschrieben werden. Die schweizerischen Hochschulen verfügen rechtlich gesehen über einen großen Spielraum bei der Organisation der Arbeit ihrer Mitarbeiter und können als autonome Entscheidungsträger betrachtet werden. Die Ergebnisse deuten auf die Kombination von Maßnahmen in den Bereichen Struktur, Kultur und Ressourcen hin, die nach Pinheiro und Stensaker (2014) gesteuert werden müssen, um Hochschulen erfolgreich zu transformieren und für den lokalen Kontext spezifische Lösungen zu schaffen.

Die Studie stützt sich auf eine thematische Analyse von 20 halbstrukturierten Interviews mit Direktoren und einer hochrangigen Führungskraft von Wirtschaftsfachhochschulen und ihren Pendants im Ingenieurwesen. Im Rahmen der Untersuchung konnten fünf Problemthemen identifiziert werden. Diese umfassen Forschungs- und Lehrkompetenzen bzw. -qualifikationen, Schwierigkeiten bei der Rekrutierung, die Gestaltung einzelner Lehr- und Forschungsaktivitäten, die Festlegung von Forschungsschwerpunkten unter Risikoaversion und schließlich das Spannungsverhältnis zwischen Akademisierung und Praxisorientierung.

Während verschiedene Lösungen in Bezug auf Struktur, Kultur und Ressourcen entwickelt und umgesetzt wurden, lassen sich auch isomorphe Tendenzen beobachten. Die Interviewdaten der dritten Studie deuten darauf hin, dass der gemeinsame Schlüssel zur Lösung vieler Probleme in der Strukturierung der Humanressourcen liegt, um eine post-Humboldt'sche Konfiguration von Forschung und Lehre zu ermöglichen. Dies ist einer der ersten empirischen und robusten Belege für einen post-humboldtschen Wandel im Schweizer Hochschulwesen. Er kann als das Ergebnis der Lösungsentwicklung durch organisationale Akteure verstanden

werden, die auf bessere institutionelle Strukturen und die Nutzung von Humanressourcen für die Erfüllung eines öffentlichen Auftrags abzielt.

Zusammenfassend lässt sich sagen, dass die Anwendung des Konzepts der organisationalen Ambidextrie, das ursprünglich für das Verständnis von Unternehmen entwickelt wurde, ein nennenswerter Beitrag dieser Dissertation zur Hochschulforschung ist. Die Ergebnisse der Dissertation stellen einen Schritt in Richtung eines besseren Verständnisses des Managements und der Etablierung von organisationaler Ambidextrie in der binären Hochschulbildung dar. Die empirische Wissensbasis über die zunehmend relevanten, aber weniger untersuchten Hochschultypen außerhalb des traditionellen Universitätssektors, deren Lehr- und Forschungsauftrag von der Erwartung geprägt ist, berufliche und wissenschaftliche Expertise zu vereinen, wird somit gestärkt.

Die wichtigsten Einschränkungen der in dieser Dissertation vorgestellten Forschung betreffen zusammengefasst die verwendeten Daten und die länderspezifische Stichprobe. Einige der verwendeten Daten sind selbstberichtet und wurden über eine freiwillige Umfrage erhoben, die potenziell anfällig für eine Selbstaufwertung (John & Robins, 1994) und eine verzerrte Auswahl ist. Außerdem erlaubt die Art der Stichproben in den drei Studien Verallgemeinerungen nur nach sorgfältiger Überlegung und weiterer Forschung.

Die Ergebnisse der Dissertation und ihre Implikationen deuten darauf hin, dass vielversprechende zukünftige Forschungsarbeiten Lösungen für die organisatorische Ambidextrie in weniger untersuchten Bereichen wie der Sozialarbeit oder den Künsten, die oft zu den nicht-traditionellen Hochschulen gehören, untersuchen könnten. Darüber hinaus sollte die Rolle der dritten Mission bei der Förderung und Aufrechterhaltung der organisationalen Ambidextrie und bei der Differenzierung der Hochschultypen umfassend untersucht werden. Schließlich könnten eine wissenschaftliche Untersuchung und ein besseres Verständnis der Gründe, warum Hochschulen sich nicht an die staatlichen Anreize zur Förderung einer

Humboldt'schen Konfiguration halten, zur Entwicklung einer besseren Hochschulpolitik beitragen.

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Publications Contributing to the Cumulative Dissertation

Paper 1 / Study 1 (Chapter 3 in this dissertation)

Baumann, S., & Leišytė, L. (2022). Changing Research Structures and Academic Staff Competence in the Swiss Non-traditional University Sector. *Higher Education Policy, 35*(3), 750–771. https://doi.org/10.1057/s41307-021-00231-3[3]

- Type of publication: Subscription based
- Publisher: Palgrave Macmillan Ltd.

Abstract:

Recent reforms in Swiss higher education transformed vocational training institutions with a teaching mission into universities of applied sciences and universities of teacher education that should balance research and teaching activities of individual lecturers following the Humboldtian model. Drawing on the concept of ambidexterity, we aim to examine the current outcome of the reforms in terms of the structural conditions for research and the research competence of lecturers at the two new types of universities. By means of a document analysis, we first assess how the shift manifests itself in institutional mission statements. We then analyze recent survey data (N=2454) regarding the lecturers' perceptions of the structural conditions for research and their research competence. While our findings suggest that the new higher education sector has formally adopted the Humboldtian model, notable differences between the two types of universities can be observed in the extent to which the new policy imperatives have influenced the mission

[3] As a subscription based publication, HEIP features a restricted access. The publisher has provided the following sharable link to the view-only, full-text version of the article for non-subscribers: https://rdcu.be/dl3S2.

statements. Furthermore, we find a certain degree of mismatch between the organizational ambidexterity required by the Humboldtian model, the structural conditions for research encountered by lecturers, and the individual research competence. A number of conceptual and policy implications are drawn.

Paper 2 / Study 2 (Chapter 4 in this dissertation)

Baumann, S. (2022). Research Profile Clusters Among Lecturers in Non-traditional Higher Education. An Exploratory Analysis in the Swiss Context. *International Journal of Educational Research Open*, *3*, Article 100182. https://doi.org/10.1016/j.ijedro.2022.100182

- Type of publication: Open access companion title of the International Journal of Educational Research (IJER).
- Publisher: Elsevier via the platform ScienceDirect

Abstract:

This article explores post-reform clusters of individual research profiles in non-traditional higher education through the case of lecturers employed by Swiss universities of applied sciences and universities of teacher education. As elsewhere in Europe, former vocational training institutions in Switzerland were transformed into higher education institutions that each had to build a research capacity. The reliance on the integration of teaching and research at the level of the individual lecturer in this complex endeavor implies that lecturers have a role in fulfilling the public research mission. In order to empirically investigate the current outcome of the reform process, lecturers are clustered using variables related to their research role from recent survey data (N = 2454). The eleven variables used for this purpose are predominantly competence and task related, but also include demographic and motivational aspects.

The findings regarding the resulting clusters empirically illustrate that the mission drift in Swiss non-traditional higher education has affected the individual research role differently. Considerable differences between lecturers within the sector exist and they can be clustered into only two similarly sized distinct profile groups. While one exhibits values for the analyzed variables suggesting that research has a low priority, the other is comprised of productive, competent, and motivated researchers. Possible ramifications of the clusters are discussed and in conclusion, several conceptual implications are drawn.

Paper 3 / Study 3 (Chapter 5 in this dissertation)

Baumann, S. (2023). Research is for Hunters, Teaching for Farmers. Investigating Solutions to Lecturer-Related Problems of the Teaching-Research Mission of Swiss Universities of Applied Sciences. *Open Education Studies*, *5*(1), Article 20220196. https://doi.org/10.1515/edu-2022-0196

- Type of publication: Open access
- Publisher: De Gruyter

Abstract:

This study qualitatively investigates solutions to lecturer-related problems caused by the relatively recent introduction of a teaching-research mission at Swiss universities of applied sciences. It thereby makes an empirical contribution to the debate on organizational actors in higher education. The investigation is informed by a theoretical framework primarily drawn from the literature on organizational actorhood and relies on data from semi-structured interviews. Representing all public universities of applied sciences in Switzerland, the sample consists of 19 directors and one head of institutes

of business schools and engineering schools. The analysis identified five problem themes and numerous solutions. The findings suggest that after almost 30 years of their inception, universities of applied sciences have been utilizing their decision-making leeway to a great extent at the central and decentral levels, and in some cases are still in the process of solving the problems caused by integrating teaching and research activities at the individual and institutional levels. While various solutions in terms of structure, culture, and resources have been developed and implemented, isomorphic tendencies can also be observed. The data suggest that the common key to solving many problems lies in the human resources and a post-Humboldtian configuration of research and teaching.

1 Introduction

1.1 Problem

1.1.1 The Creation of a new Higher Education Sector

During the last three decades, the Swiss higher education (HE) sector has undergone numerous changes induced by HE policy reforms Notably, this affected the institutions tasked with the education of teachers and higher vocational training, along with Baccalaureate schools, upper secondary specialized schools and vocational training in general (Gonon, 1994). The reforms brought a convergence towards the Bologna model in Swiss HE (Bieber, 2010, p. 782) and the introduction of new types of HE institutions (HEIs). As common in other European countries, the post-reform present-day HE sector in Switzerland consists of several legally defined types of HEIs (Huisman & Kaiser, 2001, pp. 19–25), among them universities of teacher education (UTEs) and universities of applied sciences (UASs).

The two rather recently created types of HEIs, form the non-university or non-traditional HE sector[4] in Switzerland and the reforms meant a considerable change in their respective missions, i.e., their public remits. They went from the provision of what was essentially vocational training or, in the case of the predecessors of UASs, higher vocational education (Lepori, 2008, p. 55) to a mission which is quite similar to research universities, but conceptually and for reasons of educational policy embedded in an applied environment. This happened despite the plausible presumption that the former secondary level institutions might have been able to adapt to the role of a teaching universities more easily, given their specialization at the time. The change in the public remit presented UASs and UTEs with several problems. Among them was the fact that the integration of research and teaching in

[4] For a disambiguation of the term “non-traditional”, which is adopted for the purpose of this dissertation, see sub-chapter 2.

Swiss HE initially followed a strong integrationist direction. I.e., it took place at the individual level of the lecturers, requiring new competencies from them in comparison to pre-reform days. Over time, the HEIs in question also found other resource-linked, structural, and cultural solutions to fulfill their teaching and research mission, as shown in chapter 5. With the exception of this dissertation, no empirical investigation has been devoted to taking a closer look at the solutions of Swiss non-traditional HEIs to integrate research and teaching at the individual and organizational levels and the underlying problems prompting their development.

In theoretical or conceptual terms, the integration at the organizational level can be described as a process of developing the ability to pursue two disparate things at the same time. This ability is referred to as organizational ambidexterity (Gibson & Birkinshaw, 2004; Bledow, Frese, Anderson, Erez & Farr, 2009). As explained below in section 1.2, HEIs can rely on individually ambidextrous staff in this process, i.e., lecturers who are able to teach and conduct research, or they can try to find alternative solutions.

1.1.2 Post-reform Lecturers

Since the integration of research and teaching activities at UTEs and UASs is closely linked to lecturers' careers and the requirements regarding their qualifications and competencies, Swissuniversities, the representative body for all Swiss HEIs, has been providing some groundwork in this matter to its members (Swissuniversities, 2017). The ideal type of a lecturer profile in the non-traditional HE sector was conceptualized by Swissuniversities as the "Dual Competencies Profile" (Swissuniversities, n.d.). It tries to solve the dilemma that teaching at UASs and UTEs requires lecturers with a scientific background as well as a certain amount of practical experience in the vocational fields relevant to their students. The latter applied even more to the teaching staff of the predecessors of the two types of universities and is typically found in professionals who do not necessarily have an academic background. However, the requirement to be competent in research matters favors staff with an academic background, as

this is the only qualification, which promises such a competency. Therefore, there is a general understanding in Switzerland that UASs and UTEs have to ensure that both scientific and practical competencies are present in at least an important share of their lecturers, i.e., that they have mixed profiles (Böckelmann & Nagel, 2018, p. 38; Chamber of Universities of Applied Sciences and Arts, 2013, p. 15; Graf, 2018, pp. 20–26).

The common remit of the two newer types of HEIs and the consequences for their lecturers has prompted Swissuniversities, to support UASs and UTEs financially in improving the dual competencies profiles of their teaching staffs (Swissuniversities, n.d.).

Although Swissuniversities has modelled the careers of lecturers of UASs and UTEs normatively (Swissuniversities, 2017, 2018), there is very little empirical research in this area and Swissuniversities (2017, p. 17) points out the lack of research into careers of lecturers. Anecdotal evidence reflecting the experience of observers can be found in Graf (2018), where one of the defining attributes of UTEs is claimed to be the staff's profile of dual competencies, pairing scientific qualifications with relevant professional experience (p. 20). Furthermore, Weber, Tremel and Balthasar (2010) describe the profile of the scientific staff of Swiss UASs using public data on educational achievements from the Federal Statistical Office (FSO). They calculate that 68 percent of professors and almost 31 percent of the other non-administrative staff have a degree from a research university (p. 701). Since the educational achievements of more than 40 percent of the latter group are unknown, the picture remains unclear. In addition, the study does not examine the professional experience outside of HE, which is so important for non-traditional HEIs. However, the high proportion of professors without a degree from a research university is seen as evidence for the strong link between UASs, the vocational training system, and the professional environment outside of HE (Weber, Tremel & Balthasar, 2010, p. 702).

Unlike professors at traditional research universities in most fields of study, their counterparts in UASs and UTEs have never been legally required to possess a doctorate. The

same holds true for all members of the teaching staffs at these two types of non-traditional HEIs. When UASs were first introduced in the mid-1990s, Art. 12 of the now defunct Federal Act on Universities of Applied Sciences and Arts (1995) stated that their professors were required to have a tertiary degree and professional experience spanning several years in the field they are teaching in. With the introduction of the Higher Education Act (HEdA) in 2015 this explicit formulation was dropped. All types of HEIs, including research universities, are now required to ensure that: "…teaching, research and services are of high quality and staff are qualified in their positions,…" (HEdA Art. 30, Par. A). Thus, UASs and UTEs have to steer their recruiting practices and human resources development programs strategically with their own, more detailed guidelines in order to be able to fulfill this requirement.

In case of lecturers at UASs, the Swiss Science and Technology Council describes their current profile requirements as highly complex (2013, p. 11). UTEs are described or viewed by some as a field of UASs (Lehmann, 2016, p. 263) because the two types of universities have very similar tasks and share their origins as non-tertiary institutions of vocational education. Two UTEs, one in the German and another in the Italian speaking parts of Switzerland, are even organized as departments of UASs. Therefore, strong similarities between the professional requirements and profiles of the lecturers working for UASs and UTEs can be assumed.

The experience from other countries shows that the addition of research as an important faculty task causes tensions and dilemmas in HEIs (Kyvik & Skodvin, 2003). However, there is a gap in the knowledge about HEIs' responses to such change and the implications for their staff, which is especially pronounced when it comes to UASs and UTEs. One of the possible ways HEIs can react to the changes induced by policy reforms is by adjusting their staff and their staff's competencies to the prevailing conditions. There is some evidence from Germany that this possibly happened in the form of an academic drift at UASs

(e.g. in Ziegele, Rössler & Mordhorst, 2019; Hachmeister, Duong & Rössler, 2015; Duong, Hachmeister & Rössler, 2014).

1.2 Overall Theoretical Framework of the Dissertation

This section provides an overview of the overall theoretical framework, consisting of concepts and theories, used for the dissertation project. Each of the following study chapters explicates its theoretical framework in detail in its own section. The aim of this section is to briefly summarize how the study-frameworks relate to each other within an overall framework that helps to interpret and understand the connections between the study results.

The three studies of this dissertation are grounded at the micro and meso levels of analysis. However, developments at the macro level, which are not discussed within the scope of this thesis, are the impetus for the changes, adaptations, perceptions, and actions described in the studies. Examples for such developments include massification, a term for the rapid increase in student numbers that occurred towards the end of the twentieth century (Scott, 1995), differentiation, described by Huisman (1998) as "an increase in the number of types of institutions within a system" (p. 95) as well as "an increase of differences between (types of) institutions" (p. 95), and New Public Management which aimed to increase the efficiency and the effectiveness of HEIs by emphasizing their accountability and focusing on their output through policy means (Broucker & De Witt, 2015).

Figure 1 illustrates that macro level developments endowed Swiss HEIs at the meso level with considerable leeway in finding solutions and shaping themselves, which is mainly discussed in the third study and leads to the understanding of HEIs as organizational actors that act in their self-interest and try to find solutions to the problems they encounter (Whitley, 2008a, 2011). The macro level also incentivizes a Humboldtian configuration of research and teaching, as described further below in Study 1. However, organizational actors are free to choose a configuration, which has consequences for the desired organizational ambidexterity as well as

the individual ambidexterity required from lecturers. Since Swiss HEIs are legally required to be active in research and teaching, they can choose either a post-Humboldtian or a Humboldtian configuration as described by Schimank and Winnes (2000). In contrast to a pre-Humboldtian model, both allow HEIs to unite research and teaching under a single organizational umbrella. In Humboldtian settings, professional profiles with varying degrees of individual ambidexterity are formed as lecturers combine activities and commit their human capital to the mission areas. This in turn is a major determinant of the teaching-research nexus, i.e., the longstanding ideal of European academia that the two activities co-exist in a symbolic relationship (British Academy, 2022).

While a Humboldtian configuration primarily relies on individual ambidexterity to fulfill the teaching and research mission, a post-Humboldtian configuration disintegrates the unity of research and teaching at the individual level (Leišytė, 2016) and integrates it at the organizational level. The two configurations can be achieved through various measures in the three areas of control for change and adaption, which have been described by Pinheiro and Stensaker (2014). HEIs therefore try to find their specific solutions through cultural, structural, or resource-related adjustments, which are derived and described in more detail in Study 3.

In the broadest sense, the organizational literature refers to an organization's ability to pursue two disparate things at the same time as 'ambidexterity' (Gibson & Birkinshaw, 2004; Bledow et al., 2009). In a narrower definition, this term refers to an organization's ability to exploit and explore, i.e., satisfy today's demands and be adaptive to changes (O'Reilly & Tushman, 2013). More recently, research has also been aimed at the "barely analyzed individual dimension of ambidexterity" (Bonesso, Gerli & Scapolan, 2013, p. 1) and there are studies pointing out that an ambidextrous organization can be the result of the abilities of the individual employees (Bledow et al., 2009). According to Schnellbächer et al., (2019, p. 3) individual ambidexterity is even key to organizational ambidexterity. However, little is known on how ambidexterity is accomplished and managed (Martin et al., 2019).

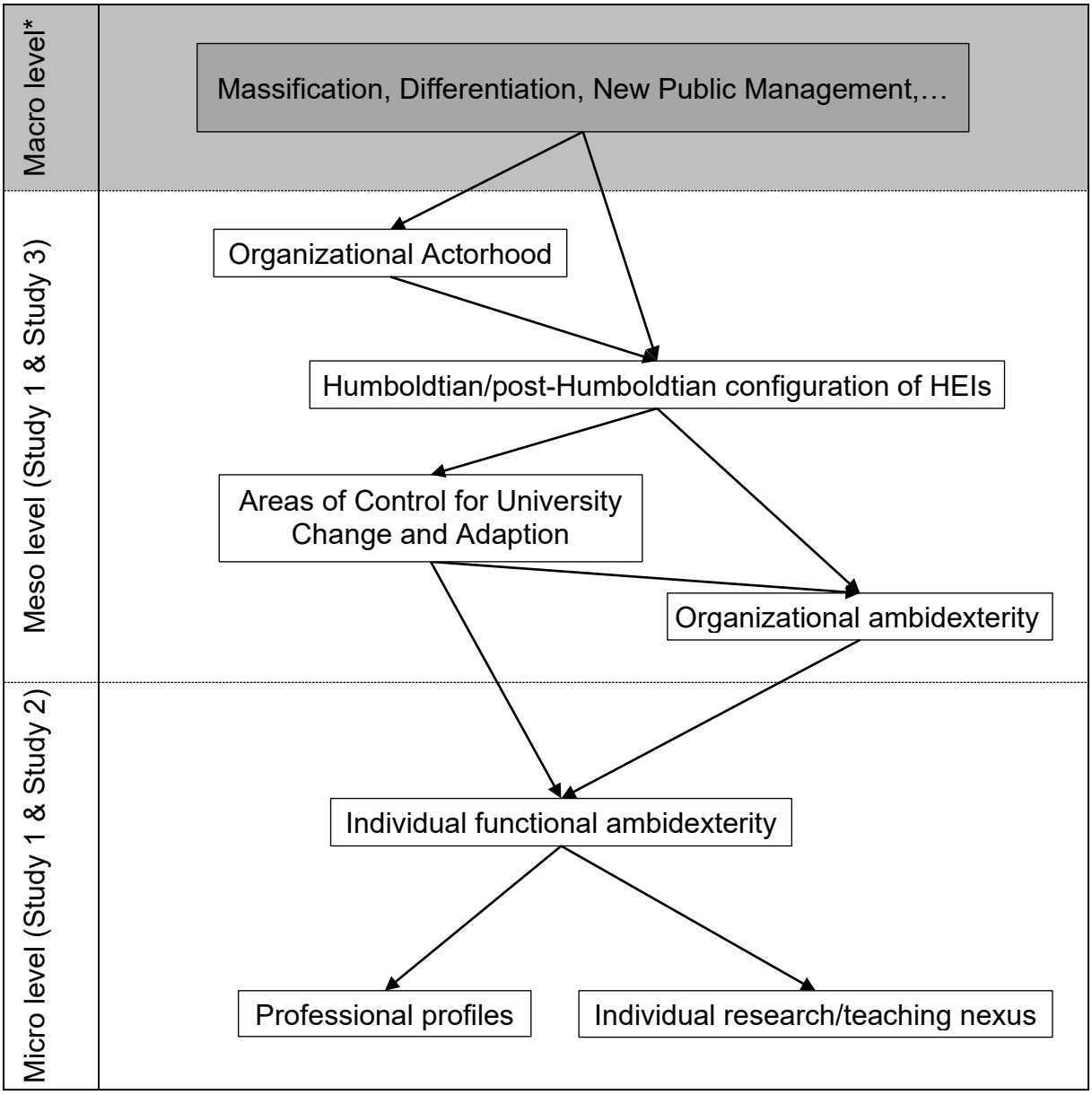

Figure 1. *Schematic Overview of Overall Theoretical Framework* (*the theoretical concepts at the macro level are not discussed in the studies, their non-exhaustive enumeration is featured for reasons of complementarity)

Research on ambidexterity tends to have corporate settings (Birkinshaw & Gupta, 2013) and generalizing its results to other contexts might be problematic (Kobarg, Wollersheim, Welpe & Spörrle, 2019). In addition, studies on ambidexterity focus on individual or organizational performance rather than individual characteristics that enable individual and organizational ambidextrous behavior. With the application of the ambidexterity concepts to

HE, individual qualifications, and competencies, the research represented in this dissertation also aims to make a contribution to the field of HE research.

1.3 Goals and Research Questions of the Dissertation

This dissertation project aims to understand how Swiss UASs and UTEs fulfill their remit of research and teaching through their dedicated staff and supporting institutional structures. This aim is driven by the fact that UASs and UTEs have only relatively recently transitioned into HEIs and had to change and adapt in order to integrate research and teaching in their organizations and to conduct both tasks simultaneously. This transformational process, whose duration provides the timeframe for the analyses in the three studies building the core of this dissertation, started in the mid-1990s and is to some extent still not completed.

As explained in more detail in the sub-chapter 2 and study chapters 3 to 5, a view of UTEs and UASs as ambidextrous HEIs is adopted. The application of the concept of organizational ambidexterity in the context of non-traditional HE aims to contribute to the reduction of the gap in theorizing ambidextrous HEIs. This gap is due to the generally limited knowledge about how organizational ambidexterity is achieved (Martin et al., 2019) and the predominant focus of ambidexterity research on for-profit businesses (Birkinshaw & Gupta, 2013), with only rare consideration of HEIs (Sliż & Dobrowolska, 2023).

Ambidexterity generally implies the successful pursuit of two disparate tasks in parallel (Gibson & Birkinshaw, 2004; Bledow et al., 2009). In the application of the concept in this dissertation, teaching represents the exploitative task of HEIs that is performed at the individual as well as the organizational levels. Exploitation improves, standardizes, and elaborates established processes (Birkinshaw & Gibson, 2004), while the explorative task is represented by research and includes the search for novel ideas, technologies, paradigms, and general knowledge (March, 1991). Furthermore, at the individual level "…ambidexterity is necessary to connect novel knowledge generated through exploration towards incrementally

developed knowledge, the result of exploitation" (Schnellbächer et al., 2019, p. 2). Therefore, this dissertation project tries to answer the following overarching research question:

How have Swiss non-traditional HEIs responded to the need to become ambidextrous in research and teaching, in particular through structural means and their staffing policies and practices?

The investigative approach for addressing the overarching research question involves answering three specific subordinate research questions. Each one of them was addressed and answered in separate studies that were published as research articles in peer-reviewed English-language journals. These subordinate research questions are as follows:

- What is the current outcome of the introduction of teaching and research in the Swiss non-traditional university sector regarding the structural conditions for research and the research competence of lecturers? (Study 1 in chapter 3)
- How can lecturers in non-traditional HEIs be grouped regarding variables related to their research role and what are the implications? (Study 2 in chapter 4)
- What conflicts and tensions result in the Swiss non-traditional university sector from the requirement to conduct research and teaching on the individual and organizational level and how are they resolved by these HEIs? (Study 3 in chapter 5)

In sub-chapter 6.1, the answers to the research questions of each study are discussed in context of the overall research question.

1.4 Overview of Methods and Data Used in the Studies

The three studies forming the core of this dissertation thesis applied different methods and partially relied on shared as well as different data to answer the research questions. Table 1 provides an overview of the data used in the studies and the methods to analyze them. Essentially, the three studies combine qualitative and quantitative methods. While Studies 2

and 3 each rely on a single method, Study 1 follows a mixed methods approach. Study 3 aligns with the international trend in qualitative HE research, particularly concerning questions of organizational structure, governance, and working conditions, where data are typically collected through semi-structured interviews (Wilkesmann, 2017, p. 582). Each of the three study chapters provides more details on the methodological approach and includes a full description on how and when the data were collected.

Table 1. *Overview of Methods and Data Used in the Studies*

	Study 1	Study 2	Study 3
Type/source of data	• Mission statements (N = 23) • Survey data (N = 2454)	Survey data (N = 2454)	Semi structured interview data (N = 20)
Method(s)	• Triangulation following Flick (2011) • Qualitative document analysis following Bowen (2009) • Quantitative data analysis (descriptive and dependency analysis, i.e., Chi-square distribution tests and one-way ANOVA)	Quantitative interdependency analysis in the form of a two-step cluster analysis following Norušis (2012)	Qualitative thematic analysis following Creswell (1998)

2 Context of the Research

2.1 Some Remarks Regarding the Terms Used for UASs and UTEs

One challenge in researching UASs and UTEs in national or international contexts is the inconsistent terminology used in published studies to refer to these HEIs, whether as individual institutions or as part of a national or international HE system. So far, a stable classification has not yet emerged (Lepori, 2021). Only through the exposure to relevant literature can early career researchers gain a general view and understanding of what specific institutions belong to the sector internationally.

De Weert and Berkens-Soo (2009) provide an overview of international designations for the national terms for non-traditional HEIs. In Switzerland, 'universities of applied sciences' is used in international contexts to designate what is domestically called 'Fachhochschulen' in German, 'hautes écoles specialisées' in French and 'scuole universitarie professionali' in Italian. More recently, the term 'Hochschule für angewandte Wissensschaften' has been in use for German UASs (Lehnert, Pfister & Backes-Gellner, 2020), which could be translated as 'HEI of applied sciences'.

Unfortunately, no comprehensive overview of international designations for UTEs seem to be in existence. Swiss UTEs commonly refer to themselves as universities of teacher education, e.g., the Bern University of Teacher Education[5], the Zurich University of Teacher Education[6] or the St. Gallen University of Teacher Education[7]. De Weert & Berkens-Soo (2009) and Lehmann (2016) mention that teacher education forms part of two UASs, which indicates the closeness of the two types of HEIs in Switzerland. However, UTEs are typically legally independent institutions.

[5] https://www.phbern.ch/studium/rund-ums-studieren/international

[6] https://phzh.ch/en/about-phzh/

[7] https://www.phsg.ch/en

Even more diverse than the international designations for UASs and UTEs are the terms used to subsume them and similar HEIs internationally. The following list demonstrates this observation:

- Non-university higher education (Kyvik & Skodvin, 2003; Doern, 2008; Teichler, 2008; European Commission, 2016)
- Professional higher education (Griffioen & de Jong, 2015)
- Polytechnics in Higher Education Systems (Doern, 2008)
- New universities (Griffioen, 2020)

As Teichler (2008) stated: "A consensus never emerged how these institutions should be termed" (p. 131) .While the term non-university is widely used in internationally recognized literature, its usage creates terminological confusion, at least in national HE systems where non-university HEIs call themselves 'universities', e.g., in Austria, Finland, Germany, the Netherlands, and Switzerland. In order to avoid this terminological confusion, the term 'non-traditional' was chosen to designate Swiss UASs and UTEs as well as the sector they form in the studies of this dissertation (i.e. chapters 3, 4 and 5). The term was accepted in all three peer-review processes and never negatively commented on.

In Switzerland, UTEs and UASs share a common history as post-secondary vocational training and education institutions. Upon their inception, both received an applied research mandate that differentiates UASs and UTEs from the cantonal universities (Lepori, 2008), which have a much longer history and are called traditional or research universities for the purpose of this dissertation. Another distinguishing feature of the newcomers to the HE sector is that they do not have the right to award doctorates. As such, UASs and UTEs form one side of the Swiss binary HE system as 'equivalent but different' HEIs according to the Swiss HE Act (HEdA) (Böckelmann, Probst, Wassmer & Baumann, 2022).

2.2 Short History of the Swiss Non-traditional Higher Education Sector

Starting in the late 1990s in the fields of technology, business, as well as engineering and then extending to most professional domains within a five year period (Lepori, Huisman & Seeber, 2014, p. 203), the educational reforms in Switzerland initially resulted in the creation of UASs (Weber, Tremel & Balthasar, 2010). In this process, Switzerland followed the examples of other countries. E.g. in Austria, the decision to establish UASs was taken in 1990, which was preceded by several German Bundesländer that began to set up UASs in the 1970s and followed by France establishing its 'instituts universitaires professionnalisés' in the 1990s (Lehmann, 2016, p. 251). Within approximately ten years of the establishment of UASs in Switzerland, the Swiss Cantons, i.e., the federal states, brought most UTEs into existence in today's form with the aid of federal legislation (Huber, 2016).

With the exception of teacher education, the promotion of vocational training and education has traditionally been a mainly federal mission in Switzerland (Gonon, 1994, p. 393). Therefore, it was regulated by federal law as opposed to traditional universities and their education, which were mainly cantonal affairs. As UASs essentially provide vocational education, the reforms put them under federal authority and a federal law regulating these institutions was enacted. Originally, Article 3 of this law on UASs (Federal Act on Universities of Applied Sciences and Arts, 1995) assigned the four specific tasks of education in the form of degree programs, continuing education, applied research and development, and the provision of services to third parties to these newly created HEIs.

The regulation initiated research activities in non-traditional HE and introduced associated problems related to organizational and individual ambidexterity, which are studied in this dissertation. However, this regulation only lasted for ten years before a new wave of higher education reform also brought UTEs under the scope of federal policies. A new law, the Federal Act on Funding and Coordination of the Swiss Higher Education Sector or Higher

Education Act (HEdA, 2015), reformulated the tasks of all types of HEIs in Article 30b to teaching, research, and the provision of services to third parties.

All of these tasks are to be performed in several fields of study (HEdA, 2015, Art. 30b) and assuring their quality through a quality assurance system is the main requirement for the successful federal institutional accreditation of HEIs. Even though the material changes to the tasks in the newer HEdA are negligible, they were from then on also applicable to UTEs. However, these HEIs are excluded from receiving federal funding for the construction and use of infrastructure and to cover basic operating costs (HEdA, 2015, Art. 47b). This situation stems from the fact that, in contrast to the UASs, UTEs remain under the jurisdiction of the cantons and are subject to cantonal and intercantonal laws and regulations, including two UTEs that are organized and managed as departments of UASs. The Bernese Law on the German-language UTE (PHG) exemplifies this. Complementing the federal HEdA, it states that the provision of basic and continuing education for teachers up to secondary school level II as well as special needs education is its central task (PHG, Art. 5). In addition, the law stipulates that the school has to conduct applied research and development in order to connect science and practice and provide services with regard to educational media as well as third parties.

In contrast to other countries like Germany and the Netherlands, where non-traditional universities such as UASs did not have a research mission, when they were first founded (Hüther & Krücken, 2016, p. 99; Kyvik & Lepori, 2010), Swiss non-traditional universities, have had a public research mission from the beginning. The sector has experienced numerous changes over time and is still developing. Notably, e.g., two UASs each split into two separate legal entities, which brought the number of public UASs to nine (SERI, 2023). Figure 2 highlights some of the more important developments shaping the non-traditional HE sector since its inception in the mid-1990s. One of the milestones in the history of the non-traditional HE sector in Switzerland was reached in 2022, when all UASs and UTEs were institutionally

accredited according to the criteria defined in the HEdA for the first time (Swiss Accreditation Council, 2023).

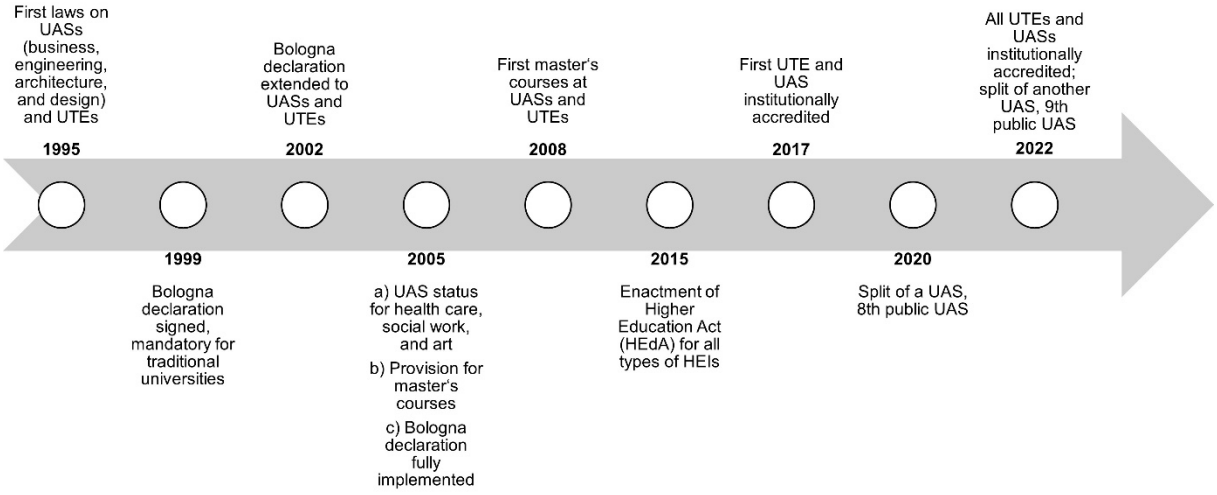

Figure 2. *Important Developments in the Swiss Non-traditional University Sector*

2.3 The Swiss Non-traditional Higher Education Sector in Numbers

2.3.1 Students

The numbers and proportions shown in Figure 3 illustrate the growth and relative importance of the non-traditional HE sector in Switzerland. For the first time in decades, in the academic year 2022/23 the whole HE sector did not grow in comparison to the previous year, when it had reached its highest number of students to date. On average, UASs educated 30.6 percent of HE students since 2014/15 and UTEs 8.4 percent. Traditional universities therefore accounted for an average of 61 percent of all HE students in Switzerland in the same period.

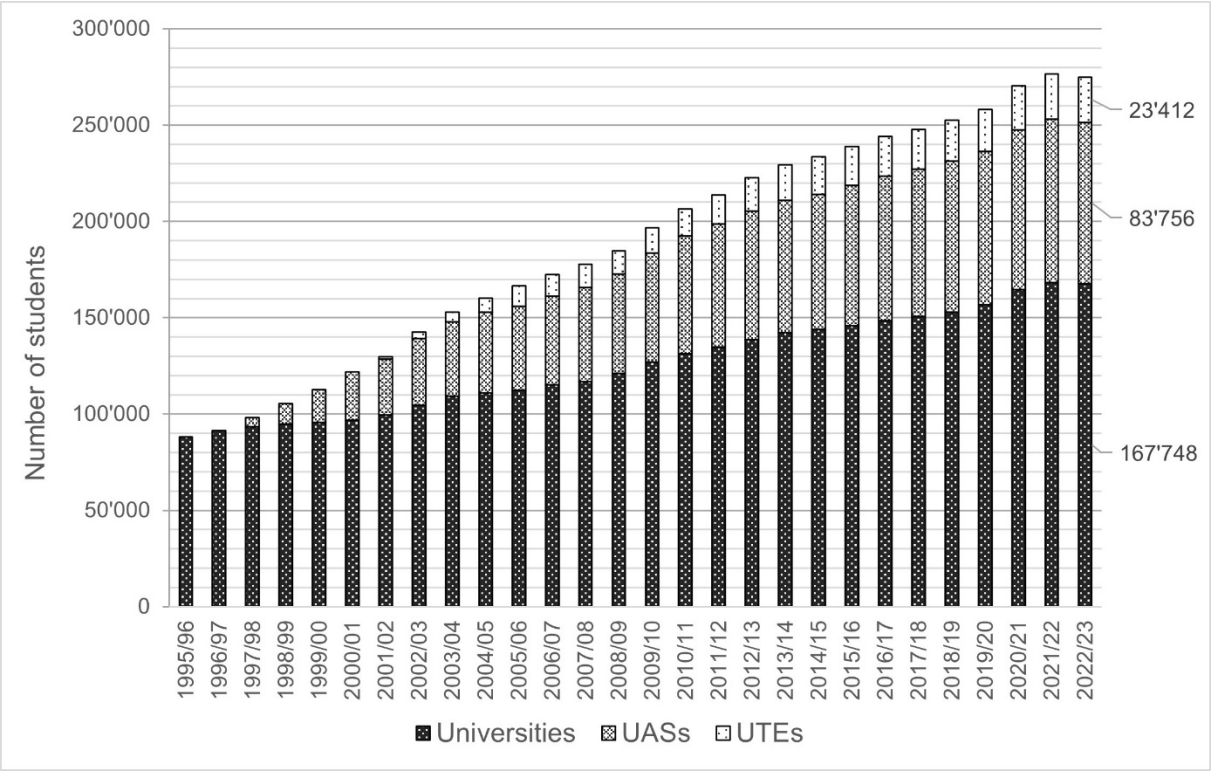

Figure 3. *Number of Students in Swiss HE 1995 to 2023* (Sources: FSO, 2023a, 2023b, 2023c)

The average annual growth rate of the non-traditional sector's students since 2001/02, when numbers for UASs and UTEs were first statistically recorded, is 7.2 percent. This is much higher than the average annual growth rate of the Swiss traditional university students, which was 2.5 percent in the same period (FSO, 2023a, 2023b, 2023c) or the Swiss economy, which only grew 2.3 percent in nominal and 1.8 percent in real terms since 2001 (FSO, 2023d).

2.3.2 Finances

The reform creating a binary HE sector in Switzerland and the transformation of the predecessors of UASs and UTEs into functionally ambidextrous HEIs, fulfilling teaching and research missions, is visible in the data on their expenditures. In 2022, total expenditures of the HE sector on research amounted to CHF 6.40 bn and for teaching, CHF 5.97 bn was spent by all HEIs in that year (FSO, 2023e, 2023f, 2023g). The shares of the non-traditional HE sector are shown in Figure 4. After an initial growth phase which ended in 2010, the joint share of

UASs and UTEs in teaching expenditures has been quite stable at around 45 percent up to 2022. The share of research expenditures, however, has been steadily increasing, albeit on a very slow pace, to about 15 percent in 2022. Within the non-traditional HE sector, the shares of research and teaching expenditures have also been quite stable. UASs are responsible for about 89 percent of research expenditures and 79 percent of teaching expenditures, which reflects their relative size in student numbers in comparison to UTEs.

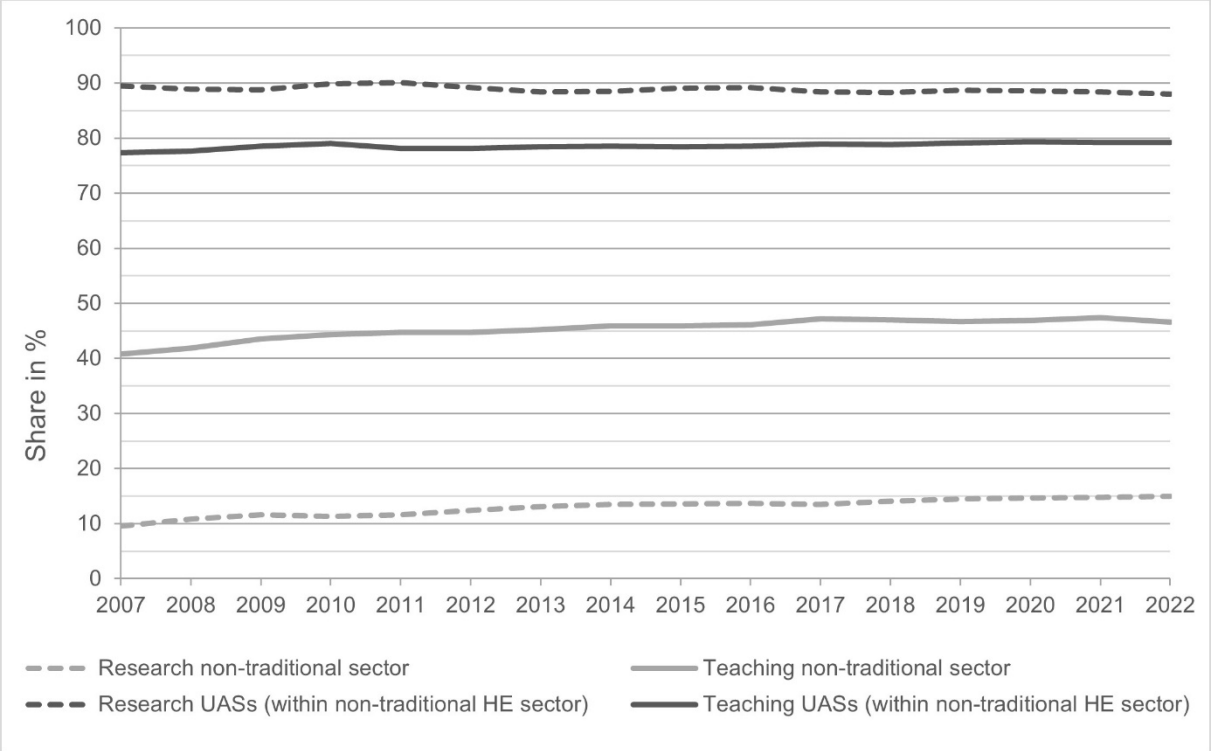

Figure 4. *Shares of Teaching and Research Expenditures in Swiss HE 2007 to 2022* (Sources: FSO, 2023e, 2023f, 2023g)

The relatively small proportions of research and teaching expenditures by UASs and UTEs indicate their importance compared to traditional universities. Considering that they educate about 39 percent of all HE students and reach a share of 47 percent of teaching expenditures in HE, their share of research expenditures is disproportionately small. This hints at the challenging situation faced by HE management, which has been confronted with growing student numbers and essentially stagnating funding.

Given that their share in total research expenditures of HEIs is only about 13.4 percent according to the FSO (2023e, 2023f, 2023g), Swiss UASs remain minor actors in the public research system. They share this position with UASs throughout Europe (Hachmeister, Duong & Rössler, 2015; Lepori & Kyvik, 2010). Considering that Swiss UTEs are more numerous than UASs, the numbers illustrate that the former are often quite small HEIs with corresponding low research budgets. Therefore, UTEs can be considered even smaller actors in the public research system than UASs.

2.3.3 Personnel

The personnel of Swiss HEIs can be broadly categorized into lecturers with managerial responsibility, other lecturers, assistants and research associates, and directorate/administrative-technical staff (FSO, 2020b). In terms of full-time equivalents (FTEs), the personnel of Swiss HEIs has increased significantly over the last two decades, as can be seen in Figure 5, which is based on data from the FSO (2023h, 2023i, 2023j). Since 2005, the average annual growth rate for traditional university personnel, which can be calculated on the basis of the data, was 2.9 percent while the non-traditional HE sector's FTEs grew by an average of 4.3 percent per annum.

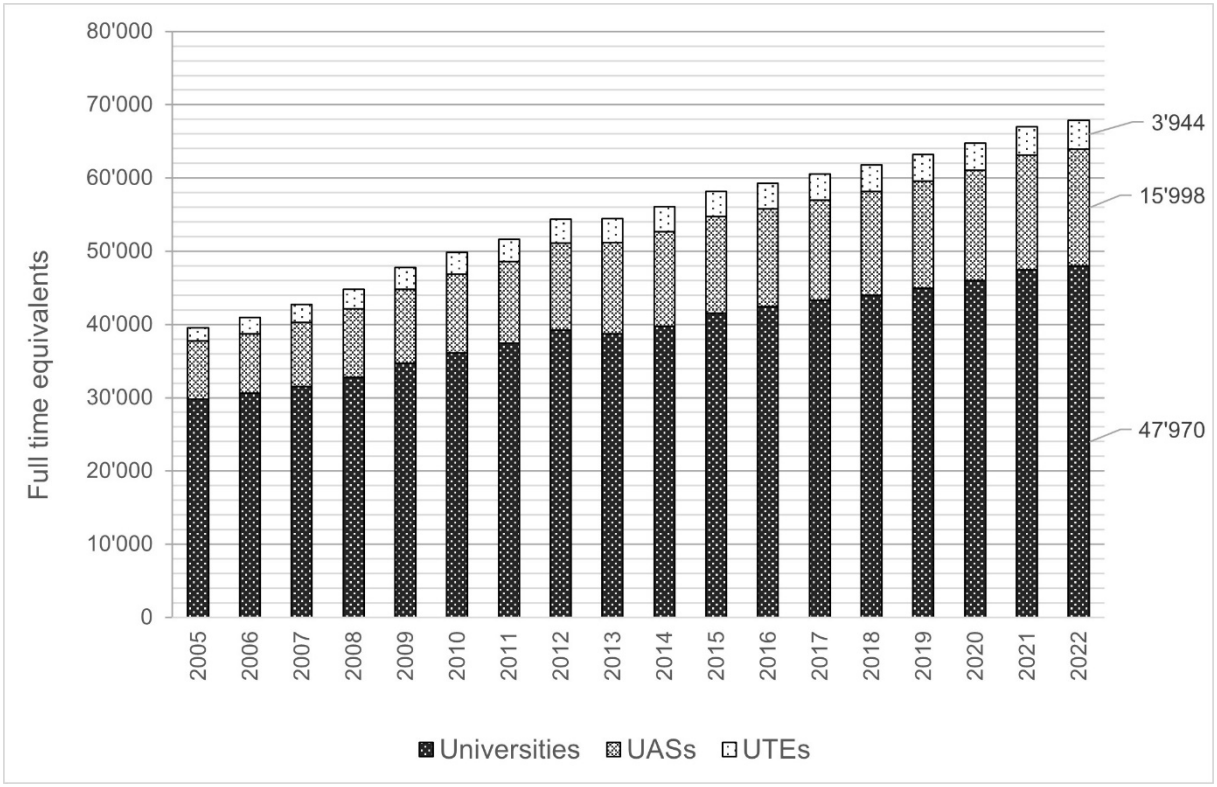

Figure 5. *FTEs in Swiss HE 2005 to 2022* (Sources: FSO, 2023h, 2023i, 2023j)

Figure 6 below visualizes the building of research capacity and the growth of teaching activities in the Swiss non-traditional HE sector. Unfortunately, data on FTEs are not available for the very beginning of the sector, but the figure still provides a good impression of the growth in personnel resources tasked with research and teaching and thus ensuring the ambidexterity as understood in this dissertation. While from 2005 to 2022 the FTEs for research increased by 352 percent and 548 percent at UASs and UTEs, respectively, FTEs for teaching increased by only 180 percent in both cases of HEIs. This disparity in the growth of human resources for research in comparison to the growth of human resources for teaching can be understood as the background for the observation in Study 3 that lecturer-related problems concerning research were much more frequently mentioned in the interviews with directors of Swiss non-traditional HEIs than lecturer-related problems concerning teaching.

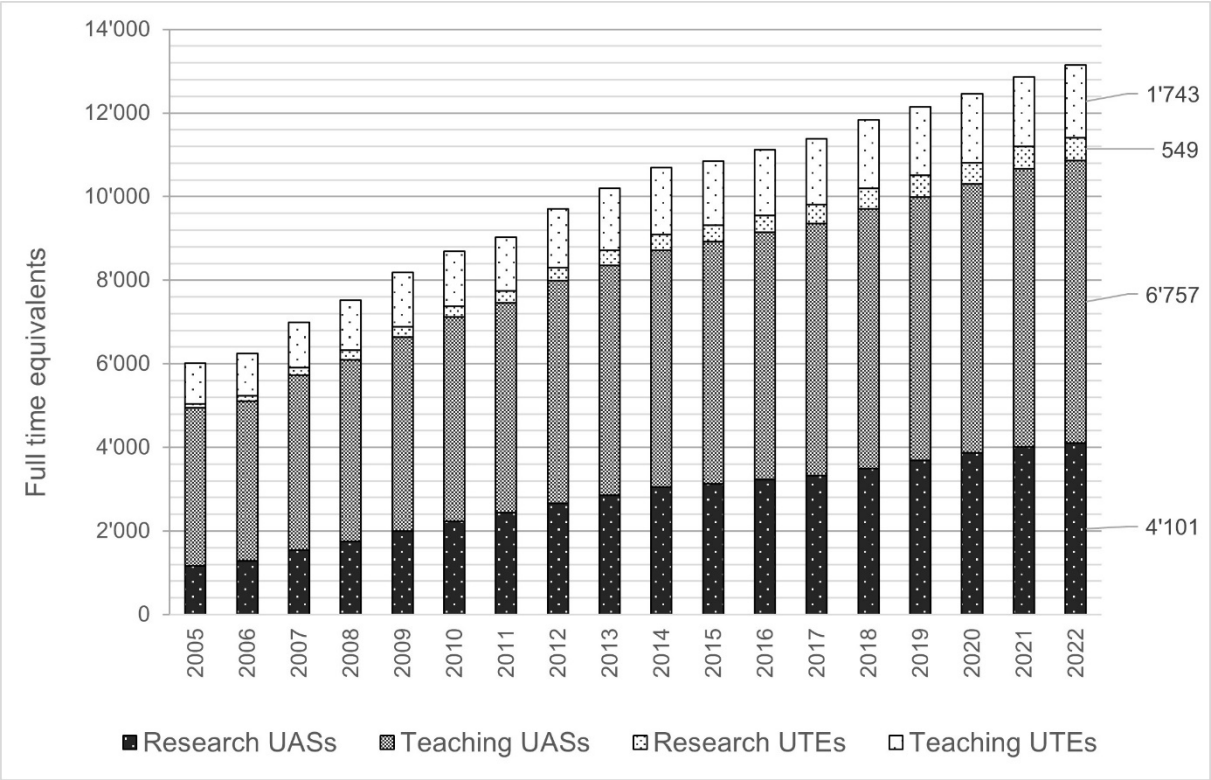

Figure 6. *FTEs in Research and Teaching 2005 to 2022* (only bachelor's and master's levels) (Sources: FSO, 2023h, 2023i, 2023j)

The average annual growth rates of FTEs dedicated to teaching of 3.5 percent for the combined types of non-traditional HEIs are dwarfed by the average annual growth rates of FTEs linked to the research mission. They reach 7.7 percent and even 10.5 percent at UASs and UTEs, respectively. The disproportionate growth in human resources dedicated to research is an indicator of the building of a research capacity and the development of functionally ambidextrous HEIs in the sector.

2.4 Career Paths in Research and Teaching in the Swiss Non-traditional Higher Education Sector

The professional and educational background of lecturers in the Swiss non-traditional university sector can be quite varied and has a strong influence on possible career paths. The umbrella organization of Swiss HEIs, Swissuniversities, has defined ideal type career paths and

positions for different categories of staff involved in research and teaching, i.e, lecturers, artistic and research associates and assistants, and practitioners, at UTEs and UASs in two separate documents (Swissuniversities, 2017, 2018). While Table 2 summarizes the possible role descriptions at the various functional levels along with their requirements, Table 3 illustrates the career paths using the designations for the positions introduced in Table 2. In contrast to UASs, UTEs emphasize that roles at the A1 and A2 levels can either be leadership-oriented or more of a professional or technical nature. Also, A1 roles with strategic and operative responsibilities are at the corporate level of UTEs and designated as A1a, whereas UASs do no longer include the corporate leadership in the category for faculty. This reflects the fact that UTEs are usually smaller institutions without the decentralized or departmentalized organization typically found at UASs.

In both types of HEIs, lecturers are predominantly found at the functional levels of A2, A3 and C. Faculty belonging to the A1 level can be described as executives. While UASs do not further differentiate this level, UTEs distinguish between A1a positions with general management roles and A1b positions that fulfill roles in specialized management, e.g., a head of instructional research or a head of teaching methodology in foreign languages.

Table 2. *Personnel Groups with Their Functional Levels and Roles as Well as Their Formal Requirements* (adapted, based on Swissuniversities, 2017, 2018)

Personnel group	Functional level and roles		Formal requirements
	UTE	UAS	
Faculty/ Lecturers	A1		
	A1a Strategic and operative leadership roles at the corporate level	• Strategic/operative leadership roles at the departmental level • Responsible for junior staff development	In addition to A2: • Extensive leadership experience • Management qualifications
	A1b Technical leadership roles in strategic area of research and teaching or mission-critical area of development		For A1b in addition to A2: • Above-average track record and reputation in mission areas • Extensive leadership experience

Table 2. *(continued)*

	A2		
	A2a Leadership role in organizational unit within teaching and research mission or within scientific support	Responsibilities in mission areas and possible management functions	In addition to A3: • Leadership experience in teaching and/research • Management competence
	A2b Technical/professional responsibility without management function		For A2b in addition to A3: • Above-average professional expertise in research and/or teaching areas and experience in other mission areas
	A3		
	Independent and comprehensive activity in at least one of the mission areas or in HE development		• Specialization in a field including work and research experience • Doctorate desirable • Specialized formal training in at least one mission area
Research or artistic associates and assistants	B1		
	Senior research/artistic associates Independent project processing and/or sub-project management, possible teaching activities		• Specialization in a field with work and research experience • Doctorate desirable • Didactic training desirable
	B2		
	Research/artistic associates Independent (Sub-)project management, possible support roles in teaching		• Master's degree or equivalent with some experience in research and/or teaching • Some work experience
	B3		
	Assistants with supporting research/artistic functions and also employable in services or third space		• Bachelor's degree or equivalent • Little or no work experience
Practitioners	C		
	Professionals working in parallel outside of HE with teaching responsibilities and (occasional) possible research activities		• Teaching degree (UTEs) or professional training (UASs) • Work experience in field relevant to students

In principle and as Table 3 shows, the functional levels of UTEs and UASs are fairly permeable. While the levels B and C can be entered from the outside of a HEI, i.e., after completing one's studies or from a professional activity in a public or private sector relevant to a HEI, levels A1 and A2 require a longer period of activity in HE. Interestingly, UASs explicitly provide for the

direct path from practitioner, i.e., level C position working in parallel outside of HE, to a level A3 position. This arrangement strengthens the connection with the world of work and lends credibility to UASs' role as providers of higher professional education and training. A-level roles are not defined as 'one way streets' and can be traversed in both directions, namely, form A3 to A1 and vice versa (Swissuniversities, 2017, 2018). However, no data exist on how frequent such crisscrossing of roles is, as the two white papers by Swissuniversities (2017, 2018) showcase conceptual ideal type career paths rather than a lived practice.

Table 3. *Ideal Type Career Paths* (based on Swissuniversities 2017, 2018)

Functional level	UTE	UAS
A (Faculty/ Lecturers)	A3 → A2a/b → A1a/b	A3 → A2 → A1
	A1a/b → A2a/b → A3	A1 → A2 → A3
	B1 → A3 → A2a/b → A1a/b	B1 → A3 → A2 → A1
		C → A3 → A2 → A1
	Practice → A3 → A2a/b → A1a/b	Practice → A3 → A2 → A1
B (Research or artistic associates and assistants)	Studies → B3 → B2 → B1	
	Studies or Practice → B2 → B1	
	Practice → B1	
C (Practitioners)	Practice → C	

Although not primarily intended for this purpose, Study 3 provides some insights into how UASs try to find or qualify staff for some of the paths described in Table 3, e.g., from the functional level of C, which includes practitioners working in parallel outside of HE, to A, which includes lecturers, or from B, the level of research or artistic associates and assistants to A.

3 Study 1[8]: Changing Research Structures and Academic Staff Competence in the Swiss Non-Traditional University Sector

3.1 Introduction

A relatively recent higher education (HE) reform, introduced in the year 1995 (Lepori & Kyvik, 2010, p. 23), brought about the creation of universities of applied sciences (UASs) and universities of teacher education (UTEs) in Switzerland. Together, they form a new non-traditional university sector (Trotter & Mitchell, 2019) that has its roots in higher vocational education. As in other countries, where already existing post-secondary institutions were merged into non-traditional universities (OECD, 1998), the restructuring of the Swiss HE sector entailed the addition of research to the public mission of the two newly formed types of higher education institutions (HEIs). The new universities, whose institutional predecessors had "very limited research experience" (Lepori, 2008, p. 50), were reorganized according to the Humboldtian model with its unity of research and teaching at the level of the individual lecturer (Schimank & Winnes, 2000). While this is somewhat contrary to the observed international trends towards a separation of the two areas in HE (Leišytė, 2016), their integration has resulted in the creation of a teaching-research nexus (Neumann, 1994) at the Swiss new universities. This change necessitated the development of a research competence at the institutional as well as the individual level in addition to the already existing teaching competence. The Swiss federal government has been actively supporting this development through dedicated funds and supporting measures (Lepori, 2008, p. 46).

We interpret the goal of this developmental process as the attainment of organizational ambidexterity by the new HE sector, i.e. the acquisition of the ability to carry out different tasks

[8] This chapter has been published as a slightly differently formatted «original article» on April 6, 2021, in *Higher Education Policy* Volume 35 (2022), pp. 750-771, https://doi.org/10.1057/s41307-021-00231-3

simultaneously (Birkinshaw & Gibson, 2004) through the functional ambidexterity of the individual lecturers working for these HEIs.

The Swiss non-traditional university sector has grown from 4.900 students in the academic year 1997/98 to 101.400 students in 2019/20 (FSO, 2020a). Together with the traditional universities, it fulfils a crucial role in a country with very little natural resources. Given these points, in addition to the importance of research for the innovativeness of new generations of talented professionals working outside of HE (European Commission, 2017, p. 5) as well as for the wider economy and society, we are interested in the results the reform has so far brought about. Roughly 25 years after the reform began, we therefore ask: *What is the current outcome of the introduction of a Humboldtian teaching-research nexus in the Swiss non-traditional university sector regarding the structural conditions for research and the research competence of lecturers?*

We address this question through the three sub-questions. First, we establish, to what extent the sector has adopted the Humboldtian model in their mission statements, because we view its adoption as a precondition for the analysis of new structures. We then move on to explore the structural conditions for research that lecturers encounter at their HEIs. Thirdly, we assess to what extent lecturers have the self-perceived competence to fulfill the additional research mission successfully thanks to their highest academic degree.

Through this study, we aim to contribute to the application of the concept of organizational ambidexterity in the context of non-traditional universities in binary HE systems. We do this through the specific case of the reformed Swiss HE system by linking ambidexterity to the Humboldtian model. While the nature and profile of research at non-traditional universities as well as the institutional profiles within the sector have been examined (e.g. in de Weert & Berkens-Soo, 2009; Lepori, 2008; Kyvik & Lepori, 2010) there are very few empirical investigations into the human capital aspects and structural conditions of the research mission of the non-traditional university sector. There is a gap in the knowledge about HEIs' responses

to the change described above and the implications for their staff. The responses from the non-traditional sector are likely to be influenced by the fact that it is not uncommon for it to have a mandate to conduct applied research (de Weert & Berkens-Soo, 2009). In Switzerland, this form of research mandate is especially pronounced and differentiates UASs and UTEs from the traditional universities (Lepori, 2008), not least when it comes to recruiting suitable lecturers. One of the possible ways a HEI can react to the changes induced by policy reforms is by adjusting its staff and its staff's competencies to the prevailing conditions. There is some evidence from German UASs that this mainly happens in the form of an academic drift (e.g. in Ziegele, Rössler & Mordhorst, 2019; Hachmeister, Duong & Rössler, 2015; Duong, Hachmeister & Rössler, 2014).

This paper is divided into seven sections. After the introduction, we present our theoretical framework and review the organizational ambidexterity literature relevant to HE. Section 3 provides important contextual information on the HE reform in Switzerland. Section 4 describes the methodology of the study. The findings are presented in section 5, followed by their discussion in section 6. The conclusions and recommendations in section 7 complete the paper.

3.2 Theoretical Framework

This contribution builds on two main concepts: the Humboldtian model of HE with its unity of research and teaching (Schimank & Winnes, 2000) and organizational ambidexterity. We expand the notion of ambidexterity to functional individual ambidexterity in order to account for the fact that HEIs with a strong integration of research and teaching according to the Humboldtian model need lecturers involved in both activities.

The origins of the Humboldtian model go back to early 19th century Germany, where Wilhelm von Humboldt initiated the founding of the University of Berlin with the unity of research and teaching as one of the cornerstones of the Humboldtian university concept

(Nybom, 2003, p. 144). The model has since influenced the university sectors on a worldwide scale (Fuller, 2005, p. 29; Höhle & Teichler, 2013a, p. 79; Nybom, 2003, p. 145). While the unity of research and teaching originally meant that there is no differentiation between the two tasks (Schimank & Winnes, 2000) and von Humboldt even viewed professors and students as being united in "the common pursuit of knowledge" (Hattie & Marsh, 1996, p. 507), its meaning has altered over time. Today, it describes the integration or blending of teaching and research in the professorial role (Clark 1983, p. 98). Additionally, there is a situational differentiation between the two activities, i.e. "There are different situations in university life, with some being devoted to teaching and others to research." (Schimank & Winnes, 2000, p. 398). The linking of the two activities is often seen as positive and synergetic in the literature (Elken & Wollscheid, 2016) as research activities can improve the quality of teaching activities, which in turn can result in positive feedback for research (Höhle & Teichler, 2013b). However, the reliance on the unity of research and teaching is also viewed critically as the empirical evidence for a clearly positive relationship between the two areas is weak (Verburgh, Elen & Lindblom-Ylänne, 2007; Elken & Wollscheid, 2016).

We do not further examine the reasons for the choice of the Humboldtian model for the new types of HEIs in Switzerland here. However, for the analysis of the work of academics, their competences, and the structures at Swiss HEIs, it is important to note, that there are incentives and legal requirements for Swiss HEIs, briefly described in the next section, to adhere to this model. Coping with the resulting work situation requires individual lecturers to be competent in research and in teaching. In terms of organizational theory, the two tasks can be seen as ambidextrous activities. Their successful integration at the individual level and the ability of the new HEIs to fulfill the decreed mission in a Humboldtian way requires individual functional ambidexterity that relies on underlying competences. The notion that individual functional ambidexterity is key to organizational ambidexterity (Schnellbächer, Heidenreich & Wald, 2019, p. 3) therefore applies to Humboldtian HEIs.

Traditionally, in the organizational literature ambidexterity broadly refers to an organization's ability to pursue two disparate things at the same time (Bledow et al., 2009; Birkinshaw & Gibson, 2004). As a concept, it "provides some theoretical guidance on how organizations create structures and systems for managing conflicting demands in their task environments" (Ambos, Mäkelä, Birkinshaw & D'Este, 2008, p. 1428). As a business management concept (Taher, Niemeyer & Boutellier 2011), it has gained acceptance by describing the ability to engage in exploration, i.e. the search and creation of new knowledge (Popadiuk, 2015, p. 28) and exploitation, i.e. refinement and implementation (da Silva Souza & Wünsch Takahashi, 2019, p. 400). In a HE context and in terms of the Humboldtian model, we interpret exploration as research-related activities, while exploitation relates to teaching-related activities.

Studies on ambidexterity are not of a uniform stream (da Silva Souza & Wünsch Takahashi, 2019), but tend to have corporate settings (Kobarg et al., 2017). Relatively few studies apply the concept to HE. Those that do so can be loosely grouped into studies concerned with HEIs that need to commercialize their research in addition to fulfilling their traditional mission, and other studies that do not share a common conceptual base, linking the pursuit of various other tasks to the need for ambidexterity. Examples for the first group include Ambos et al. (2008), who show how commercialization in research-intensive universities is often facilitated by creating organizational ambidexterity through dual structures. On the individual level, however, they find ambidexterity is rather rare and determined by personal characteristics. Chang, Yang and Chen (2009) conceptualize organizational ambidexterity as a combination of structural and contextual ambidexterity, i.e., specialized organizational units and individual researchers that are able to do research as well as commercialize research results. Still in that first group, Leišytė (2015) adopts the concept in her study of Dutch entrepreneurial universities. These HEIs balance research and technology-transfer in organizationally ambidextrous research units, consisting of individual researchers that exhibit contextual

ambidexterity (p. 5), i.e., the capacity to cope successfully with their institutional environment where more than one mission has to be pursued. Chang, Yang, Martin, Chi and Tsai-Lin (2016) link the commercial performance of entrepreneurial universities to "research ambidexterity" (p. 8), a concept they develop emphasizing the necessity to jointly develop research publication and research commercialization. As the last example of studies from the first group, Sengupta and Ray (2017) empirically examine the drivers of the successful linkages between research and commercially-oriented knowledge transfer and find that the two areas are connected in a bi-directional "virtuous cycle" (p. 895).

Within the second group of research papers, the understanding of ambidexterity differs considerably. Markides (2007) develops ideas in management education regarding the improvement of the combination of rigorous academic research with managerially relevant research in one person, which would result in ambidextrous professors. Tahar, Niemeyer and Boutellier (2011) see universities as ambidextrous organizations balancing efficiency driven-units (back-offices) that support the faculty in their creativity driven research and teaching tasks (p. 303). Soares, Dos Reis, da Cunha and Neto (2018) directly transfer the concept from business administration to HE. They examine how the ability of Brazilian universities to explore and exploit, as perceived by their managers, explains the variance in student numbers. Another study set in Brazilian HE by da Silva Souza and Wünsch Takahashi (2019) explores how dynamic capabilities, organizational learning and organizational ambidexterity are connected. Their case study operationalizes organizational ambidexterity as the balance between discovery and implementation that results from a given set of systems and processes guiding the behavior of an organization's members.

Our use of the concept of organizational ambidexterity is motivated by the interest in how public non-traditional universities balance their dual mission of research and teaching and harmonize it with their resources and capabilities. Since research and teaching functions cannot be structurally separated into subsystems (e.g. as suggested by Gupta, Smith & Shalley, 2006)

because they rest on the shoulders of the same individual in a Humboldtian system, HEIs need human resources that enable them to fulfil both functions. This is reflected in the functional definition of ambidexterity as suggested by Bledow et al. (2009) that is more generalized and extendable to individuals (p. 320). According to them, any system or individual that meets conflicting demands by engaging in different activities by displaying the ability to "switch between different mindsets and action sets" (p. 322) is functionally ambidextrous. However, little research has been devoted to examining the ability of individuals to manage and fulfill different functions (Bonesso, Gerli & Scapolan, 2013, p. 1).

Since the predecessors of the Swiss non-traditional universities were teaching institutions and lecturers are still primarily hired to fulfil teaching obligations (Baumberger, 2017; Fumasoli & Goastellec, 2015a), it can be assumed that UASs and UTEs have always been able to fulfill their teaching mission or function. However, their research capacity has been developing since their transformation into HEIs and the adaption of the Humboldtian model. In this article, we therefore focus on the research aspect of their functional ambidexterity and assess it by examining the perceived organizational structures for research and the self-reported individual competence in doing research independently.

3.3 Background Information and Context

In its HE reform, Switzerland lagged behind other European countries that had already incorporated advanced vocational education and training (VET) into the HE sector. E.g., several German federal states began to set up UASs (*Fachhochschulen*) in the 1970s (Lehmann, 2016, p. 251), Austria's UASs were established by 1995 (Beerkens, 2001, p. 35) and in Belgium, non-traditional universities had been part of HE even before the establishment of the *hogescholen* in the early 1990s (Verhoeven, 2008). The central reason for the Swiss introduction of UASs and UTEs, which belong in the same category of HEIs regarding their mandate (Graf, 2016, p. 9; OECD, 2003, p. 64), was the promotion of economic competitiveness (von Matt, 2010).

In the Swiss reform, already existing post-secondary level institutions of vocational training, without a research mission were upgraded to the tertiary HE level and charged with a public mission that includes both research and teaching. Using the analytical distinction regarding the relationship between research and teaching in HE by Schimank and Winnes (2000), it can be argued that the policy makers thereby chose the Humboldtian model for the new non-traditional university sector or enlarged the already existing Humboldtian HE system by adding new institutions to it.

Swiss HEIs have some leeway in managing their mission and there is no direct legal requirement to adhere to the principle of the unity of research and teaching at the individual level. However, the federal financing mechanism contains the incentive for HEIs to commit lecturers in both areas and distributes 7.5 percent of the federal funds for UASs according to the number of employees engaged in both activities (State Secretariat for Education, Research and Innovation [SERI], 2020). In addition, the higher education act (HEdA, 2015) which took effect in 2015 and also regulates traditional universities, requires from all types of HEIs that they accomplish their public mission of teaching and research to a high standard of quality and with qualified staff (HEdA, 2015, Art. 30, Par. A).

There is a general understanding or consensus, that lecturers are responsible for teaching and research in the non-traditional university sector in Switzerland (Martin, 2017, p. 7). UASs and UTEs therefore need a high percentage of academic staff with mixed profiles in order to pursue the two activities in a Humboldtian system (Böckelmann & Nagel, 2018, p. 38; Chamber of Universities of Applied Sciences and Arts, 2013, p. 15; Graf, 2018, pp. 20–26). Such profiles lead to individual functional ambidexterity underpinning the new HEIs' organizational ambidexterity. The consequences of the new Humboldtian mission for the non-traditional universities has prompted the Rectors' Conference of Swiss Higher Education Institutions, Swissuniversities, to support them financially in improving the profiles of dual competence of their teaching staffs since the beginning stages of the reform (Swissuniversities,

n.d.; see also Lepori, 2008, p. 50). Previous research by Hazelkorn (2005) has shown that such non-traditional HEIs often suffer from a lack of qualified faculty with the research experience and skills a doctorate typically promises. Since in Switzerland, this degree is not a legal requirement for academic staff at non-traditional universities (European Commission/EACEA/Eurydice, 2017, p. 33), this measure seems suitable in supporting the formally already completed reform.

3.4 Methods and Data

3.4.1 Introduction

Our study is based on a triangulation of different methods as described by Flick (2011). More specifically, qualitative and quantitative approaches are used to complement each other by providing stimuli for further analysis with the other approach (p. 76). In our case, a qualitative document analysis of mission statements from all Swiss UASs and UTEs active in the year 2019 is complemented by a two-part quantitative analysis of recent nationwide survey data.

3.4.2 Qualitative Data

HEIs have adopted mission statements from the corporate sector (Kosmützky, 2016), where they are used to define organizational purpose (Campbell & Yeung, 1991). Since the mission decreed by the federal authorities obligates Swiss HEIs to conduct both research and teaching and the incentives for a Humboldtian model are in place, this should be expressed in their mission statements. Internationally, a reference to the beneficial effect between research and teaching is often made in mission statements (Jenkins, Breen & Lindsay, 2003). In order to find documentary evidence for the adoption and interpretation of the Humboldtian model by the Swiss non-traditional university sector, the contents of the individual institutions' mission statements were analyzed by skimming, reading, and interpreting them (Bowen, 2009). In order "to create metrics and other analytics" (Dooley, 2016, p. 244) the document analysis combined

manifest content analysis with a subsequent simple thematic analysis. In February 2020, we examined the internet sites of all public UASs and UTEs existing in the year 2019 in Switzerland to find their mission statements. In order to identify the right institutions, we used the information provided the federal State Secretariat for Education, Research and Innovation (SERI, 2019). It classified 23 institutions as public UASs or UTEs along with a single private UAS that we exclude from our analysis because of its specialized nature. If the public entities provided neither a mission statement on a webpage nor as a downloadable document, we looked for other statements that referred to the mission of the institution. In this manner, we identified 23 documents for the qualitative analysis.

3.4.3 Quantitative Data

The quantitative data used in this study was collected through an online survey in an extensive effort in the autumn of 2018 to gain empirical information on the profiles, qualifications, attitudes, and perceptions of permanently employed lecturers at Swiss non-traditional universities. As hitherto almost no empirical data on this group of professionals existed (Böckelmann, Tettenborn, Baumann & Elderton, 2019), the survey was quite extensive and required about 30 to 45 minutes to complete. Among the more than 90 questions, the respondents answered several attitudinal questions about their perceptions of their employer's institutional structure regarding teaching and research, and about their own competence to conduct research projects. The answers to these questions represent the quantitative data used for the purpose of this article.

The link to the survey instrument was e-mailed to 10,025 permanently employed lecturers by the human resources departments of their respective employers. By the deadline of October 22, 2018, there were 2,454 usable responses received from 16 UTEs and 7 UASs. The response rate on the individual level is therefore 25 percent. On the institutional level, it reached a much higher response rate of 96.3 percent, as only from one of the targeted institutions (a

UTE) there were no responses. Due to the pairwise deletion of missing data, the actual sample size in the different analyses of the survey data deviates slightly from this number. Regarding the institutional affiliation of the respondents, 32.4 percent work for UTEs and 67.6 percent for UASs. Due to the slightly higher response rate of UTEs, their lecturers are overrepresented in the total sample, possibly rendering results per HEI type more conclusive than for the total sample. Regarding gender, the samples for UTEs and UASs are representative when compared to official statistics reported by the FSO (2020b) on the staff of educational institutions.

As described above, the dual organizational functions of research and teaching rest on the individual functional ambidexterity. This requires the embodiment of the corresponding competences in each lecturer and the presence of favorable structural conditions on the institutional level. The quantitative analysis of the survey data will first demonstrate how the individual lecturer perceives the organizational structure regarding research and teaching and whether it underpins individual ambidexterity. We use this perception measured through three survey items in order to reach a judgement to what extent the preconditions for the successful realization of the remit are present in the non-traditional universities. On a Likert-type scale from "1 - fully agree" to "7 - fully disagree" the respondents were asked to rate their agreement with the following statements:

i. At my HEI, lecturers are expected to be active in teaching as well as in research.
ii. At my HEI, simultaneous activities in research and teaching are facilitated.
iii. At my HEI, it is easiest for lecturers to work predominantly in teaching with regard to the way work is organized.

The first two items measure the structural conditions for functionally ambidextrous individual work. While the first one does so through the institutional expectation that lecturers are active in teaching as well as research, the second one measures it through the perceived facilitation of the two activities by the respondents' employers. The third item serves to assess the influence of the institutions' organizational structures on the lecturers' choice to engage in

research. Possible obstacles to this choice may be found in the competitive procedures for the allocation of internal research funds and the need for lecturers interested in research to find research funding through external contracts as described in Lepori (2008). The uncertain outcomes of such endeavors and the ensuing risk of unfulfilled work time agreements can to a large degree be blamed for the decision by lecturers to abstain from research activities and a focus on more stable teaching activities (Böckelmann et al., 2019).

The items represent the subjective dimension of how the organizational structure impedes or supports individuals in their pursuit of ambidexterity. As perceptions play an important role in how people construct their own social realities (Jussim, 1991) the results may also be a suitable indicator of the true participation in research. Individual lecturers who perceive their employers' expectation to do research, feel that they receive support in that activity and are not primarily led to teach by the structures of their employers will be more likely to be active researchers than they would be otherwise, regardless of how objective they are. Given the remit of the non-traditional university sector, the hypothesis, that overall, the structure is perceived to be supportive of research (H1), suggests itself and is tested.

We then proceed to analyze data on the self-perceived research competence thanks to the highest degree obtained by the lecturers surveyed. In a first step, this will allow us to describe the outcome of the diversification of the HE sector regarding the presence of research competence in the population of non-traditional university lecturers. Through a one-way ANOVA, we then statistically assess the influence of the highest academic degree on the self-perceived ability to conduct research (as measured on a scale from 1 to 4). This provides an insight into what qualifications are the most likely to allow lecturers to successfully complement teaching with research, i.e. bring about a functional ambidexterity. Here, the hypothesis that the higher the degree, the higher the research competence is tested (H2). The academic degree was surveyed in six categories ranging from a bachelor's degree from a UAS or UTE to a habilitation. These categories, along with their distribution in the total sample as

well as the sub-samples are shown in Table 4. As no research competence is expected from lecturers with vocational degrees, this group, including the respondents whose highest degree is unknown, is excluded from the subsequent analyses.

Table 4. *Distribution of Highest Degrees*

Type of HEI (Employer)	Highest degree													
	BA/BSc UAS/UTE		BA/BSc UNI		MA/MSc UAS/UTE		MA/MSc UNI		Doctorate		Habilitation		Vocational or un-known	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
UTE	11	1.4	8	1.0	69	8.7	336	42.3	258	32.5	24	3.0	88	11.1
UAS	86	5.2	17	1.0	195	11.7	531	32.0	666	40.1	70	4.2	95	5.7
Total	97	4.0	25	1.0	264	10.8	867	35.3	924	37.7	94	3.8	183	7.5

BA/BSc = Bachelor's degree; MA/MSc = Master's degree; UNI = degree from traditional university

3.5 Findings

3.5.1 Document Analysis

The analysis of the 23 mission statements has revealed that 18 can be classified as self-defined mission statements. The rest of the documents, all from UTEs, are partially rephrased or reproduced legal texts and requirements serving as mission statements (see Table 5). Of the 23 institutions, 22 referred directly to research and teaching as their main activities, while one mission statement of a UTE only indirectly refers to research and teaching by stating its mission is to "create knowledge" and "build competencies".

Table 5. *Mission Statements Summary*

Type of HEI	Number of public HEIs	HEIs with an institution specific mission statement		HEIs referring to public remit instead of mission		HEIs referring to research and teaching as missions / public remit		HEIs referring to Humboldtian teaching-research nexus	
	N	N	%	N	%	N	%	N	%
UTE	16	11	68.75	5	31.25	15	93.75	1	0.06
UAS	7	7	100.00	0	0	7	100.00	0	0
Total	23	18	78.26	5	21.74	22	95.65	1	0.04

Almost 80 percent of the institutions, including all UASs, have mission statements that are specific to the institutions. The following two quotes exemplify this:

> *"Graduates of the [HEI No. 7] possess reflective, professional, research and practice-based competences which can be applied in demanding professional fields in our knowledge-based society. The dual emphasis of higher education is guaranteed by the programmatic coupling of studying with research and development, as well as with practical application. …" (UAS)*

> *"We are a competence and innovation center for lifelong learning in the educational area of [HEI No. 20]. We meet high demands made on teaching, continued education, service provision and research by basing our activities in practice and science and aligning them with the needs of our stakeholders and target audience. …" (UTE)*

Instead of providing a specific mission statement online or as a downloadable document, slightly more than 30 percent of all UTEs or just under 22 percent of all non-traditional HEIs state what their public remit is, often by referring to the articles of the respective legal basis. The quote below illustrates this practice:

> *"The [HEI No. 14] facilitates the continuing education of the teaching staff on all levels of basic education and the training of the mentors of teaching internships,*

conducts applied research and development in the area of basic education and offers services to third parties (cf. Higher Education and Research Act, Art. 9)." (UTE)

No UASs were found that exclusively refer to the public remit, which points to differences in the profiles between the two sub-categories of non-traditional universities that require further research. One of the UTEs is the only institution formulating in its mission statement that individual lecturers are responsible for both research and teaching. As the statement of an organizational purpose does not necessarily have to include how that purpose is served, this result is not surprising.

In summary, the document analysis shows, that the non-traditional HE sector appears to have adapted to the role it is supposed to play after the reform in Switzerland by focusing on teaching and research. Although UTEs lag behind UASs in terms of formulating a distinctly own mission as evidenced by the relatively high percentage that only refer to their public mission and/or legal basis for their existence, the shift from teaching institutions to Humboldtian research and teaching institutions has formally occurred. Therefore, the precondition for the further analysis of the functional ambidexterity in the non-traditional university sector is satisfied.

3.5.2 Survey Data Analysis

3.5.2.1 Institutional Structures for the new Remit

The survey results show that slightly more than two thirds of all lecturers agree that their employers expect them to be functionally ambidextrous, i.e., active in both research and teaching (see Table 6). About 55 percent agree that their employer facilitates simultaneous activities in research and teaching. However, almost two thirds of the lecturers in the non-traditional university sector agree that it is easiest to just concentrate on teaching, given the way work is organized. UASs exhibit larger shares of agreement to the first and third statements

than UTEs. In line with this, Chi-square tests of independence show that there are significant associations between the type of HEI the respondents work for and the proportions of the answers to the first and third statements (X^2 (6, N = 2327) = 82.051, p < .001 and X^2 (6, N = 2303) = 35.038, p < .001). However, in both cases the association is not very strong (CC = .122, p < .000; Cramer's V = .123, p < .000 and CC = .185, p < .000; Cramer's V = .188, p < .000). For the second statement in Table 6, no statistically significant association could be found and the facilitation of simultaneous research and teaching activities does not seem to depend on the type of HEI.

Table 6. *Distribution of Lecturers' Perception of Structural Conditions for Research and Teaching*

Survey statement	fully/mostly/somewhat agree (%)			indifferent (%)			somewhat/mostly/fully disagree (%)		
	UTEs	UASs	Whole Sector	UTEs	UASs	Whole Sector	UTEs	UASs	Whole Sector
i. At my HEI, lecturers are expected to be active in teaching as well as in research.	58.3*	71.4*	67.1	15.3*	11.8*	13.0	26.3*	16.8*	19.9
(N)	(441)	(1121)	(1562)	(116)	(186)	(302)	(199)	(264)	(463)
ii. At my HEI, simultaneous activities in research and teaching are facilitated.	52.9	55.5	54.6	17.7	18.0	17.9	29.5	26.5	27.5
(N)	(398)	(870)	(1268)	(133)	(282)	(415)	(222)	(416)	(638)
iii. At my HEI, it is easiest for lecturers to work predominantly in teaching with regard to the way work is organized.	57.4**	67.4**	64.2	26.8**	19.1**	21.6	15.7**	13.5**	14.2
(N)	(428)	(1050)	(1478)	(200)	(298)	(498)	(117)	(210)	(327)

*/**significant ($p < .001$)

Along with the differences between the proportions of agreement with the survey statements, we also tested the differences in the mean scores of the lecturers' assessments of these statements for statistical significance (see Table 7). While t-tests were used in the cases of the second and third statement, a non-parametric Mann-Whitney U Test had to be used for the first one because a Levene's Test showed that equal variances could not be assumed (p = .004). At UTEs (*median* = 5), lecturers agree significantly less on average that there is an expectation to do both research and teaching than their counterparts at UASs (*median* = 5) (U = 465014.500, p < .001). However, the effect size r = .186 is small. The result of the t-test for the mean scores of the second statement shows that UTEs (M = 4.37, SD = 1.674, n = 753) also seem to facilitate the simultaneous activities in research and teaching slightly less well (t(2319) = -2.064, p = .039) than UASs (M = 4.53, SD = 1.660, n = 1568). However, UASs (M = 5.08, SD = 1.5, n = 1558) have the statistically significant larger issues than UTEs (M = 4.76, SD = 1.5, n = 745) when it comes to the preference for teaching (t(2301) = 4.876, p < .001). The effect sizes according to Cohen (1992) for the second and third statements are negligible with r = .203 and r = .101, i.e., the type of HEI plays only a small or very small role in creating the differences in the mean scores of the lecturers' answers. The structural conditions for ambidextrous work of lecturers therefore closely resemble each other at UASs and UTEs.

Table 7. *Comparison of Mean Scores of Lecturers' Perception of Structural Conditions for Research and Teaching*

	UTEs			UASs			Whole sector		
Survey statement	N	Mean	SD	N	Mean	SD	N	Mean	SD
i. At my HEI, lecturers are expected to be active in teaching as well as in research.	756	4.5**	1.7	1571	5.2**	1.6	2327	5.0	1.6
ii. At my HEI, simultaneous activities in research and teaching are facilitated.	753	4.4*	1.7	1568	4.5*	1.6	2321	4.5	1.7

Table 7. *(continued).*

iii. At my HEI, it is easiest for lecturers to work predominantly in teaching with regard to the way work is organized.	745	4.8**	1.5	1558	5.1**	1.5	2303	5.0	1.5
*significant (p = .05); **significant (p < .001)									

In summary, the results presented in Tables 6 and 7 lead to the rejection of H1 for both of the two types of HEIs or the non-traditional university sector as a whole. The majority of lecturers at UASs and UTEs perceive that their institutional structures guide them towards integration of research and teaching, although sizable shares that are indifferent or do not feel the same way remain. However, this overall perception is moderated by the fact that almost two thirds of all the lecturers feel that it is easiest to just teach, given the structures for the organization of their work. The gap between the picture emerging through the items regarding the institutional expectation and facilitation of individual ambidextrous activities and the picture emerging through the third item measuring the organizational preference for teaching is more pronounced in UASs than in UTEs. However, the effect sizes suggest that the differences between the new HEIs play a rather small role in our results.

When the statistical analysis of the three variables is contrasted with the results of the preceding document analysis, it becomes evident, that the perception the institutions create through their mission statements is just partly matched by the perception of the individuals on which the institutional mission relies on for its fulfillment. In other words, the individual ambidexterity required by the Humboldtian model is just partly supported by institutional structures. This suggests that a certain degree of mismatch between the sector's communicated mission and its actual structures has accrued or was acquiesced in the transition from pure teaching institutions to Humboldtian institutions.

3.5.2.2 Self-perceived Research Competence

The frequencies of the self-perceived research competence shown in Table 8 show, that a clear majority of lecturers (70.9 %) rate their research competence as at least good, while 29.1 percent rate it low or non-existing. When the two different types of HEIs are considered, the UTEs have a lower proportion of lecturers with good to very good research competence (67. 4 %) than UASs (74.4 %). A Chi-square test of independence shows that there is a significant association between the type of HEI and research competence (X^2 (3, N = 2163) = 10.217, p = .017). However, the association is very weak, as attested by the contingency coefficient and Cramer's V (CC = .069, p = .017; Cramer's V = .069, p = .017). For the purpose of our further analysis of the lecturers' research competence and its connection with the highest academic degree obtained, we therefore only consider the total sample. In addition, the degree categories of doctorate and habilitation were combined because the latter does not necessarily attest improved research competence in comparison to a doctorate.

Table 8. *Self-perceived Research Competence due to Highest Degree Obtained*

Research competence rating	Total sector		UTEs		UASs	
	N	%	N	%	N	%
1 - None at all	142	6.6	43	6.3	99	6.7
2 - Low	488	22.5	180	26.3	308	20.8
3 - Good	744	34.4	238	34.7	506	34.2
4 - Very good	789	36.5	224	32.7	565	38.2
Total	2163	100.0	685	100.0	1478	100.0

Overall, the mean score of the research competence of the total sample of lecturers reaches the threshold of three (M = 3.01, SD = .92, n = 2163), attesting that on average lecturers feel able to conduct research independently. As shown in Table 9 however, the mean ratings in

all categories except in the one for a doctorate or habilitation are below this level. This suggests that on average, lecturers holding bachelor's and master's degrees are not sufficiently prepared for research work and therefore lack an important prerequisite for functional ambidexterity in a Humboldtian system.

Table 9. *Self-perceived Research Competence of Highest Degree Categories*

Highest degree	Mean	SD	N
BA/BSc UAS/UTE	2.35	.92	96
BA/BSc Univ.	2.29	.81	24
MA/MSc UAS/UTE	2.45	.87	212
MA/MSc Univ.	2.74	.87	826
Doctorate or Habilitation	3.43	.78	1015
Total	3.01	.92	2163

A Shapiro-Wilk-Test ($p < .05$) showed that the dependent variable research competence is not distributed normally in any of the groups formed by the different academic degrees. As normalcy is a condition for a conventional one-way ANOVA, this prompted us to conduct a non-parametric Kruskal-Wallis Test in order to determine, if the score of the research competence is the same across the different categories of the highest degree. Its result suggests that the highest degree has a statistically significant effect on the self-perceived competence to conduct research ($H(4) = 445.634$, $p < .001$). The effect size is calculated as η^2 based on the H-Statistic (Tomczak & Tomczak, 2014). With $\eta^2 = .21$, it reaches the threshold for a large effect according to Cohen (1988).

Subsequent post-hoc-tests (Dunn-Bonferroni-tests) in the form of stepwise stepdown multiple comparisons reveal, that there are three homogeneous subgroups of degrees differing significantly in their research competence ($\alpha = .05$). As shown in Table 10, Bachelors (M Rank

= 616.33) and Masters (M Rank = 722.88) from the non-traditional university sector as well as Bachelors from traditional universities (M Rank = 678.35) do not differ significantly in their research competence and form subset 1. Masters from traditional universities (M Rank = 893.84) report a significantly better research competence than subset 1 and form subset 2. Subset 3 consists of lecturers with a doctorate or a habilitation (M Rank = 1362.08). They in turn have the statistically significantly better research competence than the degrees in subsets 1 and 2.

Table 10. *Homogeneous Subsets Based on Highest Degree and Research Competence*

		Subset (α = .05)		
		1	2	3
Sample[a]	BA/BSc UAS/UTE	616.333		
	BA/BSc Univ.	678.349		
	MA/MSc UAS/UTE	722.880		
	MA/MSc Univ.		893.839	
	Doctorate or Habilitation			1362.081
Test Statistic		1.649	.[b]	.[b]
Sig. (2-sided test)		.438	.	.
Adjusted Sig. (2-sided test)		.618	.	.

Homogeneous subsets are based on asymptotic significances.

a. Each cell shows the sample average rank of the category of highest degrees.

b. Unable to compute because the subset contains only one sample.

These results prompt us to reject H2 partially because they show that for the lowest three categories of degrees there is no statistically significant difference in the self-perceived research competence. Consequently, lecturers of the non-traditional sectors can be grouped into three groups according to their ability to meet expectations regarding their functional

ambidexterity. While Bachelors along with Masters from UASs and UTEs exhibit the least and PhDs the most promising potential in this regard, Masters from traditional universities form the middle ground, albeit with an average research competence that is closer to subset 1 than subset 3 and insufficient for independent research.

3.6 Discussion and Limitations

From the document analysis it can be concluded, that UASs and UTEs have formally adopted the new Humboldtian mission. In only one exception, research and teaching are not directly mentioned as purposes of the non-traditional universities. The high shares of lecturers that perceive the institutional expectation to be active in research and teaching found in the quantitative analysis validate the finding from the document analysis. However, there are differences between the two types of HEIs in that UTEs refer more often to the legal basis of their mission than formulating an own mission. This indicates that there is more reactive than active adjustment to the reform at these institutions than at UASs, which all formulate their own missions. This finding is substantiated by the result from the survey analysis that UASs are perceived to be more facilitating of research than UTEs and that lecturers in teacher education feel less expected to be active in both research and teaching. However, UTEs seem to provide better structures for functionally ambidextrous lecturers because in the perception of lecturers, UTEs favor teaching less than UASs through the way work is organized.

In terms of the survey results in general, it can be established that the institutional structures in the new HE sector do not fully support the lecturers in being functionally ambidextrous, i.e., in integrating teaching and research. While lecturers generally feel expected to do research and perceive that there is some form of facilitation of it, the majority of all lecturers perceive the structure of their employers to favor teaching. Also, relatively large portions of the lecturers at both types of HEIs do not agree that research is facilitated or expected of them. These findings lead us to reject H1 and we conclude that while the institutions of the

non-traditional university sector try to structurally absorb their newer research mission according to the Humboldtian model, the older purpose of teaching is still dominant, which is perceivable by the way work is organized. This finding can be corroborated by older research on Swiss HEIs illustrating that the all-round-demands placed on faculty leads to structural frictions (Böckelmann, 2009, p. 20). The transformation from vocationally oriented teaching institutions to HEIs is therefore not yet entirely completed.

The structural inequalities between research and teaching might be partially responsible for the fact that staffing practices of the new HEIs have not been completely adjusted to accommodate the need for more research competent staff. As almost 30 percent of the total sample does not have more than a low research competence, only 70 percent of the lecturers can be expected to be functionally ambidextrous. Even though, the average lecturer feels well prepared to conduct research independently thanks to her or his highest academic qualification, this result is driven by PhDs, the most numerous highest degree in the sample. When it comes to lower degrees that make up 55.2 percent of the academics in the total sample (UTEs 60.1 percent, UASs 53 percent), Masters from traditional universities feel better prepared than Masters from UASs and UTEs, and Bachelors in general. While this finding does not lead to an outright rejection of H2, none of these degrees prompt their holders to feel well prepared for independent research on average. This observation is matched by Clark's (1997) statement that "the doctoral level is where the commandment to do research most fully takes over." (p. 251). Given the relatively high number of PhDs in the ranks of its faculty, the non-traditional university sector seems to take this partially into account when hiring lecturers. This has for instance also been observed in Germany, where a growing percentage of the teaching staff of UASs possess PhDs or habilitations due to the altered requirement for a greater affinity toward research and scientific qualifications (Hachmeister, Duong & Rössler, 2015, p. 20). However, large proportions of the Swiss lecturers do not feel well prepared for independent research, which may have a detrimental effect on the research efforts of non-traditional

universities unless the average competence can be increased. In combination with the structural problems, the deficit in research competence leads to an only partial organizational ambidexterity of the sector.

This study has some potential limitations worth noting when interpreting the results. The first one arises from the nature of the survey data that might contain biases due to the respondents' lack of objectivity. Especially results of the self-perceived research competence might be subject to self-enhancement tendencies present in individuals (John & Robins, 1994). The fact that the participation in the survey was voluntary and not supported by any incentives, might also lead to a selection bias in the sample. In addition, the samples for the documentary and survey analyses are country-specific, which might lead to results that are not generalizable to other contexts.

3.7 Conclusion

The triangulation of documentary evidence and survey results leads us to conclude that so far the outcome of the reform in Swiss HE is a new sector that can only partially attain the Humboldtian ideal of a unity of research and teaching. Even though we demonstrate that there is a formal institutional emphasis of research as a complement to teaching in mission statements as well as in structural terms, the recent reform left structures at the new HEIs that favor teaching. The misalignment of structure and mission is further exacerbated by the fact that almost 30 percent of lecturers do not feel well prepared to do research. Thus, the organizational ambidexterity of non-traditional universities has to rely on an incomplete individual functional ambidexterity, which in turn is not wholly supported by suitable organizational structures. The conclusion of the triangulation is therefore that the new HEIs in Switzerland are not yet at the point where the reform process is concluded. The governance bodies of the new HEIs have to pay attention to the competences of the faculty as well as to the organizational structures that still favor teaching.

With the mentioned limitations in mind, we are of the opinion that our findings can be helpful in informing members of the management and administration of Humboldtian non-traditional universities in their quest to improve the organizational ambidexterity through the individual ambidexterity of lecturers. The findings of this study may also justify additional work uncovering underlying reasons for the perceived structural frictions and lack of research competence to develop strategies that positively impact the two areas of the non-traditional university sector. Aside from the continuation of public financial support for competence development programs, we recommend that non-traditional universities review their structures systematically in order to improve their alignment with the research mission. Furthermore, given the relatively low research competence of UAS and UTE graduates, Master's degree programs of the non-traditional university sector should focus more on research skills in order to bring its graduates to the same level of competence as their equivalents at traditional universities. This would enable UAS and UTE graduates to continue an academic career, i.e., a doctorate without significant disadvantages in this respect. Such careers are currently quite rocky (FH Schweiz, n.d.), necessitating a change to the traditional university sector and the compliance with requirements that do not exist for graduates of traditional universities.

3.8 Conflict of Interest Statement

On behalf of all authors, the corresponding author states that there is no conflict of interest.

4 Study 2[9]: Research Profile Clusters Among Lecturers in Non-Traditional Higher Education: An Exploratory Analysis in the Swiss Context

4.1 Introduction

For many, doing research is what defines the work of the higher education (HE) sector (Medcalf, 2014). It is part of the mission of non-traditional universities in many different national HE systems, particularly in Europe (e.g., see Kyvik & Lepori, 2010). However, many such higher education institutions (HEIs) have their roots in higher vocational training and education. Often, they were teaching-only until the start of this century (Griffioen, 2020) and hired academics for their professional expertise as teachers (Hazelkorn & Moynihan, 2010). Switzerland's non-traditional HE, providing the context of this study, exemplifies these general observations. Here, a mandate to conduct applied research differentiates the sector comprised of universities of applied sciences (UASs) and universities of teacher education (UTEs) from traditional universities, yet its lecturers are still primarily hired to fulfil teaching obligations (Fumasoli & Goastellec, 2015a). A similar situation is also known from Germany, where professors at the traditionally teaching focused UASs are confronted with increasing research expectations under challenging conditions (Wilkesmann & Schmid, 2014).

The mission-drift of non-traditional universities, be it through policy or isomorphic processes, meant that these HEIs had to build research capacities (Hazelkorn, 2005) through a process of individual and institutional development aimed at improving skill levels and the ability to perform useful research (Grange, Herne, Casey & Wordsworth, 2005). This process

[9] This chapter has been published as a slightly differently formatted «original research article» on June 18, 2022, as article no. 100182 in *International Journal of Educational Research Open* Volume 3 (2022), https://doi.org/10.1016/j.ijedro.2022.100182

fundamentally changed the role of the lecturer and can be interpreted as creating the basis for functionally ambidextrous lecturers that are able to teach as well as do research. This made lecturers' work more academic (Griffioen, 2020) which is not unproblematic in the context of non-traditional universities. Especially many later-career academics find it challenging to adapt to a more research affine environment and engage in research (Hazelkorn & Moynihan, 2010). However, research can be a problem at any career stage, and it is quite common for academics to disengage from research and not participate in it, even in HEIs with good conditions for it (Brew & Boud, 2009). The problem is not limited to UASs and similar HEIs, as academics from the traditional university system also encounter conditions that impede research activities (Mamiseishvili & Rosser, 2011). Kwiek (2016a) states, for instance, that 14.4 percent of Swiss academics at research universities are not involved in research.

In non-traditional HE the reliance on the Humboldtian integration of research and teaching at the level of the individual lecturer can be interpreted as one of the roots of a low research output and weak institutional research profile. According to de Weert and Berkens-Soo (2009) the coincidence of research and teaching competences can no longer be taken for granted due to the diversification of the two areas in non-traditional HE. It is therefore of interest to study the individual engagement in research more closely in this traditionally teaching-oriented HE sector. In this article, I therefore focus on the research side of the teaching-research mission by empirically examining clusters of lecturers deriving from the combination of variables related to their individual research role and resulting in a research profile as well as discussing the implications. In light of the literature on traditional university lecturers stating that there are distinct groups within the profession, I try to find answers to the following research question: *How can lecturers in non-traditional HEIs be grouped regarding variables related to their research role and what are the implications?*

I proceed in this endeavor by conducting a cluster analysis of 2454 lecturers' answers from a recent survey regarding their research-related output, motivation, qualification,

knowledge, self-efficacy, experience and working time, complemented by background and demographic information. As clustering method, I chose the two-step cluster procedure which is suitable for an exploratory analysis (Tkaczynski, 2017) and rarely found in HE research.

Through the case of Switzerland, the analysis is intended to allow decision-makers and researchers to better understand how lecturers in non-traditional HE fulfill their new role as researchers by providing an empirical exploration of typical research profiles of lecturer in this sector. Swiss lecturers form a personal category which has teaching obligations and is typically also held to do research (Baumann & Leišytė, 2022) regardless of their academic title. The results are illustrative of the outcome of an HE reform that created a differentiated or binary HE system and introduced a research mission to the new HEIs.

This contribution continues by providing some theoretical and empirical background information consisting of a short, literature-based overview of the integration of research in non-traditional HE and research findings on the peculiarities of the sector's research mission. I then detail the data used in the analysis and the method used to identify the clusters and present the theoretical frame for the variables included in the analysis. In the subsequent two sections, the results are described and their ramifications discussed. The last section contains the conclusions of the research in this paper and presents some conceptual implications.

4.2 Background

4.2.1 The Integration of Research in Non-Traditional Higher Education

The reasons for the development of research missions at non-traditional universities have primarily been studied in the European context. Here, the strengthening of the scientific basis of professional education and practice, which traditional universities generally do not engage in, and the role as regional knowledge providers are important reasons for the introduction of research in non-traditional HE (Lepori & Kyvik, 2010). However, just as important seems to be what Kyvik and Lepori (2010) termed 'research drift', i.e., a tendency of non-traditional

HEIs to imitate traditional universities. It must be stressed that this form of drift is the outcome of internal processes on the staff, program, and institutional level set off by external actors rather than the consequence of a mere desire to approximate traditional universities (Kyvik & Lepori, 2010).

Ever since the rise of the Humboldtian research university in nineteenth century Germany, teaching and research have been synergistically connected (King, 2004). The integration of research and teaching at the level of the individual lecturer has become a principle of HE (Henningsen, 2006) and one of the ideal types for the configuration of academic work that has been very influential in HE around the globe (Fuller, 2005; Höhle & Teichler, 2013a; Nybom, 2003). While there are also post-Humboldtian trends to disintegrate the unity of research and teaching (Leišytė, 2016), the "Humboldtian tradition has remained surprisingly strong across Europe…" (Kwiek, 2018, p. 168) and has influenced non-traditional HEIs there. In Switzerland, the 'situational differentiation' (Schimank & Winnes, 2000) of research and teaching at the individual level has been part of non-traditional HE since the sector was established in the mid-1990s within the scope of HE reforms that deeply modified the HE system (Perellon, 2001). The consensus that lecturers at Swiss non-traditional universities should be active in both research and teaching is relatively strong and supported by financial incentives from the state, even though there is no legal requirement to adhere to the Humboldtian model (Baumann & Leišytė, 2022). Another pillar of the integration of research and teaching at the individual level consists of the fact that lecturers need to be active in both areas, if they want to become professors (Fumasoli & Goastellec, 2015b). Both circumstances have contributed to the fact that most lecturers at Swiss UTEs and UASs are confronted with the institutional demand to fulfill a research role in addition to their teaching activities (Baumann & Leišytė, 2022).

Kwiek (2018) has shown that a small proportion of academics in national university sectors such as Switzerland, Germany and the Netherlands completely withdraw from research

and can be deemed as ‘non-performers’. This potentially entails negative consequences for the careers of such academics and might also be problematic for their employers’ missions. This research will also show whether Kwiek’s typology is applicable in the non-traditional university sector.

4.2.2 Research at Non-Traditional Universities

In Europe, the non-traditional HE sector is quite research active. Close to 100 percent of Western European UASs have a research mandate, while it is 70 percent in Northern Europe and 50 percent in Eastern and Southern Europe (ETER, 2019). Globally, a significant portion of non-traditional universities can also be considered research-oriented with regard to the perceptions of their lecturers (Arimoto, 2014). Research in non-traditional HE has several characteristics that distinguishes it from research at traditional universities. In the following, I briefly highlight some that are particularly fraught with consequences for lecturers and their role in fulfilling the research mission.

Firstly, the requirement to prepare students for a professional life leads UASs and UTEs to recruit practitioners with a certain degree of experience in industries relevant to their students. In Switzerland, lecturers at such HEIs frequently work in parallel to their work in HE and around 90 percent of them have relevant professional experience with an average duration of about 15 years (Böckelmann et al., 2019). Such lecturers tend to be very motivated teachers (Wilkesmann & Schmid, 2020), but when they become the bearers of the HEI’s research function, they are confronted with an academic environment that emphasizes disciplinary knowledge and values research-related achievement (Medcalf, 2014). This might be perceived as a barrier by individuals with a less academic identity when striving for legitimacy and space in HE (Medcalf, 2014).

Secondly, UASs and similar HEIs often have the public mission to conduct applied research and/or to be practice-oriented (de Weert & Berkens-Soo, 2009; Hazelkorn &

Moynihan, 2011; Lepori, 2008). This contributes to a differentiation of the 'market' positioning and strategic profile of the non-traditional HEIs compared to traditional universities. This differentiation rests on what Fanghanel (2012) describes as production vs. reproduction ideologies or in other words, a focus on application and the preparation for the world of work in contrast to a focus on epistemological structures and induction into the discipline. Research at non-traditional HEIs might therefore not just be a problem per se for more practice-oriented lecturers with a strong vocational background. Its peculiarities could also present a challenge to more research competent lecturers because often it "…does not result in international peer-reviewed publications, but instead in expert improvements to professional practice." (de Weert, 2009, p. 149), which affects the visibility and academic impact of the research. Research from the UK for example, suggests that academics at former polytechnics conduct research in order to improve their teaching-related knowledge of their subject areas rather than focusing on academic impact (Nedeva, Barker & Osman, 2014).

The third distinguishing characteristic is that non-traditional HEIs enjoy less generous public funding for research, which is often concentrated in the traditional university sector (Jongbloed & Lepori, 2015). The Swiss case illustrates this observation. Here, in the year 2020, traditional universities spend 58.3 percent of their financial resources on research and development, whereas this share at UASs and UTEs is a mere 26.6 percent and 14.4 percent, respectively (FSO, 2021a). The non-traditional sector only spends about 17 percent of what the traditional universities spend on research. The diverging research resources between the two HE sectors can result in large differences regarding the extent of research, research competence, and research output which have already been pointed out in the broader European context by Lepori and Kyvik (2010) more than a decade ago. In addition, the rather meager state-provided research funds lead non-traditional HEIs to organize research in a bottom-up approach. For individual lecturers, this means having to attract contracts with external partners (de Weert & Berkens-Soo, 2009) instead of exclusively relying on direct funding from their HEIs.

The last characteristic of research at non-traditional universities to be highlighted here is that it competes much more with the teaching obligations of lecturers than at traditional universities. This is manifested in the generally higher teaching load of non-traditional university lectures in comparison to their colleagues at traditional universities (Böckelmann et al., 2022; Kyvik & Skodvin, 2003; Wilkesmann, 2016). Previous research shows that the amount of time lecturers spend on teaching has a strong influence on the research performance (Hardré, Beesley, Miller & Pace, 2011; Leišytė, 2016; Maske, Durden, Gaynor, 2003) and an institutional emphasis on teaching generally hinders research (Fanghanel, 2012). At Swiss UASs, the teaching load can be three to four times higher than at traditional universities (Fumasoli & Goastellec, 2015a) and typically is about twice as high (Böckelmann et al., 2022).

4.3 Data and Method

4.3.1 Data

For the analysis in this paper, I use recent nationwide survey data on work-related tasks, task-fulfillment, qualifications, attitudes, and perceptions of fixed term and permanently employed lecturers at Swiss UTEs and UASs. The survey was supported by Swissuniversities, the umbrella organization of Swiss HEIs, and served to fill a gap regarding empirical data on lecturers in the non-traditional university sector (Böckelmann et al., 2019). The research based on the data did not require a review by an ethics committee. A preliminary version of the questionnaire was pretested by several lecturers from different Swiss HEIs and with various disciplinary backgrounds. Their feedback on alternative measures to consider and item clarity was taken into account in the questionnaire's final version. The online survey took place in the autumn of 2018, after the human resources departments of the participating HEIs e-mailed the link to the survey to a total of 10,025 lecturers. Participation was entirely voluntary, and the respondents were guaranteed anonymity. Despite the extensive nature of the survey, which required up to about 45 minutes to complete, 2,454 lecturers completed the questionnaire by

the deadline. This resulted in an individual response rate of 24.5 percent. The answers came from all seven then existing public UASs and 15 of the 16 public UTEs, leading to an institutional response rate of 96.3 percent. The only state accredited private UAS was not included in the survey due to its relatively small size and specialized nature.

32.4 percent of the respondents worked for UTEs and 67.6 percent for UASs. The response rate of the UTE lecturers was slightly higher than the one for their colleagues at UASs which leads to a weak overrepresentation of the former in the total sample (I controlled for this by conducting the cluster analysis for each lecturer category). Regarding gender, the samples for UTEs and UASs are representative when compared to official statistics reported by the FSO (2020b) on the staff of educational institutions.

4.3.2 Method

To find answers to the research question, I chose the two-step cluster analysis procedure as implemented in the statistical software SPSS. The method is suitable for exploratory data analysis without a predetermined number of clusters and prior knowledge of group characteristics (Tkaczynski, 2017), and for large data sets (Hsu, Kang & Lam, 2006; Norušis, 2012). The term 'two-step' is attributed to the two iterations of the method's algorithm, which consist of a preclustering of the cases and a subsequent hierarchical clustering of the resulting preclusters that leads to the automated selection of the optimal number of clusters based on the Schwarz Bayesian Criterion (BIC) (Norušis, 2012). The method allows the simultaneous use of both continuous and categorical variables, in which case it uses log-likelihood distance measures in determining the clusters (Tkaczynski, Rundle-Thiele & Beaumont, 2010). Two-step clustering minimizes the weaknesses of applying another cluster method singly (Shih, Jheng, & Lai, 2010, p.11) and is considered to produce more reliable and accurate results when compared to traditional clustering methods such as the k-means clustering algorithm (Norušis, 2012; Tkaczynski, 2017).

Cluster analysis methods commonly neither test a hypothesis nor distinguish independent from dependent variables. However, one a priori hypothesis that can be tested is that the lecturers in the sample are too homogenous to be clustered into meaningful clusters. The validation of the two-step cluster solution followed the method suggested by Norušis (2012). This consists of an evaluation of the model fit through the so-called silhouette coefficient, chi-square tests and Welch's tests to confirm the variance between the clusters regarding the categorial and continuous variables and then running the same statistical procedures for the randomly split dataset.

The exploratory nature of cluster analysis can encourage researchers to use too many variables in an analysis (Gnanadesikan, Kettenring & Tsao, 1995). I tried to avoid this problem by limiting the choice to variables at the micro-level with a direct, literature-based, and intuitively logical link to research. This limited the number of candidate variables from the survey to eleven, a number well within the range specified by the rules recommended by Sarstedt & Mooi (2019) regarding the relationship of the number of cases and variables in cluster analysis.

An iterative approach was chosen for the selection of the variables in the final cluster solution. It is based on the proven idea that variables are sequentially removed from a subset of candidate variables in a backward procedure, while a statistical performance measure is evaluated after each removal (Anzanello & Fogliatto, 2011). In a first step, all eleven variables were included in the calculations of the two-step procedure. I then successively eliminated the variable with the least predictor importance, a measure calculated by the two-step algorithm for the importance of a variable for cluster formation (Norušis, 2012), and reran the analysis until none of the variables left fell below the lower bound of 0.2. This allows for a relatively easy interpretation of the cluster solutions as they do not include potentially numerous variables that each only have a marginal influence on the formation of the clusters. Furthermore, this process also improved the quality of the final cluster solution as compared to the intermediate ones. The

final cluster solution includes one variable each for the research qualification, the research experience, the intensity of the research activity, the research motivation, the research self-efficacy, the familiarity with current research, and two variables as measures for research productivity. The variables for gender, age and academic work experience did not meet the criteria of a predictor importance ≥ 0.2 and lowered the silhouette coefficient. Therefore, these three variables were not included in the final cluster solution.

4.4 Theoretical Frame

Griffioen (2020) includes tasks and competencies in her depiction of typical professional profiles of lecturers at non-traditional HEIs found in job ads. I expand on this notion of a profile by including motivational and demographic measures. But rather than investigating what profiles are being sought after by HEIs, I focus on the profile clusters that can empirically be found at these institutions and result from fulfilling individual research roles.

I briefly outline the reasons for considering all eleven variables in the cluster analysis in the following. Additionally, Table 11 contains complementary information on the operationalization of these variables. While the direction of the influence of one variable on another cannot be determined with a cluster analysis, Figure 7 shows a schematic overview of all variables in the cluster analysis and their possible direct interactions in determining the research profiles.

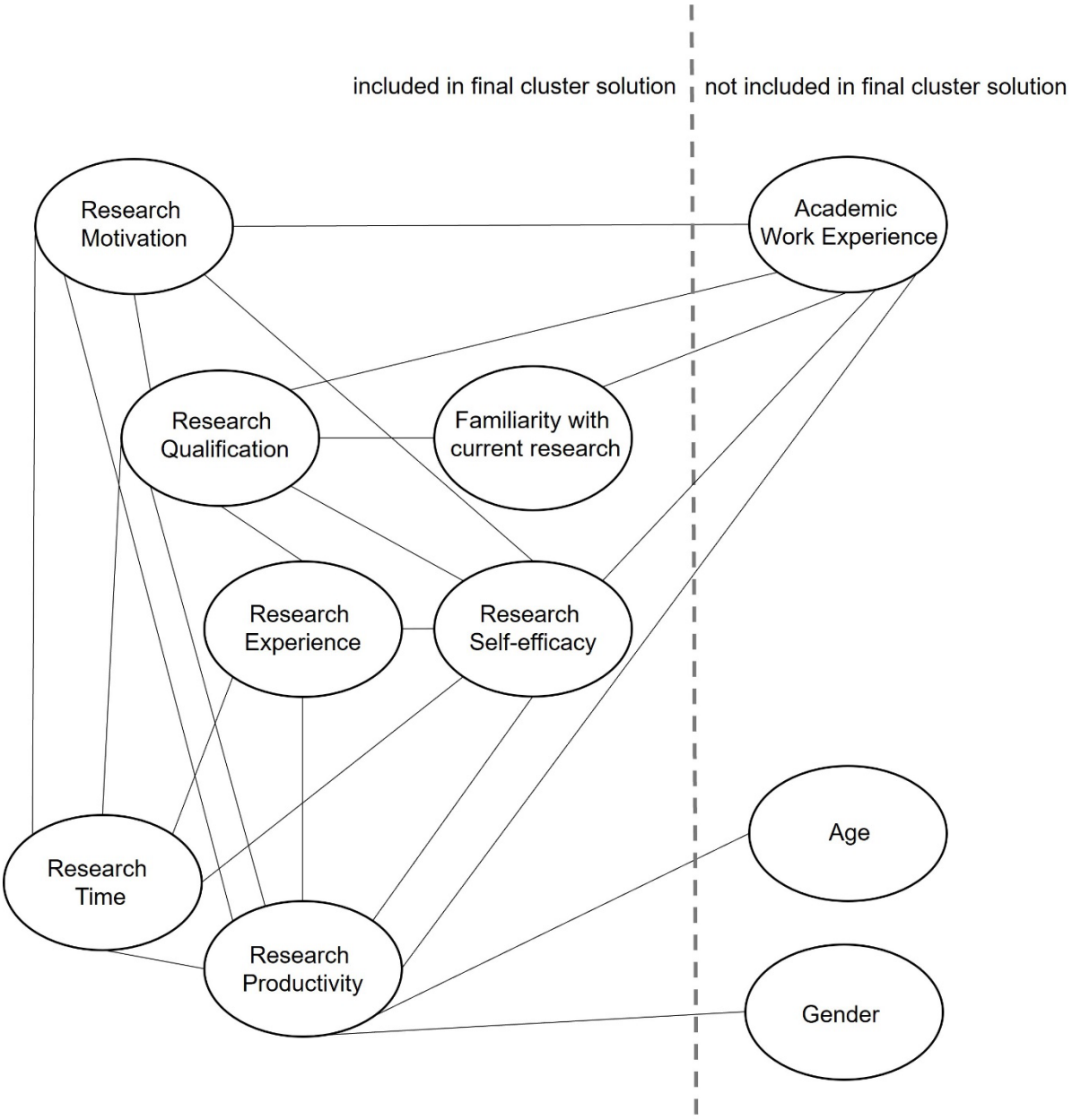

Figure 7. *Schematic Overview of all Variables in the Initial Cluster Analysis* (peer-reviewed publications and conference presentations summarized under research productivity)

Research productivity

Publications are an indicator of research (Fox, 1992) and a common measure for research productivity is the number and type of publications over a specific period (Sax, Hagedorn, Arredondo & Dicrisi, 2002; Townsend & Rosser, 2007). Frequently only peer-reviewed publications are counted as relevant output (Nygaard, 2017). Following this definition, a dummy variable from the reported number of *peer-reviewed publications* in the form of academic journal papers, book chapters and conference papers published in the two years prior

to the survey was constructed. Since I do not analyze the factors of high or low research productivity but aim to classify researchers into distinct groups, dummy variables seem appropriate to determine whether lecturers are active researchers or not. Since practice-oriented lecturers in applied research could find other ways of presenting research output more useful than publishing in peer-reviewed publications, I follow Nygaard (2017) by also incorporating *conference presentations* as a measure for research productivity. All presentations of a research project, poster presentations and presentations of conference papers within a two-year span prior to the survey were considered relevant output for the formation of this dummy variable. From the literature on research productivity, it is known that it is influenced by virtually all variables included in the cluster analysis (e.g., Walker & Litwiller (2013) for motivation; Maske, Durden & Gaynor (2003) for research experience, time spent on research, and academic work experience; Kwiek (2016a) for age and gender).

Academic work experience

Work experience at traditional universities entails a socialization of lecturers that leads to taking research activities for granted. According to Maske, Durden & Gaynor (2003) and Hu & Gill (2000) this experience is important in how lecturers are able to engage in research activities and produce research output. Furthermore, it has a direct link to the overall research experience, which in turn could influence the research self-efficacy. In an environment shaped by an academic drift, this variable is not equally distributed across lecturers and is expected to play a role in determining how lecturers in non-traditional HE engage in research.

Gender

Gender has been identified as a significant factor for the involvement in research (Barry, Berg & Chandler, 2012; Leišytė & Hosch-Dayican, 2014), and more specifically in the production of research output, by many studies (e.g., Albert, Davia & Legazpe, 2016; Hesli & Lee, 2011; Kwiek, 2016a; Maske, Durden & Gaynor, 2003). Commonly, such studies find that women

publish less than men and ascribe this to interrupted careers, higher teaching loads, more frequent part-time positions and less focus on the fields women were originally trained in (Hesli & Lee, 2011). Additionally, gender is also found to be a factor in the perception of research-related goals at non-traditional HEIs (Griffioen & de Jong, 2015). Thus, gender could be relevant to the selection and assignment of research-related tasks that are connected to the research profile.

Research motivation

In order to consider motivational aspects in the clustering of lecturers, I included the importance of research in the motivation for the daily work. Intrinsic motivation is not a uniform concept or measure but essentially describes that the reward is innate in the activity itself as opposed to external results or consequences of the action (Deci, 1975). Little research has been done on faculty motivation (Daumiller, Stupnisky & Janke, 2020). However, it is known that intrinsic motivation has a strong and positive effect on research success, regardless of demographics and position (Stupnisky, BrckaLorenz & Laird, 2019) or personal and institutional characteristics (Walker & Litwiller, 2013). Furthermore, intrinsic motivation improves research effort and productivity through the perceived value of conducting research (Hardré et al., 2011). As such, the research motivation plays an important role in determining how lecturers engage in research activities in an environment with rather challenging conditions, such as non-traditional HE.

Research qualification

I use the proxy of highest degree as a measure for the *research qualification* of lecturers. There is a strong relationship between the educational level and the ability to conduct research. E.g., PhDs are commonly expected to possess the skills to be independently research active, while holders of master's or lower academic degrees typically are not (Paris Conference of European Ministers for Higher Education, 2018). The educational level affects the research self-efficacy and involvement in research (Baumann & Leišytė, 2022; Griffioen & de Jong, 2015), the latter

is expressed through the variables of research time and research experience. Since lecturers' research competence cannot be taken for granted in non-traditional HE (de Weert & Berkens-Soo, 2009), the research qualification could be an important factor in determining individual research profiles.

Familiarity with current research

Familiarity with current research is required in research-led teaching in which research results form part of the curriculum and are conveyed to students by the lecturer acting as an expert (Griffith, 2004). This proxy variable was formed from the survey variable measuring the intensity of research-led teaching. In a practice-oriented teaching environment, the integration of current research results in teaching can be challenging and requires a familiarity with research in one or more specific subject areas or disciplines. This ability might not be a universal trait in the traditionally teaching focused lecturers of non-traditional HEIs and therefore might play a role in the formation of their research profiles.

Research self-efficacy

Self-efficacy is defined as the "belief that one has the power to produce desired effects by one's actions" (Bandura, 2002, p. 270). This belief is rooted in the self-perception of competence, rather than the true level of competence and affects the persistence and level of motivation (Bandura, 1997). Therefore, it can be assumed that research self-efficacy, i.e., "lecturers' beliefs in their own research capabilities" (Griffioen & de Jong, 2015, p. 627) is directly linked to research motivation as well as research experience and consequently expected to play a significant role in the formation of research profiles.

Age

Numerous studies have shown that age affects academics' research activities. Studies in the context of research universities typically show that age has a diminishing effect on research output (e.g., Albert, Davia & Legazpe, 2016; Kwiek, 2016a; Kyvik & Aksnes, 2015; Sax et al.,

2002). However, due to the Mathew Effect younger lecturers might have a disadvantage compared to older colleagues who have had more time to be successful in the acquisition of research projects and the production of research output (Yair, Gueta, & Davidovitch, 2017). Even though age is often understood as a proxy of the career stage, this is not necessarily so in the context of Swiss non-traditional HE. Here, lecturers who would be considered older academics at traditional universities can be at an early-career stage because of the professional experience they are required to have.

Research experience

The number of years with a substantial workload in research (20 percent of an FTE) is included in the cluster analysis as a continuous variable for the *research experience*. The 20 percent level was chosen to avoid nominally long research "careers" that only involved minor or random exposure to research activities. From the literature it is not entirely clear, what the role of research experience in the formation of a research profile is. While e.g., Maske, Durden and Gaynor (2003) and Albert, Davia and Legazpe (2016) find a positive effect on research productivity, Taylor, Fender & Burke (2006) find a negative effect. Furthermore, Brew & Boud (2009) suggest that delays in developing research experience may contribute to low research productivity. The research experience is also known to positively affect the research self-efficacy of lecturers in the context of professional HE (Griffioen & de Jong, 2015).

Research time

The variable *research time* measures for each case, what percentage of an FTE is dedicated to research activities. When considering the basic fact that time is an input to teaching as well as to research and doing one thing means less of the other (Boyer, 1990), a situation described by the incompatibility thesis (de Weert, 2009), research time determines research productivity (Maske, Durden & Gaynor, 2003, Kwiek, 2016b) and is an important factor influencing the configuration of the research profile. The Swiss system allows for a discretionary determination

of individual research and teaching obligations (Böckelmann et al., 2019), which therefore exhibit large variances resulting in a heterogenous picture.

4.5 Results

The sample characteristics presented in Table 11 show the distributions of the categorical variables as well as the mean values of the continuous variables for the whole sample. Overall, the lecturers exhibit a bigger probability to present at conferences than to publish refereed publications. A good 47 percent of the sample, which consists of 41.3 percent females, have work experience in the traditional university sector. For over 40 percent of the lecturers, research is not a motivation in their daily work, even though 41.5 percent of them have at least a doctorate and for almost 60 percent at least a certain degree of familiarity with current research can be assumed. 29.2 percent of the surveyed lecturers have a low or very low research-self efficacy. On average, the lecturers in the sample are about 50 years old, are characterized by a substantial research experience of 5.24 years and spend 12.52 percent of an FTE on research activities. The rather large standard deviations reflect a large amount of variation in these three variables.

Table 11. *Sample Characteristics Regarding Cluster Variables* (* not included in final cluster solution)

Variable	Operationalization		%	n	Mean (SD)
Peer-reviewed publication	At least one peer-reviewed publication in last two years	Yes	39.9	979	
		No	60.1	1475	-
Conference presentation	At least one conference presentation in last two years	Yes	60.0	1472	
		No	40.0	982	-
Academic work experience*	Work experience in research related roles of the traditional university sector	Yes	47.1	1157	
		No	52.9	1297	-
Gender*		Female	41.3	1014	
		Male	57.1	1402	-
		Unspecified	1.5	38	

Table 11. *(continued)*

Research motivation	Motivated in daily work by research activities	Not at all	3.4	84	-	
		Rather not	6.2	152		
		Neutral	31.0	761		
		Somewhat	24.7	606		
		Strongly	34.7	851		
Research qualification	Highest degree	Habilitation	3.8	94	-	
		Doctorate	37.7	924		
		MA univ	35.3	867		
		MA UAS/UTE	10.8	264		
		BA univ	1.0	25		
		BA UAS/UTE	4.0	97		
		Vocational	5.9	146		
		Other	1.5	37		
Familiarity with current research	Current research forms basis of knowledge taught	Not at all	3.4	84	-	
		Rather not	6.2	152		
		Neutral	31.0	761		
		Somewhat	24.7	606		
		Strongly	34.7	851		
Research self-efficacy	Self-Perceived ability to perform research thanks to education	Very low	6.6	142	-	
		Low	22.6	488		
		Good	34.4	744		
		Very Good	36.5	789		
Age*	In years		-	-	49.63	(8.26)
Research experience	Substantial research experience (≥ 20 % of FTE) in years		-	-	5.24	(7.40)
Research time	Research time in % of FTE		-	-	12.52	(17.18)

The two-step cluster analysis procedure revealed two distinct clusters within the data set that are compared to each other in Table 12. Due to the listwise deletion of cases with missing values, the final cluster solution comprises 2152 lecturers of the original 2454. As mentioned above, the cluster solution was validated, and I briefly describe the process before focusing on the cluster solution itself. First, the model fit was evaluated by the silhouette coefficient, which is a measure of cohesion and separation of clusters. Values closer to one indicate that the data points lie well in their clusters and that cluster overlap is minimal, while values closer to zero or minus one indicate that the clusters are not really unique, i.e., that data

points are not lying well in their clusters (de Amorim & Hennig, 2016). The model generated the value of 0.4, which indicates a fair solution (Sarstedt & Mooi, 2019). As a second validation step, independent samples Welch's tests (T-Tests are not applicable due to heterogeneity in variances) for the continuous variables and Pearson's chi-squared tests for the categorical variables were applied to confirm that the clusters vary significantly across the segmentation variables (see last column in Table 12). The two clusters exhibit a statistically significant variation regarding all eight variables leading to the rejection of the null hypothesis that the entire sample of lecturers is homogenous with respect to the included variables. The effect sizes of the mean tests for the continuous variables in the form of Cohen's d suggest that the two clusters are well separated and that over 85 percent of the cases in cluster 1 are above the mean of cluster 2 for each variable (Magnusson, 2021).

Thirdly, as suggested by Norušis (2012) the cluster solution's stability was assessed by splitting the dataset into random halves and repeating the two-step procedure for each half. The results for each halved sample are similar in terms of the number and characteristics of the clusters and predictors importance[10]. Both silhouette measures were very similar (.4 and .3). The validity of the cluster solution can therefore be assumed with reasonable certainty.

The intermediate cluster solutions including age, gender and academic work experience consisted of the same number of clusters as the final solution presented in Table 12. However, the cluster quality was lower and mean and chi-square tests did not show any statistically significant differences between the clusters regarding these three variables. This suggests that they play a negligible role when it comes to clustering Swiss non-traditional university lecturers with the help of the other research related variables.

[10] Even cases sample: cluster 1 32.8 % and cluster 2 67.2 %; odd cases sample: cluster 1 35 % and cluster 2 65 %

Table 12. *Cluster Comparison* (variables sorted by predictor importance, modal values of categorical variables on top)

Variable	Predictor import-ance	Cluster mean or distribution				Test result
		Cluster 1 (n = 1131)		Cluster 2 (n = 1021)		
Peer-reviewed publication	1	Yes No	75.3 % 24.7 %	No Yes	91.9 % 8.1 %	$X^2(1) = 986.271$, $p < .001$, $\varphi = -.677$ ($p < .001$)
Research qualification	.78	Doctorate MA univ. Habilitation BA UAS/UTE MA UAS/UTE BA univ.	68.2 % 23.2 % 6.1 % 1.3 % 1.1 % 0.1 %	MA univ. MA UAS/UTE Doctorate BA UAS/UTE BA univ. Habilitation	54.8 % 19.3 % 13.7 % 7.9 % 2.3 % 2.1 %	$X^2(5) = 793.311$, $p < .001$, CC = .519 ($p < .001$), Cramer's V = .607 ($p < .001$)
Research time	.74	22.8 % of FTE		3.8 % of FTE		$T = 30.577$, $p < .001$, $d = 1.275$
Research experience	.65	9.33 years		1.69 years		$T = 28.069$, $p < .001$, $d = 1.173$
Research motivation	.63	Strong Rather motivated Neutral Not at all Rather not motivated	60.7 % 20.5 % 15.5 % 1.7 % 1.6 %	Neutral Rather motivated Rather not motivated Strong Not at all	44.4 % 29.4 % 11.1 % 10.4 % 4.8 %	$X^2(4) = 324.845$, $p < .001$, CC = .478 ($p < .001$), Cramer's V = .543 ($p < .001$)
Research self-efficacy	.54	Very Good Good Low Very low	57.7 % 29.7 % 10.9 % 1.7 %	Good Low Very Good Very low	39.4 % 35.7 % 13.0 % 11.9 %	$X^2(3) = 540.216$, $p < .001$, CC = .448 ($p < .001$), Cramer's V = .501 ($p < .001$)
Conference presentation	.49	Yes No	84.5 % 15.5 %	No Yes	61.2 % 38.8 %	$X^2(1) = 480.711$, $p < .001$, $\varphi = -.473$ ($p < .001$)
Familiarity with current research	.20	Strongly Somewhat Neutral Rather not Not at all	67.5 % 20.7 % 4.8 % 3.7 % 3.4 %	Strongly Somewhat Neutral Not at all Rather not	37.8 % 29.9 % 14.8 % 9.6 % 7.9 %	$X^2(1) = 212.718$, $p < .001$, CC = .300 ($p < .001$), Cramer's V = .314 ($p < .001$)

The two final clusters comprise 52.6 % and 47.4 % of the cases. The variables exhibit differing importance as predictors for cluster membership (see second column in Table 12). The most important predictor is the dummy variable for peer-reviewed publications (1.00), while the least important is familiarity with current research (.20), which is just within the criteria for the inclusion of variables.

Considering the results, the label ‘research-oriented lecturers’ for cluster 1 seems fitting. The vast majority of lecturers in this group actively contributes to the scientific discourse through peer-reviewed publications and conferences presentations. On average the individuals in cluster 1 spend slightly more than a fifth of their working time on research, i.e., approximately one day per week, and they are characterized by an average substantial research experience of a good nine years. More than two thirds of research-oriented lecturers have a doctorate as research qualification and almost a further 30 percent a habilitation or master’s degree from a traditional university. Only 2.4 percent of lecturers in cluster 1 have their highest degree from a non-traditional HEI. In line with the qualifications, more than 60 percent reported a strong research motivation and 57.7 percent have a high research self-efficacy. 67.5 percent strongly base their teaching on current research findings, which implies a good knowledge of the research in their field.

In comparison to cluster 1, cluster 2 represents lecturers with a fainter research profile. I label them as ‘non-research-oriented lecturers’. While they publish peer-reviewed material only in very exceptional cases, a considerable portion (61.2 %) has presented at conferences. The group’s comparatively low research output goes hand in hand with a low average research time that approximates to just slightly more than a third of a workday per week. Lecturers in cluster 2 typically have a low research experience as expressed through the short average duration of less than two years of substantial research experience. As the highest degree, the master’s from traditional universities dominates in this group of lecturers, suggesting a lower research qualification than found in cluster 1. Correspondingly, research is not a motivating factor in the daily work of 60.3 percent of lecturers in cluster 2. Nevertheless, their research self-efficacy is most frequently reported as good by almost 40 percent. However, only a slightly smaller percentage of lecturers in this group has a low level of research self-efficacy. Regarding the familiarity with current research, the modal value lies in the same category as in cluster 1, but it is almost 30 percentage points lower.

4.6 Discussion and Limitations

Brew (2010) describes HE as a divided community in which academics, students and support staff focus on separate tasks and goals, and work in separate social spaces. The results of this study suggest that lecturers in non-traditional HE are themselves a split group. They can be distinguished by the intensity of the integration of research in their work as lecturers. Almost half of all lecturers do not seem to be affected by the research drift in a meaningful way. The clear result of the cluster analysis was predicted as a widening research and teaching divide by Enders and Musselin (2008) and empirically confirms Clark's observations that "…not all academic staff will or should be researchers…" (1995, p. 209) for non-traditional HE.

The clustering of lecturers into just two groups, one made up of motivated, experienced and active researchers, and one with lecturers that exhibit a lower propensity to get actively involved in research, seems to confirm the policy choices in other countries that lead to a greater separation of research from teaching and the integration of these activities at the institutional level (Enders & de Weert, 2009; Leišytė & Hosch-Dayican, 2014; Musselin, 2005, 2013) instead of the individual level.

The cluster solution also indicates that the building of research capacity in Swiss non-traditional HE has not been broadly successful yet and informs a potential further exploration of the reasons inhibiting many lecturers from partaking in the research mission of their employers. Even though the non-research-oriented cluster is associated with lower research qualifications, over half of the lecturers in this cluster still feel well prepared for doing research and around 30 percent are motivated by research in their work. The fact that they have on average very little research time makes it all the more remarkable that more than 60 percent manage to present at conferences. This and the fact that the majority of them base their teaching at least to some extent on current research results suggests that they recognize the importance of research in the education of their students.

The clusters in the Swiss non-traditional HE sector appear to mirror Kwiek's distinction of research performers and non-performers (2016a) at European universities. However, the share of the latter in the non-traditional sector is much larger than Kwiek found for his sample of academics at Swiss traditional universities. This difference can be understood as a manifestation of the differentiation between the two HE sectors in Switzerland and therefore as principally intended by educational policy. However, the size of the non-research-oriented cluster gives rise to the question, whether the intended differentiation needs such a large group of non-research-oriented lecturers in non-traditional HE and whether the incentives for individual research activities are sufficient. One of Kwiek's (2016b) more worrisome conclusions, however, might also apply to the Swiss non-traditional HE with its two clusters of lecturers. Since individual publication practices and research performance are not likely to change anytime soon, Kwiek is concerned about intra-institutional tensions, if two such different types of academics work side by side at HEIs. Connell (2005) also describes challenging management issues resulting from faculty in non-traditional HE that are divided by research interest and qualification. In addition, she also observes that research-oriented staff grow frustrated because of a perceived disadvantage in comparison to staff at research-intensive HEIs on the other side of the binary divide, where the research contribution and the number of publications are important criteria in the academic recruitment process (Reymert, Jungblut & Borlaug, 2020). So far, no empirical research on such problems in Swiss non-traditional HE has been published, but in light of the results presented here, they are likely to be ascertainable.

Further, the results of the exploratory cluster analysis suggest that the individual research profiles in non-traditional HE are primarily determined by the academic background of lecturers. This result is in line with the view expressed in Neumann (1994), Brew (2010) as well as Annala and Mäkinnen (2011) that academic communities of practice have a significant effect on the integration of research activities in lecturers' work. Academically higher qualified lecturers with a stronger academic identity acquired during their PhD studies are therefore more

likely to engage in research because they have a stronger role orientation toward research. The role orientation is probably also affected by the research motivation, which is much stronger in the cluster of research-oriented lecturers. Kwiek (2018) has empirically identified a positive correlation between role orientation and research performance for traditional universities. It appears that the non-traditional sector is not much different in that respect, even though the conditions for research are not the same. Since the non-traditional HE sector in Switzerland and most other countries does not have the right to award doctorates, but due to the research mandate needs to recruit lecturers with this qualification from traditional universities, it can be inferred that this type of lecturer will become more widespread at non-traditional HEIs. Such a development might intensify the tensions described above and increase the number of frustrated research-oriented lecturers. This "personnel drift" (Neave, 1979) might eventually lead to a de-differentiation of research between the HE sectors, even though the differences in the allocation of research resources are likely to persist. Consequently, the relegation of a significant portion of lecturers, presumably those with a more practice-oriented identity, to less prestigious teaching posts could become widespread. The clusters of this analysis might therefore not just be the outcome of the recent HE reform in Switzerland but also a signal for a two-tier system regarding the status of lecturers at non-traditional universities in the making.

The large cluster of researchers with a strong academic background at UASs and UTEs also suggests some consequences for the teaching mission of these HEIs. According to Viebahn (2017) the individual research orientation can lead to a diminished ability to determine the curriculum because the expertise necessary for successful research can conflict with a broad disciplinary orientation necessary for teaching. Furthermore, the fact that research is competition-based might influence lecturers in their social attitude, possibly reducing their willingness to support weaker students (Viebahn, 2017). The management of non-traditional HEIs could therefore be increasingly challenged to balance the effects of the different interests and competences of the two clusters.

The research in this paper is subject to several limitations. The first one that needs to be mentioned is the reliance on self-reported data. It can lead to a bias regarding social desirability (Podsakoff, MacKenzie, Lee & Podsakoff, 2003) and self-enhancement (John & Robins, 1994). However, research has shown that online self-report surveys can increase honesty levels (Wood & Griffiths, 2007) and that social desirability is less of a problem when responses are anonymous (Richman, Kiesler, Weisband & Drasgow, 1999; Wood, Griffiths & Eatough, 2004).

A further limitation is the fact that the research productivity has been measured for a relatively short period of time (two years) which could have an influence on the results. However, the inclusion of two measures, publications and conference presentations, should mitigate some of the potential impact.

Lastly, the factor that the statistical significance of a typology derived from cluster analysis cannot be established, since "every typology developed on the grounds of empirical data runs the risk of having been constructed ad hoc for that specific dataset" (Lepori, Geuna & Veglio, 2017, p. 32) presents another limitation. The generalizability of the results can therefore not be taken for granted. This is somewhat aggravated by the country-specific sample with a specific disciplinary mix because comparative research (e.g., Padilla-Gonzalez et al., 2011) suggests that publication practices can vary between national HE sectors and disciplines.

4.7 Conclusion

The two-step cluster analysis shows that 15 to 25 years after the formation of UASs and UTEs in Switzerland, the lecturers in Swiss non-traditional HE can be partitioned into two similarly sized distinct clusters, each characterized by similar levels of variables related to their research roles. The cluster termed 'non-research-oriented' has not yet integrated research in a meaningful way and has a weak research profile. This finding echoes a long-established view and relatively recent empirical work concerning the traditional university sector, that not all

academic staff can be researchers (Clark, 1995) and that many do not meaningfully engage in research (Kwiek, 2018). While the existence of the research profile represented by this cluster can be interpreted as the result of the politically desired differentiation of HE sectors in a binary system, its size calls the choice and incentivization of the integration of research at the individual level for the non-traditional HEIs into question and gives rise to worries regarding intra-institutional tensions and the diminishing ability to determine relevant curricula at UASs and UTEs.

A logical reaction to the empirical situation and its possible disadvantages is to reconsider the application of the integration of research and teaching at the individual level in non-traditional HE. The positioning of the research mission at the institutional level would help to take off the burden of being research active of the less research-oriented lecturers. This in turn would allow the concentration of research funds and resources on research-oriented lecturers, which could potentially strengthen the institutional research profile of non-traditional HEIs, a process for which just having a research mission or some research activities is not sufficient (Lepori, Geuna & Veglio, 2017).

However, teaching-oriented practitioners – those lecturers that are especially needed for the differentiation of the non-traditional sector from the traditional universities – might thereby lose status. Measures at the institutional level or higher designed to elevate teaching in status might be one way of addressing the problem. The differentiation between the HE sectors concerning the type of research they are supposed to conduct, could still be maintained, as the post-Humboldtian model for conducting research could be introduced as an additional level of differentiation between the two HE sectors in a binary system.

4.8 Acknowledgements

The author wishes to thank the participants of the REHES III workshop for providing him with valuable feedback and suggestions on preparing the manuscript. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

4.9 Declarations[11]

- **Funding:** This study was funded by Lucerne University of Applied Sciences and Arts
- **Conflicts of interest/Competing interests:** The author has no conflicts of interest to declare that are relevant to the content of this article.
- **Availability of data and material:** Proprietary data, anonymized data can be made available upon request

[11] In the published article, the declarations appear at the beginning of the article. In this chapter it has been moved to the end for the sake of clarity.

5 Study 3[12]: Research is for Hunters, Teaching for Farmers. Investigating Solutions to Lecturer-related Problems of the Teaching-Research Mission of Swiss Universities of Applied Sciences

5.1 Introduction

The higher education (HE) sector in Switzerland has been expanded and significantly restructured through reform initiatives over the last 30 years. One of the major aspects of these reforms was the creation of a non-traditional higher education sector, which essentially consists of universities of applied sciences (UASs) and universities of teacher education (UTEs). Following the example of other European countries, albeit with a considerable time lag, former post-secondary vocational training and education institutions of regional significance were merged into HE institutions (HEIs) with an interregional significance and given a new legal mandate, which includes research. Before the reform, the institutional predecessors of UASs were teaching-only, a feature shared with other national educational systems (Griffioen, 2020). This paper focuses on the problems that emerged with the adoption of the research mandate by UASs, and the solutions these HEIs developed in response and within the bounds of their organizational autonomy.

With the inception of UASs and UTEs in the late 1990s, Swiss HE was restructured into a binary system with research universities and non-traditional universities existing in parallel as 'equivalent but different' HEIs according to the Swiss HE Act (HEdA) (Böckelmann et al., 2022). The most important differences in terms of the profiles of the two types of Swiss HEIs are that research universities are science-oriented and supposed to conduct basic research, while non-traditional universities offer scientifically sound, practice-oriented, and

[12] This chapter has been published as a slightly differently formatted «original article» on August 11, 2023, as article no. 20220196 in *Open Education Studies* Volume 5, Issue 1 (2023), https://doi.org/10.1515/edu-2022-0196

professionally relevant education, and are involved in applied research (SERI, 2016). Almost 30 years after the introduction of a binary HE system, the non-traditional HE sector in Switzerland educates about 40 percent of all HE students and UASs, the focus of this study, about 31 percent (FSO, 2022a). While research activities at the research universities generate 58.3 percent of their total costs (FSO, 2021b), this proportion is 26.7 percent for UASs (FSO, 2022b).

Another difference between the two types of HEIs in Switzerland, with wide-ranging cultural and resource consequences, is the fact that non-traditional HEIs had to develop a research capacity. This need is typical for such institutions (Hazelkorn, 2005) and can be met by individual and institutional development improving skill levels and the ability to perform useful research (Grange, Herne, Casey & Wordsworth, 2005). This process results in ambidextrous HEIs that rely on functionally ambidextrous lecturers who can effectively teach and conduct research. In addition, solutions for balancing the new mission of research with the long-standing mission of teaching must be found. Since the views in the literature on the relationship between research and teaching range from conflicting via neutral to synergetic (Cenamor, 2021), such solutions can potentially vary significantly. In Switzerland, this is an ongoing process in which UASs enjoy considerable leeway as organizational actors.

Providing the theoretical framework for this study, the concept of organizational actorhood implies that organizations "are freestanding, strategic and integrated actors imbued with rights and identities" (Zapp, Marques & Powell, 2021, p. 539) and therefore autonomous decision-makers. As such, they can find their own solutions to the problems of developing and maintaining research capacity and organizing the teaching and research missions within the limits of state policies. It is argued that HEIs, as organizational actors, adopt internal structures and procedures that represent "more flexible and efficient ways of organizing academic work" (Pinheiro & Stensaker, 2014, p. 175) than previous institutional arrangements.

Krücken and Meier (2006) suggest that, from a conceptual point of view, the consequences of the diffusion of the new model of organizational actorhood for universities will be heterogeneous. Fumasoli, Barbato, and Turri (2020) come to a comparable finding. They describe that HEIs are subject to similar pressures and incentives in finding solutions, yet the process can result in unique outcomes as these actors simultaneously emulate relevant institutional templates and develop distinctive behaviors. This observation and the lack of empirical evidence regarding the non-traditional university sector lead to the two-part research question of this contribution:

What problems linked to lecturers and the teaching-research mission do Swiss UASs as former teaching-only institutions have, and what solutions have they found?

Being descriptive and explanatory in character, this study investigates the research question through semi-structured interviews with members of the top management of business and engineering schools of Swiss UASs. The analysis is intended to provide decision-makers and researchers with a better understanding of the empirical outcome when public HEIs with weak research traditions acting as organizational actors in a binary system have to find solutions to the tensions created by their teaching-research mission. The paper also provides some insights into human resources management related initiatives, which have traditionally been less prioritized than structural and resource-related solutions in the transformation of HEIs into organizational actors (Pinheiro & Stensaker, 2014). Finally, the paper contains some of the first empirical evidence for a post-Humboldtian shift in Swiss HE.

This contribution continues by situating the analysis through the presentation of its theoretical framework of organizational actorhood, along with some contextual information on Swiss UASs. In the subsequent section dedicated to the method, the data collection through semi-structured interviews is detailed, and the composition and construction of the sample are explained. This is followed by the description of the findings, which consist of the identified problem themes and the corresponding solutions. In a further section, the findings and some

conceptual implications in light of the presented theory are discussed. The final section covers the limitations of the study and contains the concluding remarks.

5.2 Theoretical Framework and Context

In order to interpret and understand UASs' shaping of the teaching-research mission and becoming functionally ambidextrous organizations, it is useful to draw on the concept of organizational actorhood. It helps in the balanced exploration of the interplay between environment and institutions (Zipparo, 2021). This section aims to provide some country-specific context and to demonstrate the applicability of the organizational actorhood model to Swiss UASs. Having done the latter, the analysis can focus on the problems and solutions themselves instead of how and why they were identified and/or developed. I.e., solutions can be interpreted as the results of actions of goal-oriented entities deliberately choosing to solve problems that hinder goal attainment. Furthermore, the work by Pinheiro and Stensaker (2014), which provides the basis for identifying and describing in what areas organizational actorhood is enacted to solve the lecturer-related problems caused by the tensions between teaching and research, is discussed in this section.

Except for some institutions rooted in vocational education, research and teaching represent core activities for most publicly funded European HEIs (Deem, 2006). In Switzerland, they are mainly carried out by staff called 'lecturers' for the purpose of the Swiss Higher Education Information System (SHIS). While research associates can also have a role in teaching, lecturers, which include professors, represent the largest group carrying out the teaching-research mission at the micro-level of Swiss HEIs (e.g., FSO, 2022c). Therefore, they are the focus of this research.

Together with 14 legally independent UTEs, one private and nine public UASs (SERI, 2023) form the non-traditional university sector in Switzerland. The fact that two UTEs exist as departments of UASs indicates the similarities between these HEIs. As direct successors of

post-secondary vocational training and education institutions, they provide scientifically sound, practice-oriented, and up-to-date education with vocational relevance in their respective subject areas. While UASs educate professionals in engineering and information technologies, architecture, construction and planning, chemistry and life sciences, agriculture and forestry, business and services, design, health, social work, arts, applied psychology, applied linguistics, and sports, UTEs train teachers for the primary, lower-secondary and baccalaureate levels. As the main admission requirement, UASs accept the vocational baccalaureate, while UTEs and research universities focus on the baccalaureate (SERI, 2023). While all Swiss HEIs award bachelor's and master's degrees, only research universities are allowed to award doctoral degrees.

Another difference between research universities and non-traditional HEIs in Switzerland is the diverging research resource allocation. As in other European countries with a binary HE system, public funding for research is concentrated in the traditional university sector (Jongbloed & Lepori, 2015). While most research activities at research universities are state-funded, researchers at UASs and UTEs have to attract third-party, project-based funds from external partners (de Weert & Berkens-Soo, 2009). This has consequences for the extent of research, research competence, and research output, which can also be found in the broader European context (Lepori & Kyvik, 2010). The final difference with consequences on who fulfills the teaching-research mission to be mentioned here is the unequal ratio of research assistants and associates to lecturers. For example, in 2021 it was 3.5 at research universities (FSO, 2022e) and a mere 0.7 at UASs (FSO, 2022c) and 0.3 at UTEs (FSO, 2022d). This indicates that lecturers in the non-traditional university sector can rely much less on mid-level staff in their daily work than university lecturers.

For the purpose of this study and its interviews, a broad understanding of research and teaching was adopted. The definition by Enders and Musselin (2008) reflects this well and states that "Teaching includes all activities linked to training, from teaching class, to preparing

courses, organizing internships, using new technologies, conceiving e-learning curricula, tutoring groups, etc." (p. 147), while research concerns experimentation, writing papers, technology transfer, project writing, networking, and similar activities (Enders & Musselin, 2008). This definition implies that some activities of the teaching-research mission overlap with the so-called 'third mission' of HEIs, which often encompasses knowledge and technology transfer, continuing education, and social engagement in the literature (Pasternack, Schneider & Zierold, 2015). As the concept of the third mission is still evolving or even "nebulous and ambiguous" (Compagnucci & Spigarelli, 2020, p. 18), delimiting the missions can be difficult. This study therefore pragmatically understands activities regarding knowledge and technology transfer, continuing education, and social engagement as being part of the third mission.

The configuration of research and teaching in HE has been a much-discussed matter in HE research over the last few decades (Tight, 2016). The extensive literature on the relationship of research and teaching does not present a homogeneous picture (Malcolm, 2014). There is a long-standing debate in Europe that goes back at least to the 19th century when von Humboldt and Newman presented their differing visions of the university (Deem, 2006). Contemporary debates often ignite or respond to policy concerns and stem from discussions about the idea of the university and HE, postwar research failing to find a relationship between research and teaching, and efforts to strengthen the linkages between the two areas (Tight, 2016). Positions in these debates state that research and teaching are either synergetic and positively related to each other, conflicting due to time scarcity, different skills, and different reward systems, or unrelated (Cenamor, 2021). Despite the lack of consensus regarding the link between research and teaching, research has been able to show that it is a pedagogic choice in HE "framed by layers of disciplinary, departmental, and institutional variation" (Malcolm, 2014, p. 296).

One such variation is found in the configuration of research and teaching. Schimank and Winnes (2000) offer a widely used analytical tool that distinguishes between three

configurations. The Humboldtian configuration, probably best exemplified by German research universities, is characterized by little or no differentiation of roles and/or organizations and/or resources for teaching and research (Schimank & Winnes, 2000). Pre-Humboldtian HEIs are primarily devoted to teaching, and research is delegated to specialized institutions outside of the educational system, while post-Humboldtian HEIs are active in both areas and differentiate them at the level of roles of the staff, at the level of financial resources, and/or at the organizational level (Schimank & Winnes, 2000).

Swiss HEIs have some latitude in configuring their teaching-research mission. While, according to the latest HEdA, they have to be active in both areas, no legal obligations hold them to a specific way of fulfilling this. In finding solutions for the configuration of research and teaching, and other problems related to their mission, Swiss HEIs can be interpreted as organizational actors.

The organizational actorhood thesis suggests that HEIs behave as autonomous decision makers (Whitley, 2010) like organizations in other sectoral contexts, especially business corporations (Whitley, 2008a). Gaining traction toward the end of the twentieth century, the idea that universities should be more entrepreneurial and strategic when it comes to generating economic payoffs from public investment in academic research led to processes that increased control over their resources and entailed changes to the governance of HEIs (Whitley, 2010). Essentially, autonomy, accountability, and competition were emphasized (Seeber et al., 2015). Krücken and Meier (2006) depicted this globally observable transformation process in HE as the reconfiguration of HEIs into organizational actors that share the four features of accountability, autonomous goal definition, the creation of formal organizational structures around those goals, and professionalized university management.

Conceptually, organizational actorhood is accompanied by isomorphism. This process describes the impingement of the environment on organizations that results in similar solutions to similar problems (Bromley, 2016). In HE, this occurs through practices and ideas that emerge

from HE contexts and permeate HEIs globally (Whitley, 2012). However, in the context of research universities, heterogeneous outcomes of the decisions of organizational actors have been shown conceptually (e.g., by Fumasoli, Barbato & Turri, 2020) as well as empirically by Gornitzka and Maassen (2011). The latter have demonstrated that even under very similar conditions regarding traditions, values, and norms, solutions can differ considerably. For the context of UASs, however, empirical evidence is rare or non-existent.

When UASs entered the HE stage in Switzerland, the demands for 'useful research' had already been established and the way science and HEIs were managed by federal and cantonal governments was changing under the influence of new public management principles (Benninghoff & Braun, 2010). From the onset of their existence as HEIs, UASs were embedded in a science system which Whitley (2008b) calls "state-delegated" or "state-chartered" (Benninghoff & Braun, 2010). Such systems essentially rely on state-delegated control over employment, resource allocation, and facilities to HEIs and scientific elites, while the state retains the ultimate authority over the nature and structure of HEIs, the award of qualifications, and some processes of resource allocation (Whitley 2008b, pp. 18-19). Thus, Swiss HEIs enjoy a relatively high degree of autonomy as organizational actors in finding distinctive ways to fulfill their public remit. They share this characteristic with other post-reform European HEIs that commonly have some degree of autonomy as they adapt and interpret state directives (Musselin, 2009). The European University Association (2012) classifies the autonomy of Swiss HEIs as "medium low" in organizational, "medium high" in financial and staffing, and "high" in academic terms.

According to Pinheiro and Stensaker (2014), university management has three key areas which need to be controlled in order to successfully change and adapt universities. These are culture, which concerns meanings, roles, and identities, structure, pertaining to the organization of people and work, and resources in the form of people and funding. The three areas provide the framework for categorizing the solutions the HEIs in the sample found as

organizational actors in changing and adapting to the teaching-research mission. This seems appropriate, as Pinheiro and Stensaker (2014) investigated how academic work is newly organized by rationalizing structures and replacing procedures perceived as outdated with new ones that promise more flexibility and efficiency. They show mainly conceptionally that although HEIs are subject to "dominant global ideas, blueprints and/or archetypes at the (macro) level of the organizational field of HE" (p. 5), local arrangements and their consequences for the performance of HEIs can vary significantly due to contextual factors. In considering risks, opportunities, and rewards, HEIs acting as organizational actors facilitate processes of change and adaptation specific to their local context through the control of culture, structure, and resources. Pinheiro and Stensaker (2014) suggest that culture is the most difficult area to control because universities are known for their institutional persistence. According to the two authors, structural and resource-based changes are easier to implement because of their stronger link to strategic processes.

Through the case of a Danish research university, Pinheiro and Stensaker are also able to demonstrate that the central administration played a major role in initiating and implementing change. They interpret this as a tentative manifestation of the general trend of European universities becoming more unified organizational actors. This finding suggests that processes of change and adaptation at Swiss UASs should also be analyzed through this lens and led to a priori codes reflecting central/decentral aspects, of which only one regarding the primary initiator of the solution was used in the final analysis.

5.3 Method

5.3.1 Sample and Interview Procedure

To understand what lecturer-linked problems Swiss UASs have encountered in fulfilling the teaching-research mission as former teaching-only HEIs and how they have been solved, a qualitative approach was adopted. As cases, business and engineering schools were chosen

because they have the longest histories as UASs in Switzerland (Graf, 2016) and therefore also the longest exposure to the tensions caused by the teaching-research mission and manifested in the area of human resources. Consequently, engineering and business schools, which are all organized as departments of multidisciplinary UASs, have had the longest time to find solutions to problems as organizational actors. They were also chosen for reasons of representativity since business and engineering represent the only subject areas that are found at every public Swiss UAS. Due to its relatively small size and specialized nature, the only state-accredited private UAS was not included in the sample.

Data were gathered through semi-structured interviews. This form of interviewing was chosen because it allows for following leads as well as posing follow-up questions and permits the understanding of the experiences and contexts of the interviewees (Hill & Haigh, 2012) as they delve into how they perceive and solve the problems resulting from the inherent tensions between research and teaching. The sample, representing all public UASs in Switzerland, consists of 19 directors and one head of institutes standing in for a director who was appointed only shortly before the interview and did not have time to acquaint herself with the topics of the interview yet. The organizational actorhood approach understands HEIs as integrated organizations (Krücken & Meier, 2006), i.e., with some degree of unity at a central level. While the chosen interview partners are at a decentral level, they are directly connected to the center and implement centrally initiated measures. Through the narratives of the interviewees, it should therefore be possible to capture the degree to which solutions are initiated by the central administration and adapted by decentral units. This should also make it possible to identify subject area specific differences, as these are the result of decentral adaptations of solutions.

One of the UASs encompasses more than one business school and also several engineering schools. In two preliminary interviews with the persons coordinating the schools within these subject areas, a sample of interviewees was identified. Hereby, the representativity

of the schools for this organizationally complex UAS was the main criterion, while potential language barriers were also considered.

Directors at Swiss UASs are the heads of the departments that may include more than one subject area and contain the business schools and engineering schools. As such, directors hold the most senior management position of their departments and are ultimately responsible for their development. At the time of the interviews, the participants had been active in their roles from 12 months to 14 years and often had had management or teaching positions in the predecessors of their employers. Table 13 presents an overview of the sample and, to provide some context, the full-time equivalent (FTE) represented by the lecturers, research associates, and assistants working for the organizational units headed by the interviewees, as well as the number of students.

Table 13. *Sample Description*

UAS	Dept./School subject area	FTE		No. of students[a] at dept./school[b]
		Lecturers	Research associates and assistants	
1A	Engineering*	147.3	132.1	1323
1B	Business	81.8	9.5	1396
2A	Engineering*	134.0	146.0	925
2B	Business	41.1	n.a.	676
3A	Engineering	62.1	109.0	383
3B	Business*	83.8	86.3	822
4	Business	41.4	23.1	931
5	Business	62.5	79.3	1666
6A	Engineering	192.4	137.7	1966
6B[c]	Business	172.3	31.8	3763
7A	Engineering*	134.4	207.0	1524
7B	Business	187.4	39.5	2702
8A	Engineering	93.1	181.2	1723

Table 13. *(continued)*

8B	Business*	49.9	16.1	1564
9A	Engineering	134.1	259.1	1705
9B	Business	75.9	11.7	982
10A	Engineering	39.9	10.9	471
10B	Business	95.2	38.5	1531
11A	Engineering	203.7	275.7	2468
11B	Business	257.3	173.0	8532

*= Multidisciplinary department

[a] = Does not include students in continuing education courses with less than 60 ECTS

[b] = Academic year 2021/22, sources: for nos. 4-5 annual reports 2021, for nos. 1; 6-11 FSO (2022f), for nos. 2-3 personal communication with author

[c] = Head of institutes as interviewee

Before the interviews were conducted, all interviewees were informed about the research project and its aims. They were assured that participation was voluntary, and that their answers would be kept anonymous and confidential. The interviews, which were conducted individually, lasted between 50 and 90 minutes. Due to the restrictive measures against the Covid-19 pandemic, part of the interviews took place online, while another part was conducted in a location chosen by the participants.

An interview guide[13] was used to ensure consistency with the themes identified as important to the research question in the literature (Brewster et al., 2015). Regarding the usage and structure of the interview guide, the recommendations of Mason (2004) and Mertens (2009) were followed. The interviews were structured into five sections that addressed the current organization of individual research, teaching and third mission activities, the individual and

[13] See appendix

institutional problems caused by the teaching-research mission and their solutions, how the competences of lecturers are ensured, and the origins of the idea that UASs should combine research and teaching. To gather clarifications, examples, and details, follow-up questions were asked. With the help of digital recordings of the interviews, verbatim transcripts were written and then subjected to thematic analysis, which identifies, analyzes, and reports patterns, i.e., themes within data, according to Braun and Clarke (2006).

5.3.2 Analysis

Within the methodological frame of thematic analysis, the investigation presented in this study principally followed an a priori theoretical orientation suggested by Creswell (1998). With this approach, which grounded theorists like Charmaz (1990, p. 1162) might call "more traditional logical-deductive", the research question, data collection through the interviews, and the initial coding system were influenced by existing theories and knowledge. The deductive codes resulting from this theoretical orientation concerned the areas of control regarding the problems and solutions, the problem themes 'configuration of the individual teaching-research mission' and 'practice requirement', and whether solutions were initiated from the central administration or decentral units of the UASs in the sample. The search for other concepts and passages illustrating specific themes capturing "something important in relation to the overall research" (Braun & Clarke, 2006, p. 82) led to the development of additional codes, which introduced an inductive element to the analysis. Thus, the codes for the solutions per se and the remaining problem themes of 'research and teaching competences and qualifications', 'establishing a research track through the acquisition of research projects and risk aversion', and 'academization versus practice-orientation' were developed inductively. Complementary contextual codes for organizational characteristics, such as size, subject area, and institutional profile, were also developed in order to build a basis for comparisons. For this purpose, information was gathered from the HEIs' websites, if the interviewees did not mention it.

The coding work per se was done with the help of the ATLAS.ti software. Primarily, the inductive search for themes and, to a lesser extent, the development of the contextual codes followed the NCT model introduced by Seidel (1998). It offers an iterative and recursive process consisting of "Noticing", i.e., finding interesting things in the data, "Collecting" similar issues, and "Thinking" about what has been noticed and about patterns and relations in the data (Friese, 2019, p. 109). The analysis thereby focused on what was said during the interviews instead of on how it was said.

As a first step, the author read and re-read the interview transcripts, identifying all statements in which interviewees refer to problems linked to lecturers and the teaching-research mission or their solutions in an implicit or explicit way. In a second step, the statements regarding solutions were coded with one of the three key areas that are important for the university management to control, as suggested by Pinheiro and Stensaker (2014) and described above. Next, a within-category analysis was conducted to find patterns and similarities which were used for drawing descriptive conclusions on the variations within the main categories and between the HEIs.

The final categories were the result of the coding process conducted by the author, who manually repeated the coding procedure to provide stability, as suggested by Krippendorff (2004). In order to establish a degree of reproducibility or intersubjective agreement in a single investigator situation, two HE researchers each independently checked the a priori coding of several transcripts. Differences between the author and the code checkers concerned two solutions and their categories reflecting the areas of control identified by Pinheiro and Stensaker (2014). As these areas are not entirely unambiguous, such differences were not unexpected and both were related to the question of whether the solutions are structural or resource-based. The differences were analyzed and used to improve the code definitions. This led to the re-coding of one of the solutions in question. Additionally, all translations of quotes were verified by a further HE researcher proficient in English and German.

5.4 Findings

Overall, five main themes regarding the problems related to lecturers and the teaching-research mission were identified in the interview data. These themes provide the structure for this section at the first level. They are briefly described based on evidence from the transcripts and exemplified through quotes where possible. Following each problem theme, the specific solutions and their decentral or central nature, as narrated by the interviewees and understood as manifestations of organizational actorhood, are presented. The three areas proclaimed to be important for the control of change and adaptation by Pinheiro and Stensaker (2014) provide the structure for the solutions. Even though the problem themes are all related to lecturers and are thus resource-based, they often overlap with the areas of structure and culture. This also applies to the solutions and attributing them to one area of control cannot be done unambiguously in every case. Toward the end of this section, Table 14 provides an overview of the identified problem themes, along with the solutions and the associated areas of control.

5.4.1 Research and Teaching Competences and Qualifications

A clearly identifiable problem caused by the teaching-research mission, reported by virtually all interviewees, is that many lecturers have to be competent in both areas. In particular, the research competence has been described as increasingly crucial because “One can’t improvise oneself as researcher anymore” (8B). At the same time, interviewees acknowledge that “the best researchers are not necessarily the best teachers” (4). As an additional difficulty, the professional orientation of UASs entails that lecturers need a solid professional experience in order to convey current knowledge and practices to students who want to apply the lessons in their occupations. This problem is treated in a separate section below. However, the data show that this requirement favors professionals without teaching qualifications and a weak research competence. In combination with the fact that most university graduates with research skills are not qualified teachers either, UASs are often confronted with a situation in which they have

to decide between practice-oriented lecturers with weak teaching and research skills or research-oriented university graduates with weak teaching skills and little practical professional experience.

Several participants mentioned the detrimental effect of the absence of the right to award doctorates on the presence of research competence at their HEIs. Unlike research universities, UASs cannot directly create a supply of research affine young academics matching their specific requirements. This situation is aggravated by two factors. First, most participants reporting this problem acknowledge that UASs lack the critical mass of master's graduates in order to efficiently run doctoral programs, even if they had the right. Second, several participants from both school types expressed their doubts about whether each UAS on its own terms could shoulder the financial and organizational burden of doctoral education. Nevertheless, the majority of interviewees representing business schools would welcome the right to award PhDs. This is in contrast to the directors of engineering schools, who were of the opinion that this right was not needed.

5.4.1.1 Resource-based Solutions

5.4.1.1.1 Prioritization of Research Competence

A solution used by the majority of schools, regardless of the subject matter, is that they prioritize research qualification and competence over teaching when hiring new lecturers. The prioritization takes place within the scope of recruiting processes that are a decentral responsibility and is justified by the perception that teaching competence is easier to acquire than research competence. The following quotations illustrate this:

> *This has always been an important point [in recruiting]. What do the research activities of new lecturers look like? What do they want to research? In what direction? What's the potential for acquisitions and of the network? Ultimately, these are very important criteria for the selection of applicants. We clearly steer in this direction. […] I would say that it is easier for a good researcher to acquire*

teaching competence, to which we also attach great importance. For example, with our certificate [in HE didactics] and our internal continuing education. We take our student survey very seriously in this respect. This is easier for our institution than the alternative, i.e., developing people with no or little experience in research. (11A)

Last year, I hired a lecturer who came to us just because he can do research here. That's his motivation, to do research and provide services. Teaching, of course he does that too, but there are varying aspirations; one has to look at that in a multifaceted way. (10B)

The prioritization of research over teaching competence at the time of hiring goes hand in hand with a clear tendency to recruit PhDs at virtually all schools in the sample. The PhD quota among newly hired lecturers is described as up to 90 percent. Among lecturers in general, it is lower, and 50 percent was frequently mentioned. However, the quota at engineering schools seems to depend on the industry specialization of the lecturers, with some areas where PhDs are still a clear minority. Some participants also emphasized the need for PhDs in teaching at the master's level, as exemplified below:

Well, the trend goes definitely in that direction [of hiring PhDs]. I don't think it is a must, but I am of the opinion that a dissertation is a useful additional form of education to the master's degree or a diploma. And since in teaching we always have a 'plus one' rule, a dissertation is required for broadly utilizing people and that they can teach at the master's level. I think this is appropriate for a UAS. (9B)

5.4.1.1.2 Increase Levels of Competences

A further, more broadly applied measure to building and maintain research capacity, which is pursued by all schools, is strengthening the competences of lecturers, thereby improving human resources. While all participants report that research competence can be acquired through internal continuing education courses, a majority of schools also employ sabbaticals and

individual continuing education budgets – in some cases described as "generous" (10B; 11A/B) – for this purpose. While these measures are initiated and provided with resources at the central level, they are determined and carried out at the decentral level. Several interviewees reported that lecturers and their superiors determine together whether such qualification measures are necessary and jointly monitor the progress.

Less diverse solutions regarding the teaching competence were given an account of. Apart from declaring teaching experience as a desirable trait during recruiting processes and offering help through didactics coaches, all interviewees described their schools as relying on formally qualifying the many lecturers who enter the schools without a teaching background. Universally, schools require lecturers to go through some sort of teacher training organized and coordinated through central means. In many cases, there is a reliance on structured continuing education programs amounting to a minimum of ten ECTS points and called Certificates of Advanced Studies (CAS). While most schools will cover the fees for this, lecturers have to complete it during their spare time. As one of the interview participants put it:

> *Concerning didactics, there are programs at the level of [UAS] that are well-made. Lecturers have to follow a certain teaching track. Either they have already completed something, or they follow the track of [UAS]. It's 15 days, which are not an entirety but more or less correspond to a CAS and are very helpful. We can see, when we hire somebody from the field or from research – both have this problem – didactically, they are mostly not very good, and these 15 days really help. (2A)*

5.4.1.2 Structure-based Solutions

5.4.1.2.1 Phase-out of Non-research Affine Lecturers

Despite efforts to qualify lecturers for research work, a significant number of the interview participants, all from business schools, reported that they have given up on qualifying later-career lecturers that lack research competence. Instead, this decentralized solution uses

structures that allow them to be assigned tasks that are not directly related to research but are rather part of the third mission. While several interviewees admitted that this would lead to a "two-tier society" (11B), the problem is clearly perceived to be "transitional" (4), as the natural fluctuation in the body of lecturers continually reduces the number of older, less qualified lecturers. The following quotation represents this stance and the fact that older, non-research affine lectures are tasked with third mission activities:

> *As mentioned, I still have these older lecturers who don't meet [the requirement to teach and do research]. In one institute, I have relatively many people who predominantly teach. So, they can sometimes do consulting, but there is little research going on. Consulting is also part of the knowledge and technology transfer mission. It's a certain compromise we've made for them. (10B)*

5.4.1.2.2 Team-based Research

Another tendency visible in the interview data is the quite common reference to the facilitation of more team-based research at the decentral level. This brings the research mission to the institutional level and combines the practice-orientation and research competence of several lecturers, akin to an "orchestra" with "musicians that have to get to know each other" (9A), as the quote below illustrates:

> *But one of the two areas [of practice and research] has to be present in depth in everyone. And then, it absolutely works that competences are combined. Someone who intimately knows the current practice and others who are scientifically up to date. (7B)*

Team-based research allows competences that might not be present in a single lecturer to be pooled and also facilitates the acquisition of third-party funded research projects. Lecturers with strong theoretical backgrounds but weak industry ties can rely on colleagues with strong networks but weak research competences to reach out to potential project partners. In turn,

scientific rigor can be guaranteed to project partners. This is important, as they are often small to medium enterprises that are not primarily focused on research activities and would find it challenging to establish scientific credibility on their own. Team-based research entails that lecturers are "no longer automatically project leaders" (9A) and suitable project structures have to be found.

5.4.1.2.3 Informal and Formal PhD-Structures

Another avenue that is detectable mainly in the data of business schools, with only one smaller exponent being the exception, is that structures for lecturers willing to pursue a PhD, and thus increase their research competence, were created at a decentral level. Although Swiss UASs are not allowed to award doctoral degrees, informal and formal arrangements are widely used by both types of schools to offer master's students and graduates working as assistants a perspective. Especially business schools extend this possibility to lecturers and also research associates with the potential to become lecturers. Such employees are supported to varying degrees in pursuing a PhD while working at the same time. This form of qualifying employees, who sometimes "even at the age of 50 really like to start a PhD" (8B), is perceived as more advantageous than hiring young PhDs with a university background, who often lack the required practical experience. Two exemplary quotations represent the solution:

> *With the somewhat younger candidates, we clarify whether they have a research interest or research experience. If so, the question "Are you going to do a PhD?" arises sooner or later. This is in the sense of personal development or of a PhD as advancement. Doctoral sponsorship, as you might know it. In a way, this is a form of academization, but not in the sense of a university academization, […] but in the sense of a continuing development, of securing faculty development. (6B)*

> *We have a PhD program that financially supports doctoral candidates. On the one hand, with time and on the other hand, with cash for travel expenses and publications. (11B)*

While some schools rely on formal agreements with Swiss research universities, informal and formal agreements with universities from other countries seem to dominate. Participants justify this solution with the universally reported suboptimal cooperation between Swiss research universities and UASs, the latter being described as "permanently in the role of the supplicant" (7B). Each UAS tries to find ways around this problem with their PhD-structures, often on an ad-hoc basis and "relying on personal contacts" (3B), which underlines the decentral nature of the solution.

5.4.1.3 Culture-based Solution

5.4.1.3.1 External Accreditation as a Justification for the Restructuring of the Lecturer Body

A clear difference in the interview data between subject areas is the strategic use of international accreditations by business schools as a tool to shape the prevalence of competence in the body of lecturers. One prestigious and globally active association was particularly frequently mentioned in connection with this subject area-specific solution at the decentral level of UASs. While three of the larger schools have already completed the process, three more were undergoing their first accreditation by this association at the time of the interviews. Interviewees narrated that the accreditation criteria represent a strong exogenous influence on their expectations regarding the qualifications and academic performance of lecturers and limits the recruitment of personnel with little research competence. Accreditation criteria are integrated into individual performance agreements and formulated as medium-term goals, such as "One publication in an A-level journal every five years" (11A). The effect of accreditations is illustrated by the following quotes:

> *For quite a while during the [global nonprofit accreditation association] accreditation process, we had the challenge of meeting the quota for scholarly academics with a doctorate and a sufficient research performance. In order to*

meet the quota, we had a clear focus on PhDs when hiring. However, with the very explicit target that this is not permanent. The point was to change the percentages of PhDs and the other lecturers. (7B)

5.4.2 Difficult Recruiting due to Practice Requirement

The other competence-related problem frequently mentioned in the context of the dual mission of UASs is the difficult recruiting due to the practice requirement for lecturers. Typically, new lecturers should have gained prior professional experience outside of the HE sector over a meaningful period. Depending on the UAS, three to five years are the minimum given by the interviewees. One of the common issues resulting from this requirement is the fact that potential candidates often have had long and successful careers in their respective industries, which is reflected in their salaries. This creates a situation in which UASs compete with the private sector. Virtually all interviewees described this difficulty in recruiting suitable lecturers, as illustrated here:

The bigger problem [than the high workload] is that, for example, in electrical engineering, we got stuck several times during the recruitment process. Simply because there were no suitable candidates. The good ones, that is, engineers in big, interesting R&D projects tackling exciting challenges, have different kinds of renumerations in the industry, and it's very hard to find people. (2A)

And if the ideal candidate exists, he doesn't come to us because of the wage level we have. So, from that, the ideal candidate does not exist. (4)

5.4.2.1 Resource-based Solutions

5.4.2.1.1 Building Practice Experience, Hiring from Neighboring Countries, and Relying on Contractors

Regarding the practice requirement, which enables a practice-orientation that interviewees described as the "unique selling proposition" (2B) of UASs, the data reveal a variety of

solutions in conjunction with hiring practices pursued at the decentral level that cannot be pinned on the type of school represented in the sample. From a clear but not unimportant minority of interviewees, one solution appeared. It consists of hiring young PhDs or master's graduates "that don't have direct industry experience" (8A) as scientific staff and developing them through the exposure to practice in major applied research projects and third mission activities, such as services. This solution also implies that the practice requirement is redefined and that "practice experience can be gained on the job in research and service projects" (3B). Gaining practical experience this way may require many years. A faster solution that is also reportedly practiced by most schools is to hire candidates from surrounding countries like "Germany, Italy, France" (11A) that "have lower wage levels" (10B) than Switzerland.

A further solution to the requirement of teaching current and practice-oriented course content is to rely on external lecturers who are not employed by the schools but instead teach as individual contractors. Business schools in particular make extensive use of such freelance teachers, who are often highly specialized practitioners in their fields. Several participants described that they outnumber the lecturers on a permanent and fixed-term basis at the bachelor's level. Usually, such lecturers have a teaching load below 20 percent of an FTE and are exempt from the requirement to do research. As some interviewees remarked, such external lecturers also offer the advantage that schools can part quickly with them when their expertise or time is no longer needed. They fulfill a role as an "adjustment variable" (4) at the decentral level.

5.4.3 Configuration of Individual Teaching and Research activities

Relying on an open admission system in a mass higher education system, teaching cannot be postponed or only partially fulfilled by Swiss UASs. The resulting primacy of teaching, coupled with high teaching loads, is universally reported to be a problem for lecturers who are also supposed to do research. Growing student numbers contribute to the severity of the problem in

the eyes of business school directors. Several interview participants from both types of schools lament the lack of teaching assistants who could provide some relief for lecturers involved in time-consuming research. This is also perceived as a disadvantage compared to research universities. Only one business school participant reported providing teaching assistants to lecturers. In general, lecturers are therefore severely limited in the possibility of meaningfully engaging in research. As two participants put it:

> *We continue to have this dilemma between time for teaching and time for research, and the good researchers are not always satisfied that they don't get the research time they wish for. I regret that, but somebody has to teach, and I don't want somebody who just reels off the content of the curriculum. (11B)*

> *The second issue that we have due to the dual mission and the lacking possibility to have substitutes for lecturers, like professors at universities with assistants, is that this leads to very full schedules, and then one has to do research between 2.30 and 4 pm. That is very demanding! (9B)*

A less frequent but nevertheless typical problem described by several interviewees is that research affine lecturers conduct research outside of their paid time. The lack of or limited funding provided by third parties and the schools prompt them to work more hours than contractually agreed, as otherwise they would have to do less research. This leads to cases of research being conducted at least partially in the spare time of lecturers. While in the short run this behavior sometimes facilitates research for UASs and is tolerated, many participants admit that it creates frustration and needs to be limited.

At the same time, tendencies for avoiding research and striving for teaching dominated work portfolios – described by several interviewees as a "flight" – seem to be an almost universal problem that has to be addressed. This problem is caused by the fewer risks and uncertainties of teaching activities compared to research work at UASs. Participants from both subject areas raised this problem with a similar frequency:

My problem is the flight into teaching. So, people like to teach, and in teaching, they can plan their whole year by January. They know they will get a certain amount of ECTS in the spring and fall, and then they are happy. They have planning dependability. In research, they never know if they can get into a project, for instance. (10A)

The funding for teaching is totally secured, and the organization of a daily routine is much easier. […] The risk is that the ones with a dual profile suddenly realize that it is more comfortable to be active in teaching only. (8B)

5.4.3.1 Structure-based Solution

5.4.3.1.1 Differentiating Lecturers Through Personnel Categories

In the interview data, one theme regarding the solution to the problems linked to the configuration of the teaching-research mission has clearly come to light as dominant. Instead of expecting every lecturer to be active in research and teaching, interview participants described the introduction of personnel categories at the central level of their UASs in order to regulate differing requirements to be active in the two areas. The number of categories already in use ranges from two to six. Generally, they include one or more categories without research requirement and several categories with graduated increases in the expected time spent on research activities. The business and engineering schools of at least two UASs have even introduced categories for pure researchers that are ranked above mid-level staff.

The more differentiated categorization simplifies the recruitment of new lecturers and makes it possible to link wages to categories of lecturers with different individual configurations of the teaching-research mission. Thus, the higher risks and stress involved in research can be incentivized. Several interviewees stressed that research and teaching require different mindsets in the context of UASs. In the words of one director, “teaching is farming and research, that’s hunting.” (2A). Differentiated lecturer categories facilitate the recruitment of employees with the right preferences and reduce the phenomenon of “flight into teaching”.

Only one UAS in the sample started its institutional life with differentiated lecturer categories. However, over the years, it has become common practice to create categories with differing requirements, and Swiss UASs are at various stages and maturity levels. Only two larger UASs with a single lecturer category remain. However, according to their directors, they are in the process of introducing new categories through reforms initiated at the central level, which should be completed within the next few years. Since "it simply isn't realistic to expect all lecturers to do research" (7B), the business school of one of these UASs has already introduced a category for lecturers without a research requirement on its own terms. Several participants also described that they have used categories defined by the central administration of their HEIs and complemented these with additional ones. This indicates that the centralized solution can allow adjustments at the decentral level. The differentiation and categorization of lecturers are illustrated by these quotations:

> *Well, basically, there's a framework provided by [UAS] called the 'new typology of teaching and research personnel'. And in there, teaching-oriented lecturers are clearly defined. […] Then there are assistant, associated, and full professors, just like at universities. And here, we were a bit inspired by [a canton] and have two levels of teaching-oriented lecturers. We have those that really just teach and then go home, and then we have a higher wage group for those who take on certain tasks in continuing education, the administration, or are regularly doing research without being a project manager. They receive a wage supplement. It's not enormous, but still approximately 500 Swiss Francs per month. (4)*

> *[…] because of the constraints in the real world, we understand that if people would like to do research, they have to specialize in research. And so, because of that, we have these different categories. (5)*

5.4.4 Establishing a Research Track and Risk Aversion

The interview participants, especially the ones from engineering schools, emphasize that the applied nature of the research connects lecturers with up-to-date scientific and technological

developments and keeps lecturers in touch with the real world, which enables them to teach relevant, updated, and practice-oriented content. However, the low levels of research funds force UASs to require lecturers to find funds. Since "the grapes don't grow into your mouth." (2A), entrepreneurial skill and motivation are needed, which is described as problematic by a number of participants from both types of schools. New lecturers are reported to often experience difficulties in acquiring research projects and establishing a research track. This can be the result of the above-mentioned problems regarding competences. More importantly, this can also be caused by a weak network in a specific research area or by time constraints when newly appointed lecturers have to develop their teaching while at the same time being obliged to start doing research.

However, the interview data show that difficulties in acquiring research projects and establishing research tracks are frequently the consequence of the risk aversion of newly appointed and established lecturers alike. Even though participants assure that lecturers rarely have to face reprimands or other negative impacts on their careers due to research projects gone awry, they seem to fear personal consequences if, e.g., they cannot stay on budget or schedule. As the data suggest, building the right "culture of solidarity and shared risks" (2A) to combat this problem has not been broadly concluded in a successful manner. The following two quotations represent aspects of this problem theme:

> *In research, there is always a certain amount of risk involved and projects have to be acquired. At UASs, it's really the case that you have to generate funds for 50% of your research time. Simply because we have very low levels of internal research funds, and this does cause a certain stress. (1B)*

> *It is really noticeable that [the risks involved in research] generate a lot of stress, especially for lecturers that have a whole team around them. They are the breadwinners of their teams, put bluntly. […] And that creates a lot, a whole lot of pressure to perform, I have to say. […] In principle, a tenured lecturer has*

something like a small business that needs to be managed. It's not much different from the carpenter, who has 15 employees and also needs to secure deals. (3B)

5.4.4.1 Structure-based Solutions

5.4.4.1.1 Team-based Research and Expansion of Mid-level Staff

While some schools seem to rely on financial incentives to motivate lecturers to take risks in finding research projects, a majority of the interviewees explained that they try to emphasize teamwork in research. While this does not necessarily take the pressure of the acquisition off lecturers, it distributes the workload and, as described above, competence requirements. Several participants from both types of schools mentioned that this would also bring the individual research mission to an institutional level, e.g., a team, an institute, or an organizational unit below that.

The emphasis on teamwork and the consequential division of labor are essentially made possible through a substantially expanded mid-level staff at the decentral level, as many interviewees reported. While lecturers remain the main drivers in the acquisition of projects, research assistants and associates support them in writing proposals and by doing much of the hands-on research work. As one of the participants put it:

Increasingly, it is the lecturers who make acquisitions and then it is the assistants who do the actual research. That was certainly not the case when I started as a lecturer 15 years ago. I did a lot of research by myself. (4)

The expansion of the mid-level staff is done through recruiting younger PhDs with a thorough methodological know-how or master's graduates who are motivated to write a dissertation in the short to mid-term, as described above. The establishment of this solution at the decentral level results in a varied picture. While one engineering school goes as far as providing a personal research assistant to lecturers with important research responsibilities, most engineering school interviewees recount a ratio of one lecturer to two to four assistants,

and one described, “My company rules are […] two to five research assistants per lecturer. Either his or her own or pooled in an institute setting. That adds up; that’s what works.” (9A)

Several interviewees stressed that the division of labor between lecturers and mid-level staff also has financial advantages. The hourly wage rates of lecturers make exploratory research, as well as labor-intensive methods, expensive, and the involvement of mid-level staff brings project costs down.

5.4.4.1.2 Grace Periods and Internal Funding for new Research-active Lecturers

To address the specific problems newly appointed lecturers face, several interviewees explicitly mentioned that newcomers with research obligations get a grace period of several years to establish themselves and come up with meaningful third-party funded projects. The solution appears to be a central directive linked to personnel categories, and depending on the UAS, two to six years seem to be deemed necessary for this purpose. A minority of interviewees also described structures within spending powers at the decentral level that provide initial aid in the funding of research conducted by newly appointed lecturers and the subsequent preparation of academic publications through earmarked internal funds.

> *So, [newly appointed lecturers] have this pressure, this pressure of the acquisition. Somebody who is just teaching certainly doesn’t have that. That’s certainly a challenge for [the management of the school]. That’s why we created this incentive with this performance-focused support, which gives me a certain amount of latitude if I am a new researcher. (10B)*

5.4.5 Academization Versus Practice-orientation

In general, interviewees described that academization to various degrees was necessary for building a research capacity, which is then the basis for an institutional research profile. Frequently, the melding of the two opposing forces of academization and practice-orientation has been reported as challenging. This is not only a problem at the level of lecturers but also

has reputational aspects because stakeholders in the form of politicians and students react to a perceived outcome.

On the political level, the interviews reveal that, especially in the more peripheral UASs, participants face criticism from politicians and other stakeholders supporting strong vocational education. They perceive the academic drift as an obstacle to the successful professional qualification of highly employable graduates, who are often seen as the key success factor of the Swiss economy. In acknowledging that academization really is a problem at some UASs, a number of directors explained that these political discussions have consequences for the acquisition of research and service projects, as many entrepreneurs no longer consider UASs fitting partners, as illustrated by this quotation:

> *[The shift to more academic lecturers] is a problem and I think one really has to be careful who we send out there to provide services and find research partners. UASs have made mistakes in this respect. And then we lose our unique selling proposition of 'practical relevance', I can already feel that sometimes. It's because all UASs are lumped together. (2B)*

Closely related to this is the tension between the teaching of more theory-driven academics and students' expectations. The latter can perceive lecturers as too theoretical or too distant from practice and then conclude that the curricula do not align with their primary interest in work-related matters.

Another problem created by the general trend of academization is that lecturers with an academic background are oriented toward academic performance measures. Several interviewees explained that the visibility of applied research is difficult to establish for such lecturers. One reason, which seems to be more prevalent in engineering schools, is that many projects are accompanied by "thick non-disclosure agreements" (11A). Increasingly, this visibility is especially important for business schools striving for an international accreditation.

However, this creates another tension because the transfer of academic research to teaching is not always possible:

> *At a school of management, this is not easy. If you really look at it closely, the link between teaching and research is not so clear. I have many good researchers. They do research and they also teach. But what they do research on can't really be communicated in teaching. […] One can research certain topics in accounting, for instance. But this isn't transferred to bachelor students. (4)*

5.4.5.1 Culture-based Solution

5.4.5.1.1 Embrace Academization

The interview data suggest that at the level of lecturers, academization is mainly perceived as a generational problem. Lecturers who do not like the way UASs are developing and either think that practice-orientation is not emphasized enough or that the research requirement is an unnecessary burden for practice-oriented lecturers are reported to be older and to have a weak academic identity. Therefore, these lecturers will gradually disappear and be replaced by more research affine lecturers. The quotation below exemplifies the solution:

> *Over time, this will resolve itself quite mechanically, also due to the new appointments. […] The problem exists primarily due to older lecturers who were suddenly told that they have to do this and that and never delivered. So, I would say a tension still exists, but it's declining. (4)*

A common solution to the sub-problems of defining relevant research and successfully combining the academic drift with practice-orientation seems to be to embrace academization. Not all schools in the sample seem to do this to the same degree. Particularly larger ones seem to pursue it within the scope of decentral HR policies and accept it as a condition for successfully fulfilling the teaching-research mission more readily than smaller ones. The fact that certain research is not transferable to teaching is thereby accepted. Especially business schools that are trying to get accredited have to adopt this stance to a certain degree:

I take it as a compliment. We are academic! […] I am a strong proponent of academization as long as two conditions are met: we primarily accept students with a vocational baccalaureate […] and our research helps to improve practice. So, please, let us work. What happens here is our concern and if we want to be internationally competitive, we have to be academized. That's good, after all, we are a higher education institution. The goal of our school is to be among the 50 best-ranked business schools in the world within the next ten years or so. […] This requires top publications and mentions in the international media. And that new things are explored, not just consulting services on a higher level. (11B)

One important aspect of embracing academization is winning research grants awarded by Swiss and international funding agencies and carrying out academically prestigious projects. Typically, such projects are the realm of research universities and confront UASs with financial problems because project leaders at UASs are not financed through the grants. Nevertheless, the practice supports the building of a long-term research capacity for all types of schools in the sample by attracting lecturers who are research affine. However, the interview data indicate that smaller schools are "very selective" (10B) and generally show more restraint in venturing into such projects. While they are pursued "for reputational reasons" (4) or because the overall strategy of the UAS demands it, only select lecturers are expected to conduct prestigious research because "Not everyone can handle something like that" (9B). The following quotes exemplify the differing approaches to such research for smaller and larger schools, respectively. The second quote also illustrates that the driver for embracing academization can be at the central level. However, most UASs undergo academization because it is important for strategic purposes at the decentral level.

We have a few lecturers who are supposed to try to secure National Science Foundation projects; they number three people. And we have the other lecturers that are more active in services and Innosuisse projects, so, work more with businesses. […] So, from that point of view, we have engaged certain profiles that

can do National Science Foundation projects. But we, as the business school, are not the drivers in this; it comes from the [UAS]. (4)

I don't place any restrictions on what kind of research projects are acquired. […] But I push for SNSF and EU projects. That's research for the long term; with that, we can better build long-term capacities. Thus, our school has become very attractive to strong researchers, and everybody here feels that research has a very high significance. (11B)

Table 14. *Overview of the Problem Themes and Areas of Control of the Solutions*

	Area of control and identified solution		
Identified problem theme	Resources	Structure	Culture
Research and teaching competences and qualifications	• Prioritization of research competence • Increase competence levels	• Phase-out of non-research affine lecturers • Team-based research • Informal and formal PhD-structures	External accreditation as a justification for the restructuring of lecturer body
Practice requirement	Building practice experience, hiring from neighboring countries and relying on contractors		
Configuration of individual teaching and research activities		Differentiating lecturers through personnel categories	
Establishing a research track through the acquisition of research projects and risk aversion		• Team-based research and expansion of mid-level staff • Grace periods and internal funding for new research-active lecturers	
Academization versus practice-orientation			Embrace academization

5.5 Discussion

The interview data suggest that the global isomorphic trends that HEIs as organizational actors are subject to according to Whitley (2012) can also be found on a national level. The solutions, although not always found in all interviews, are only exceptionally unique for a single school or UAS.

Overall, few problems regarding teaching become evident in the interview data. The history of Swiss UASs suggests that their teaching culture is firmly established, and the financing mechanisms seem to guarantee that the human and financial resources for the teaching mission are relatively abundant. Teaching is most often reported as difficult to combine with research work. This is a well-known structural problem in HE research.

The data suggest that most of the problem themes tackled within the scope of the organizational actorhood of the sampled UASs are addressed through measures from one area of control. However, the theme of *research and teaching competences and qualifications* seems to require a combination of measures from all three areas of control that Pinheiro and Stensaker (2014) have identified. While teaching competence is still valued by the management of the schools in the sample and lecturers are required at the central level to obtain teaching qualifications, the interviews revealed that PhDs are often preferred for lecturer positions because they possess the much valued and increasingly important research competence. Less research competent lecturers and also mid-level staff are given the opportunity to improve their skills through support structures such as continued training courses and PhD sponsorships. Lecturers are also encouraged to participate in team-based research in order to bundle competences which might not be present in a single person. This solution could contribute to human resource development if properly applied. However, less research affine lecturers, often in the end phase of their careers due to their age, do no longer seem to fit UASs. One solution is to task them with third mission activities, such as consulting, as they slowly disappear into retirement or become the exception because UASs are reluctant to employ them. This leads to

a restructuring of the body of lecturers, for which international accreditations appear to be an additional legitimate justification at the decentral level in the case of business schools. The development of a temporal two-tier system appears to have been accepted.

The difficulties of finding mission-critical lecturers meeting the *practice requirement* are tackled mainly through resource-based means by UASs. One solution emerging at the decentral level and in accordance with decentralized responsibilities is to broaden the base from which suitable human resources are recruited. In part, this is done by frequently hiring lecturers from neighboring countries. In another part, the use of external contractors for teaching assignments, rather than employing lecturers with the same level of practice-orientation on a permanent or fixed-term basis, contributes to minimizing the problem. Business schools seem to make more use of this solution. Engineering schools tend to rely more on employed lecturers who are also involved in research projects to connect their students with the current practice. The interviewed engineering school directors all described how important this function of research was for up-to-date teaching and several also emphasized it as a key differentiator from HEIs on the other side of the binary divide. One important contributing factor to business schools' greater reliance on external lecturers could be the third solution of broadening the base for finding human resources. Business schools have been recruiting younger PhDs with little relevant practical business experience to enhance their research capability, a practice that was already described by Lepori (2008). These academics are allowed to gain relevant practical experience by conducting research and through third mission activities. One result of this practice might be the slow but profound redefinition of the practice requirement, which is a strong cultural component of Swiss UAS and their vocational mission.

The *configuration of individual teaching and research activities* is a persistent problem at Swiss UASs. The dominant solution appears to be the structuring of lecturers into a number of categories that are prescribed at the central level of UASs and are tied to different requirements regarding teaching and research activities. Thus, lecturers are no longer only in

principle expected to be engaged in both missions. While one UAS started with such a differentiated body of lecturers, the other participants described the rather recent introduction of or current push for more than one personnel category for lecturers. The differentiation of lecturers has also been observed at German UASs and described by Duong, Hachmeister and Rössler (2014). However, given the described propensity for a flight into teaching, even the categorization of lecturers according to how much research and teaching are supposed to be done does not entirely solve the problem.

The differentiation of lecturers includes the possibility that lecturers have no research obligations at all. This can be interpreted as a transition to a post-Humboldtian configuration "characterised by differentiating roles and resources for teaching and research" (Leišytė, Enders & de Boer, 2009). This shift is accentuated by the introduction of more team-based research at the decentral level as a solution to the competence problems.

Even though post-Humboldtian tendencies are visible, a meaningful individual teaching-research nexus remains desirable for the interviewees. The federal financial incentive to have lecturers active in both research and teaching continues to contribute to this ideal.

In order to facilitate *establishing a research track through the acquisition of research projects* and to counter *risk aversion* in this process, Swiss UASs have been building structures to allow lecturers to adapt slowly to and cope with the challenging research environment. Consequently, lecturers are not required to distinguish themselves through a high research productivity and the acquisition of third-party funds from the very early stages of their employment thanks to the introduction of grace periods and the possibility of falling back on, albeit limited, internal funds. The relief provided by more team-based research and the possibility of resorting to the help of an expanded mid-level staff further reduces the strain on lecturers, who are typically faced with high teaching loads. In light of the literature testifying to the problems regarding teaching loads and low research productivity (e.g., Maske, Durden & Gaynor, 2003; Leišytė, 2016) the solution holds some promise. It seems to be partially driven

by the difficulties of finding suitable lecturer candidates among practitioners working outside of HE, for whom establishing a meaningful research track can be a daunting prospect.

The problem theme of *academization versus practice-orientation* essentially has its roots in the culture of the UASs. The data suggest that it calls for a solution at the decentral level that is also from that area of control. While it seems to be easier for larger schools or departments to embrace academization, smaller ones cannot completely stem themselves against this trend, in part because academically prestigious research projects are required at the central level. The described differentiation of lecturers thereby plays an enabling role since it allows for employing strong researchers with fewer teaching obligations compared to traditional UAS lecturers. However, the interviews also imply that the solution is not risk-free. Some UASs could end up with largely academized lecturers who have difficulties in transferring their research to teaching and, hindered by the challenges of UAS research funding, are not able to achieve the desired success by the standards of academic performance measures. The ramifications for the motivation of the lecturers as well as for the students, of whom only about 15 percent advance to a master's program and who expect practice-relevant curricula on the bachelor's level, are potentially grave.

Overall, the findings also suggest that the organizational actorhood of Swiss UASs entails a relatively heavy reliance on decentralized solutions by departments and schools when creating solutions to lecturer-related problems of the teaching-research mission. Virtually all solutions seem to be decentral except for the requirement of teaching qualifications and the introduction of personnel categories. As these two solutions involve basic conditions of employment that have to be uniform for all employees across the departments or schools of a UAS, they are largely determined by the central administration. The creation of personnel categories addresses a problem highlighted by Lepori and Attar (2006). The two authors found the personnel structures of Swiss UASs to lack clear differentiations between lecturers with different profiles.

The fact that the majority of solutions are linked to resources and structure also illustrates Pinheiro and Stensaker's (2014) principle that these two areas are controlled more easily when organizational actorhood is enacted, and thus offer more potential to initiate change and adaptation when UASs choose and take action in their interest. Relatively few solutions concern culture and they are concentrated at the decentral level of a UAS. This suggests that cultural change is easier to implement at the decentral level in the context of Swiss non-university HE. The organizational actors thereby seem to respect that understanding culture at a disciplinary or departmental level is essential for initiating cultural change (Godfrey, 2014).

A final observation of note concerns the use of the third mission to support the transformation of UASs. On the one hand, lecturers with insufficient research competence are entrusted with consulting and similar activities; on the other hand, young academics who lack the practice experience that is mission-critical for Swiss UASs are expected to gain relevant industry experience through activities falling under the third mission.

5.6 Limitations and Concluding Remarks

This study relies on qualitative measures and a small sample size to detect patterns in the problem-solving of organizational actors. It is bound to the culture and organization of Swiss HE that grant substantial discretion to HEIs in the pursuit of their public mission, which allows for a high degree of organizational actorhood. While the sampling can be considered representative of Swiss business schools and their counterparts in engineering, the findings cannot be assumed to be applicable to other subject areas without careful consideration or further research. The same is true for generalizing the findings to other national contexts, where the lecturer-related conditions for the teaching-research mission of UASs might be quite different from the Swiss situation.

Furthermore, both the interviewer and some of the interviewees faced linguistic challenges – albeit minor ones – as several interviews were not conducted in the first language of the participants. It cannot be completely excluded that this setting has influenced the findings.

In conclusion, this investigation confirms empirical as well as conceptual findings from the research university sector in a different context, that of UASs. The solutions to lecturer-related problems found by Swiss UASs reflect the leeway of their organizational actorhood in decision-making and the importance of devolving problem-solving to the decentral level. The latter is especially true when change is needed in the area of culture, which is hard to control for the university management. At the same time, the findings suggest that this leeway is limited by isomorphic pressures, as exemplified by the universally applied solution of differentiating lecturers into post-Humboldtian categories, the embrace of academization, or the prioritization of research competence.

Overall, this study has made the trend toward more research-oriented HEIs with academized staff in a binary HE system visible. The test of time will reveal how this is perceived by the public and employers in an economy shaped by small and medium enterprises, who so far have been critical of academizing higher vocational education.

Future research could try to shed light on whether subject areas that have been introduced into the non-traditional university sector more recently follow the trend toward research-oriented HEIs with largely academized staff and how they might differ from the subject areas analyzed in this paper in finding solutions to the problems created by integrating teaching and research. A different but no less promising future direction for research, especially for policy measures, could further deepen the understanding of the reportedly suboptimal cooperation in PhD education between Swiss research universities and UASs.

5.7 Acknowledgements

The author is grateful for the contributions of Sude Pekşen, Lina Zenkienė and Anna-Lena Rose, all working at the Center for Higher Education of TU Dortmund, to this research project.

5.8 Conflict of Interest

The author states no conflict of interest.

6 Overall Discussion and Concluding Remarks

6.1 Discussion of the Findings

The overarching goal of this dissertation is to understand, through empirical means, how Swiss UASs and UTEs fulfill their teaching and research mission by becoming ambidextrous organizations and maintaining the ability to teach and conduct research. As former post-secondary institutions of vocational education and training, these HEIs had to build and must sustain a research capacity suitable for fulfilling a publicly mandated applied research mission, which differentiates them from Swiss research universities. Additionally, Swiss non-traditional HEIs have to make sure that their research and teaching staff is practice-oriented and equipped with substantial practical experience in professional fields relevant to their students. While the studies presented in chapters 3 to 5 include separate discussions on their respective findings, this section serves to synthesize the insights from the three investigations and highlight how they corroborate each other. The subsequent sections below address the limitations of the dissertation, suggest future research avenues, and focus on implications for policy makers and HE management practice.

The documentary and survey evidence presented in the first study testify to the fact that UASs and UTEs have formally adopted an institutional emphasis of simultaneous research and teaching activities. Even though one of the sampled HEIs explicitly refers to a Humboldtian configuration of individual research and teaching activities, the evidence does not allow for a clear picture of the way the mission is accomplished at the individual level. However, 29.1 percent of the surveyed lecturers have no or only a weak research competence and 51.1 percent belong to the subset with bachelor's and master's degrees from UASs and UTEs with a statistically significantly lower research competence than the other subsets. These figures, indicate that the unity of research and teaching is unlikely to be implemented for the majority of lecturers working at Swiss UASs and UTEs.

The survey data analyzed in Study 1 also brought to light that there are still structures in place that favor teaching. Almost two thirds of the surveyed lecturers report that it is easiest to concentrate on teaching because of the way work is organized, instead of trying to be active in research and teaching. This is upheld by findings from the two other studies. Study 2 clearly demonstrates that roughly half of the lecturers employed in the Swiss non-traditional HE sector do not engage in substantial research activities. While this is probably in part due to weak research qualifications revealed in Study 1 and a low research self-efficacy pointed out in Study 2, the phenomenon of 'flight into teaching', which was identified through the interviews in Study 3, can also be seen as evidence for the still not ideal structures for combining research and teaching at the individual level. Lecturers are able and seek to reduce risks in their daily work by concentrating on teaching activities with a high planning certainty that leave little room for meaningful research work. Additionally, Study 3 shows that third mission activities are delegated to less research-affine lecturers. This practice further reduces the exposure of such lecturers to research activities and weak research structures.

Some of the structural conditions for research work are policy-induced and therefore essentially not alterable for the organizational actors. Study 2 lists some of them, e.g., the reliance on third-party research funding, the applied nature of the research mandate, the institutional emphasis on teaching, and the high teaching loads in comparison to research activities. However, Study 3 suggests, that non-traditional HEIs are adjusting their structures wherever they are able to, and their autonomy as organizational actors allows it. Qualification measures are arranged to qualify lecturers for research work, financial incentives are being put in place to encourage and facilitate research endeavors, and team-based research projects are promoted. Nevertheless, the fact that most lecturers with a substantial research engagement and publication output are graduates from the research university sector, as shown in Study 2, suggests that the more practice-oriented lecturers might not be reached by these structural adjustments. A critical factor at play here could be the observation that only roughly 60 percent

of non-research-oriented lecturers are at least somewhat motivated by research in their work and an even much smaller percentage reports a strong familiarity with current research in relevant fields. Additionally, and in accordance with this observation, over a third of this group has a low self-efficacy in research, which is accompanied by lower academic qualifications than found among research-oriented lecturers.

The problems with structures and human resources seem to prompt HEIs to shift to a post-Humboldtian configuration of research and teaching, i.e., not all lecturers are required to be functionally ambidextrous and active in the two areas. This is somewhat unexpected because state incentives financially reward HEIs for staff members that are simultaneously active in research and teaching. However, the requirement to provide practice-oriented education and training calls for having a portion of lectures that are not research-oriented and have a strong industry background. It is not entirely clear whether the large cluster of lecturers with little exposure to research work identified in Study 2 is already the result of this post-Humboldtian configuration or rather a causal factor in its emergence. However, given the chronology of the studies, the latter seems more likely.

The Swiss non-traditional university sector is still transitioning and adjusting to its mission, partly owed to the different speeds with which the various fields or subject areas have been incorporated into it. The first study clearly indicates that the reform process was not yet concluded at the time of the survey. While a formal institutional emphasis is equally placed on research and teaching in mission statements as well as in structural terms, the perception by lecturers that the structures at their HEIs favor teaching and the finding that more than 30 percent do not feel well-prepared for research work hints at the fact that non-traditional universities might not follow a Humboldtian ideal to achieve organizational ambidexterity. However, whether this is an intentional strategic outcome or the result of institutions coping with low individual ambidexterity cannot be ascertained by the first two studies alone or in combination. However, Study 3 allows for the conclusion that the post-Humboldtian tendency

is the outcome of intentional measures. The interviewed directors emphasized that in many cases, research can no longer be considered an individual activity of every lecturer. Instead, it is reserved for specialists, increasingly the subject of specific personnel categories, who receive support from research associates.

Overall, it seems clear that even with a presently more post-Humboldtian configuration, the lecturer body will still undergo more changes in the coming years. The fact that according to Study 1 only about 20 percent of the lecturers in the non-traditional HE sector do not perceive an expectation by their employers to be active in research and teaching and only about 27 percent feel that simultaneous activities are not facilitated by their HEIs leaves room to deduce that a portion of the non-research-oriented lecturers, who currently represent 47.4 percent of the lecturers as shown in Study 2, will have to become functionally ambidextrous in research and teaching in the near future. As the findings from Study 3 suggest, non-traditional HEIs are willing to qualify them for research work, e.g., through continuing education courses and informal and formal PhD-structures. However, this change will also be driven by new recruitment strategies. They will be designed to find the right people for the differentiated lecturer categories, which themselves represent a structural solution facilitating a post-Humboldtian configuration.

The second study indicates that a relatively large portion of the lecturers are not individually ambidextrous because they are not meaningfully engaged in research. This group is characterized by non-publishing lecturers and little academic work experience. A large percentage of these non-research oriented lectures is not motivated by research in their work. Since they are also less qualified for research work, but vital for ensuring the politically desired strong practice-orientation, Swiss non-traditional HEIs have created personnel categories that allow them to keep such lecturers, as an integral part of their staff without subjecting them to a research requirement, as Study 3 reveals. This can be interpreted as a consequence of the structures favoring teaching and the reported limited individual ambidexterity. Additionally,

Study 3 shows that Swiss non-traditional HEIs are also carefully maintaining a direct link to practice through their staff by other measures. E.g., where university graduates are needed because of their research competence, they are introduced to applied research and the relevant industry through third mission activities. Some HEIs also provide newly appointed lecturers with research associates that are familiar with the acquisition of third-party funded research. This commitment to practice-relevance is also clearly evident in the results of the document analysis of Study 1, where many institution-specific mission statements refer to this distinguishing feature.

Despite the observed post-Humboldtian tendency, an Humboldtian elite or core that is active in both areas has been established and fostered. The sampled HEIs have at least partially done so by accepting academization, which enables them to compete with research universities for research funds and to follow state incentives designed to support a meaningful research-teaching nexus at the individual level. However, the situation does not allow HEIs to fully take advantage of incentives aimed at employing lecturers in a balanced manner in both research and teaching.

The evidence contained in this dissertation suggests that the transformation of Swiss non-traditional HE is occurring primarily as planned change, following the logic of "initiatives guided by formal leaders" (Dee et al., 2023, p. 6), rather than as emergent change materializing from the grassroots level (Dee et al., 2023). The realignment with new priorities is a type of second-order change that carries risks and can invite resistance (Bartunek & Moch, 1987). However, in the case of Swiss non-traditional HE, there is no evidence that organizational change is failing to achieve the expected results, as often observed in HE transformation according to Kezar (2018).

In the pursuit of organizational ambidexterity in Swiss non-traditional higher education, individual ambidexterity does not seem to be as crucial as it is in the corporate context, where it is seen as key (Schnellbächer et al., 2019). This confirms the statement by

Kobarg et al. (2019) that generalizing findings from the corporate sector to other contexts might be problematic. The current conditions under which the sector operates, akin to those found in other national HE contexts, lead non-traditional HEIs to disintegrate research and teaching at the individual level. In striving for organizational ambidexterity in research and teaching, HEIs build structures that rely only to a limited extent on individual ambidexterity. This solution enables them to address tensions and dilemmas often associated with adding research to a HEI's mission (Kyvik & Skodvin, 2003), as well as to resolve conflicts that can arise between transformational change and long-standing institutional missions and values (Dee et al., 2023). Individual ambidexterity is only required from a Humboldtian core of lecturers, which is increasingly academized. The findings in this dissertation therefore partially confirm research by Ziegele et al. (2019) and Hachmeister et al. (2015), who also observed an academic shift in German non-traditional HE.

6.2 Limitations

While this dissertation provides a comprehensive analysis of the response of Swiss non-traditional HEIs to the need to become ambidextrous in research and teaching, it is essential to recognize the inherent limitations that may affect the interpretation and generalizability of the findings and thereby enhance the scholarly value of this dissertation. This section outlines the key limitations encountered during the research, including methodological constraints, data-related challenges, and potential biases.

Several limitations arise from the nature of the data used. One significant potential limitation is the tendency for self-enhancement among individuals (John & Robins, 1994), which could bias the self-reported quantitative data extensively used in this research. The data also contain measures that specified durations of time containing a degree of arbitrariness. It cannot be ruled out that longer or shorter durations would have influenced the results.

Further limitations related to the data impact the generalizability of the findings. The sample on which the qualitative data are based, represent only two subject areas. This limited scope necessitates caution when making generalizations. Furthermore, while country-specific samples are essential for investigating a national HE system, they pose challenges for broader generalizations without careful consideration. A methodological limitation that might additionally affect the generalizability of the findings is associated with data-based typologies. They carry an inherent risk of not fitting other, similar datasets (Lepori et al., 2017). Consequently, the typology developed in this dissertation may not be applicable to other contexts, such as different countries or HE sectors, and attempting to generalize it could lead to erroneous conclusions.

6.3 Concluding Remarks, Future Avenues of Research, and Implications

This dissertation has put a spotlight on the trend to a post-Humboldtian configuration of the non-traditional university sector in the binary Swiss HE system. The transformation of former post-secondary institutions providing higher vocational training has resulted in HEIs whose organizational ambidexterity is not primarily based on individual ambidexterity, as suggested by the Humboldtian ideal. Currently, Swiss non-traditional HE is a de facto post-Humboldtian sector with a Humboldtian elite or core that is active in both areas of research and teaching. This allows HEIs to do no less than three important things. Firstly, they can at least partially follow state incentives designed to support a meaningful research-teaching nexus at the individual level. Secondly, they can compete for third-party research funds, which not all lecturers, especially the ones with weaker academic backgrounds, are able to secure. And thirdly, they can maintain a stronger connection to practice than would be possible by relying solely on functionally ambidextrous lecturers. The HE sector-specific requirement to be practice-oriented and primarily active in applied research does not allow for a complete

academization of lecturers at UTEs and UASs, however it is accepted to a degree and even used to build research capacities.

Swiss non-traditional HEIs have found solutions that allow them to fulfill their mission in a post-Humboldtian configuration. The majority of the solutions are structural in nature and seem to address the structural problems that are reported by lecturers. Thus, the potential for a broad short- to medium-term improvement at the meso level regarding the suitable configuration and conduct of research and teaching activities in the non-traditional HE system can be assumed.

The role of the third mission in creating an ambidextrous organization in HE has also been revealed through this dissertation. Younger, research-affine, and research competent staff with degrees from traditional universities are introduced to relevant industries and acquainted with practical problems, which enables them to conduct meaningful applied research. At the same time, third mission activities are used to maintain ties to the industry by utilizing the knowledge and networks of often older and less research-affine lecturers with weak academic track records. This supports the required strong links between practice-orientation and a scientific foundation in the education of students at non-traditional HEIs. It also helps to alleviate the tensions that Dee et al. (2023) describe when transformational change and the commitment to historic institutional missions and values are in conflict. In addition, the observed practices involving the third mission's role in creating ambidextrous HEIs might also lead to a lasting change in the understanding of what competences lecturers in Swiss non-traditional HE need to have.

In order to make a definitive judgment on the state and form of the organizational ambidexterity of Swiss UASs and UTEs and to confirm the findings in this dissertation, future avenues for research regarding the post-Humboldtian configuration in the non-traditional HE sector of Switzerland can be suggested here. One avenue should lead to broadening the knowledge regarding less studied fields like social work, health care, and the arts. Even though

they principally face the same challenges as the fields featured in this dissertation, differences in their proximity to practice and industry, the typical qualifications of lecturers, research opportunities, and other aspects may lead such HEIs to adopt different solutions than the ones observed through the research for this dissertation. Another promising avenue for future research could be the deeper study of HEIs' usage of the third mission in managing research and teaching at the individual as well as the organizational level. Comparative research on the non-traditional and traditional university sectors regarding this topic could lead to interesting contributions to the existing research on HE differentiation.

Lastly, this dissertation also contains indications that HEIs do not uniformly adhere to state incentives aimed at employing lecturers with a meaningful research-teaching nexus in the pursuit of their teaching and research mission. Future research should delve into the reasons behind the varying responses to state incentives and explore the resulting advantages and disadvantages that HE management must balance. Gaining deeper insights into these dynamics could inform improvements in HE systems and the policies that support them.

The findings of this dissertation offer significant insights into the practice of transforming and managing non-traditional HE in Switzerland, providing a deeper understanding of how ambidexterity at both the institutional and individual levels is achieved and maintained. Some implications for policy and practice can be derived from this. However, evidence-based predictions on the implications are only feasible for the present or short term because the sector is characterized by dynamic social and economic developments, making accurate mid- to long-term predictions challenging. One of the more evident implications for practice is that management of HEIs must align organizational and institutional structures with the research mission. In this necessary process, academization has to be accepted and shaped according to context-specific needs. The profile-specific requirement to provide practice-relevant teaching demands structures that have to be specific and carefully build and maintained in light of the academization trend. This makes management at the meso and micro levels

challenging. Intra-institutional tensions will have to be addressed with deliberate measures at the central and decentral levels of HEIs.

Coupled with other challenges such as decreasing student numbers and budgetary constraints, the mentioned implications could create an environment that is ripe for innovative ideas. A relatively immediate solution could be the retention of more graduates of non-traditional HEIs. They have experienced the balancing act between the professional and academic worlds, which makes them ideal candidates to uphold the mission of the new HE sector and shape its fulfillment. While such a fundamental decision requires the commitment from top management in decentralized units as well as from centralized decision makers, it must be implemented by middle management in the decentralized units in a way that is appropriate for them. The HR department will also play a decisive role, as it ultimately has to find the right talents and influences personnel selection decisions.

From a policy perspective, supporting the increased retention of graduates from non-traditional HEIs to enhance organizational and individual ambidexterity could involve facilitating the promotion of researchers and teachers from the new HE sector. This could be achieved by granting UASs and UTEs the right to award doctorates or by improving cooperation between the binary sectors through political pressure and measures. Additionally, improving ambidexterity at the meso and micro levels may include seeking more specific state incentives that support the teaching and research missions of non-traditional HEIs, acknowledging their distinct needs compared to traditional or research universities. The current incentives reinforce a Humboldtian ideal, which might not be suitable for non-traditional HE.

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Appendix

Semi-structured questionnaire

Aufnahme starten! Start recording!

English	Deutsch
For how long have you been director of your department?	Wie lange sind Sie schon Direktor/in?
1. Does your department expect all employed regular lecturers (excluding research associates/external lecturers) to be active in research and teaching? (From our survey, we know that 71.4 % of lecturers feel that way.)	1. Erwartet ihr Departement von allen angestellten Dozierenden (ohne WiMas und externe Doz.), dass sie aktiv in Forschung und Lehre sind? (71,4 % in der Dozierendenbefragung bejahten dies.)
If yes: o How is the expectation communicated? o Can lecturers decide how much of each activity they want to do (discretionary teaching-research nexus) o How are parallel activities in teaching and research facilitated? o Professorships awarded for teaching-only (title not function)? o What is the percentage of lecturers that fulfil the requirements of the SERI (SBFI) 50-20-20 financial benefits? ▪ The average percentage for your UAS is xx % (calculated from SERI	Falls ja: o Wie wird diese Erwartung kommuniziert? o Können Dozierende nach eigenem Ermessen festlegen, wie viel Forschung und Lehre sie machen möchten? o Wie werden parallele Tätigkeiten in Forschung und Lehre von der Hochschule unterstützt? o Können Dozierende ohne Forschungstätigkeit eine Professur FH erlangen (Titel nicht Funktion)? o Welcher Prozentsatz der Dozierenden erreicht die 50-20-20 Kriterien des SBFI (SEFRI) für die Bemessung des Grundbeitrags für den Wissenstransfer?

data). How does that compare to your department? If no: ○ How are individual research and teaching activities organized? ○ Who does both research and teaching? ○ Can lecturers change from research to teaching and vice versa? ○ Can teaching-only lecturers become professors? ○ What about the SERI 50-20-20 incentive, is your department/UAS forgoing the financial benefits of this rule? ○ Did this solution create any new tensions or conflicts, e.g. between researchers/teachers?	▪ Der durchschnittliche Prozentsatz für Ihre FH beträgt xx % (Grundlage SBFI Daten). Wie steht ihr Departement im Vergleich dazu? Falls nein: ○ Wie wird die individuelle Tätigkeit in Forschung und Entwicklung organisiert? ○ Wer macht beides, also Forschung und Lehre? ○ Können Dozierende von der Lehre in die Forschung und umgekehrt wechseln? ○ Können Dozierende ohne Forschungstätigkeit eine Professur FH erlangen? ○ Verzichtet die Hochschule nicht auf finanzielle Mittel, wenn Dozierende nicht in Forschung und Lehre tätig sein müssen? ○ Hat die Regelung, dass grundsätzlich nicht gleichzeitig geforscht und gelehrt werden muss, zu neuen Konflikten oder Spannungen geführt? Z. B. zwischen Forschenden und Lehrenden?
2. What's the origin of the idea that UASs should conduct research and teach at the same time?	2. Wo liegt der Ursprung der Idee, dass FHs gleichzeitig Forschung und Lehre betreiben sollen?

○ Why on the individual level (according to Humboldtian model)? ○ Do you feel that the HE reform that created UASs/UTEs took an idea from the traditional university system and imposed it on the new HEIs? ○ Does the research-teaching mandate or the current law HFKG allow for diverse institutional solutions regarding the organisation of the two areas? ○ Are there any requirements other than the SERI 50-20-20 criterium that lead you to require research and teaching from lecturers (e.g. accreditation, personal expectations from lecturers)?	○ Warum wird das auf der Individuellen Ebene gemacht (gemäss dem Humboldt'schen Modell)? ○ Finden Sie, dass die Hochschulreform aus welcher FHs/PHs hervorgegangen sind, die Idee Forschung und Lehre auf individueller Ebene anzusiedeln von den Kantonalen/traditionellen Universitäten genommen hat und sie FHs/PHs überstülpt hat? ○ Erlaubt der zweifache Leistungsauftrag diverse institutionelle Lösungen hinsichtlich der Organisation von Forschung und Lehre? ○ Gibt es ausser des 50-20-20 Kriteriums des SBFI noch andere Anforderungen, welche sie dazu veranlassen Forschung und Lehre auf der Ebene der Dozierenden anzusiedeln (z. B. Akkreditierungen, Erwartungen von Dozierenden, interne Regeln)?
3. What are the tensions, conflicts, and dilemmas of the teaching and research mission on the institutional and the individual level at your department?	3. Was sind an Ihrem Departement auf individueller und institutioneller Ebene die Spannungen, Konflikte und Dilemmas der zweifachen Leistungsauftrages Forschung und Lehre zu betreiben?

4. What are the solutions to solve the tensions and dilemmas in general, for your department/UAS? a. Internationally, there were already tendencies to hire full-time lecturers as teaching-only, sometimes limited to introductory courses or research-only about 20 years ago (see Finkelstein, 2003). Is that something your department is doing as well, maybe for other reasons than reducing the tensions between research and teaching? b. Do you have different personnel categories for lecturers, e.g., for researching lecturers and teaching-only lecturers, c. any changes to the "Personalverordnung" (engl.: Personnel Ordinance/ Personnel Regulation/ Staff Regulation; franz.: Ordonnance sur le personnel) that have influenced the teaching-research nexus. d. For how long have you been using this Personalverordnung (Staff regulation)? e. Do you have a strategy to solve the problems at your department?	4. Was sind die Lösungen um die Spannungen, Konflikte und Dilemmas im Allgemeinen und spezifisch an Ihrem Departement? a. International gibt es schon seit 20 Jahren Tendenzen, Dozierende anzustellen, welche ausschliesslich in der Lehre bzw. in der Forschung tätig sind (siehe Finkelstein, 2003). Wird das an Ihrem Departement auch gemacht, evtl. wegen anderer Gründe als die Reduktion von Spannungen zwischen Forschung und Lehre? b. Haben Sie an Ihrem Departement verschiedene Personalkategorien für Dozierende, z.B. für Forschungsdozierende und Dozierende die nur in der Lehre tätig sind? c. Gibt es Veränderungen in der Personalverordnung, welche die Verbindung von Forschung und Lehre beeinflusst haben? d. Seit wann benutzen Sie die jetzt gültige Verordnung? e. Haben Sie eine Strategie am Departement, um Spannungen zu lösen?
5. How does your department make sure that lecturers are scientifically and	5. Wie stellt Ihr Departement sicher, dass Dozierende in Bezug auf Praxis, Lehre

professionally/practice-wise on a sound basis? a. Do you qualify your lecturers? How? b. When recruiting new lecturers, do you prefer PhDs to other (lower) qualifications due to the research abilities of the degree holders? c. What is the approximate percentage of lecturers with a PhD? d. Is it a problem, that UASs are not allowed to grant PhDs/would it be easier to find ambidextrously qualified lecturers?	und Wissenschaft gute Qualifikationen bzw. Kompetenzen haben? a. Qualifizieren Sie Ihre Dozierenden? Falls ja, wie? b. Wenn Sie neue Dozierende anstellen bevorzugen Sie dann Doktorierte ggü. tiefer qualifizierten, weil sie ausgewiesene Forschungskompetenzen haben? c. Was ist der ungefähre Anteil Doktorierter an Ihrem Departement? d. Ist es ein Problem, dass FHs/PHs kein Promotionsrecht haben? Wäre es sonst einfacher “ambidextere” Dozierende zu finden?