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Digital Academia. Investigating Science and Higher Education in the Digital Age / Digitale Transformation in Forschung und Hochschulbildung erforschen / Étudier la transformation numérique dans la recherche et l'enseignement supérieur

Edited by Philippe Saner, Luca Tratschin, Christian Leder, and Katja Rost

Seismo

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Inhalt / Sommaire / Contents

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Introduction to the Special Issue: Digital Academia. Investigating Science and Higher Education in the Digital Age

Einleitung zum Sonderheft: Digitale Transformation in Forschung und Hochschulbildung erforschen

Introduction au numéro spécial : étudier la transformation numérique dans la recherche et l'enseignement supérieur

Philippe Saner*, Luca Tratschin**, Christian Leder**, and Katja Rost***

1 Introduction[1]

The digital age has transformed many aspects of contemporary life, and academic work is no exception – just envision the manifold activities revolving around issues such as open science, digital skills, and the data sciences. The everyday use of digital technologies and the political discourse on digitalization have become pervasive in research and higher education. This special issue brings together articles that examine various aspects of digital academia, from the emergence of new research fields to the organizational transformation of universities and the use of social media in academic communication. By incorporating various sociological perspectives, this volume contributes to a deeper understanding of digital technologies' roles in shaping the present and future of science and higher education. While this special issue encompasses various perspectives, it focuses on the case of the Swiss higher education system. From our perspective, the contribution and added value of this volume are threefold. It probes the fruitfulness of approaches to the digitalization of research and higher education, focusing on the case of Switzerland. Second, it offers empirical insights that are not only relevant from a sociological standpoint but also can provide orienting knowledge for actors in the Swiss higher education and research system. Finally, the special issue offers perspectives and foundations for further comparative studies that reach beyond Switzerland. In this introduction, we frame this issue in a broader and more conceptual way to provide context for its

1 The authors gratefully acknowledge support from the Swiss National Science Foundation (NRP 77 Digital Transformation, Project Number 197506).

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individual contributions and hint at fruitful perspectives and avenues for further research on digital academia for the Swiss case and beyond.

We conceive of digital academia as the entanglement of various practices, discourses, forms of expertise, and institutional arrangements, as well as of actors, interests, strategies, and power relations concerning the development, dissemination, and use of digital technologies in science and higher education. In our perspective, this concept encompasses several sociological inquiry levels. The *first* level, a macro perspective, involves studying science and higher education as social systems that are embedded in broader society and that have established their modes of communication and observation as well as institutions of self-governance. This includes the specificities of national research and higher education systems and their transformation through digitalization. *Second*, we consider a field perspective to be important, one that focuses on the level of disciplines and specialties in the science system (Jacobs 2014). The emergence of new scientific fields, such as digital humanities or data sciences, as well as the transformation of existing disciplines and research practices, including computational biology or digital sociology, closely relate to the digital transformation of science. The *third* level is the organizational perspective, in which we focus on universities and other research and higher education institutions that digital tools, devices, and platforms affect, but that simultaneously have actively contributed to the further development and dissemination of such sociotechnical systems. *Finally*, a micro perspective involves examining the experiences of researchers, teachers, and students who are challenged by new forms of digital teaching and learning, changing scientific methods and modes of knowledge production, and demands for communication and visibility of research results and publications through social media and other platforms. New digital learning opportunities and changing skill demands in labor markets require higher education organizations and national education policies to monitor and adapt to these developments.[2]

Although we cannot address this broad topic in every detail, we briefly highlight some of the analytical insights we draw from the current state of the sociological study of the digitalization of science and higher education:

First, we note that digital transformation further increases existing forms of competition over status and reputation between universities (Brunsson and Wedlin 2021; Krücken 2021), but also between higher education and research systems due to large investments in sociotechnical systems such as artificial intelligence (AI) by corporations, nation-states, universities, and other organizational actors worldwide. The results of current research suggest that these trends will continue or even soon accelerate, with proclamations of a "global race" for technological innovation in scientific fields and higher education fueling them. However, the increased impor-

2 For a similar (albeit not identical) perspective regarding the general study of the Swiss higher education system, see the position paper, "Producing and sharing knowledge on the Swiss higher education and science system" by the network called Research on Higher Education and Science (REHES) (Tratschin et al. 2020).

tance of competition does not mean that cooperation is becoming less significant. While competition and cooperation clash in some cases (Musselin 2019), cooperation can be understood as a behavioral strategy in competitive settings (Musselin 2019; Arora-Jonsson et al. 2020). Thus, competition and cooperation interrelate in complex ways and should be investigated accordingly.

Second, these investments in science and higher education, together with the underdetermined, ambiguous nature of the notion of digitalization (see section 1), open new spaces and opportunities (Eyal 2013) – for example, for alliances between universities and their environment, as well as for new actors in digital higher education. As our examples and the contributions to this special issue show, actors in universities and disciplines succeed in institutionalizing new fields when they manage to establish concepts that are broad enough to include actors from inside and outside their organizations or research communities. Thus, participants in these spaces do not necessarily need to share a common understanding, but rather need to be committed to the institutionalization of such new forms and activities (Tratschin 2021; Saner 2022).

Third, by understanding digitalization as a transversal issue that transcends multiple fields of knowledge, we point to the emergence of new interdisciplinary fields as well as processes and practices of boundary work and boundary crossing (Gieryn 1983; Lamont and Molnár 2002) at various levels in the academic world. This includes increasing collaboration between not only universities and their environments, as mentioned above, but also disciplines and scholars in different research fields, leading to new practices and modes of knowledge production, which digital tools and platforms often enable. We will elaborate on these general analytical insights in the introduction by reviewing recent social science research on the digital transformation of academia and by drawing on the results of our projects and their contributions to this special issue.

The articles collected in this volume address these general insights in various ways. As mentioned, they all focus empirically on digital academia in the Swiss context (and in one case, in German-speaking countries), but they also reflect on this sociotechnical transformation's broader implications. We do not claim that the observations in this introduction are universally valid for all higher education and research systems: Most of the work we review here is based on research conducted by scholars from the Global North, that is, Europe, North America, and Australia. While some of these studies are relevant to developments and experiences in science and higher education in the Global South, we recognize that our focus has certain limitations.

Therefore, in this extended introduction, we review and discuss only a small selection of recent works on the digitalization of higher education and research in sociology and higher education research. In *section 2,* we discuss the digital transformation of higher education and research from a discursive perspective. In *section 3,*

we emphasize the changing boundaries of knowledge production. In *section 4,* we investigate the emergence of new fields and the transformation of existing disciplines and research practices. In *section 5*, we review universities' and other higher education organizations' digital activities and organizational efforts as well as the opportunities and challenges induced through these changes. In *section 6*, we shed light on new learning opportunities and changing skill requirements that are articulated in higher education and labor markets in the digital age. In the concluding *section 7,* we briefly introduce the five contributions to this special issue.

2 Digital Transformation as a Societal Discourse

In many areas of society, digitalization is seen as a fundamental change. The central buzzwords of "big data," "artificial intelligence," "blockchain," "quantum computing," or "cybersecurity" are treated as expressions of digitalization in the societal debate. Digitalization and its associated technologies are considered major challenges with disruptive potential – for instance, regarding labor markets and higher education – but are also associated with opportunities. A recent example is the discussion of large language models, such as ChatGPT, whose societal potential and dangers have also been discussed in terms of education (Kasneci et al. 2023) and research (Kalla and Smith 2023).[3] The discussion of individual technologies such as ChatGPT is embedded in a broader discourse on digitalization being conducted in the public as well as in the business community or in government strategies. Digitalization has thus become one of the central self-descriptions of present society. This discourse on comprehensive societal change, which is condensed in the concepts "digital transformation" or "digitalization" and is associated with new technological capabilities and solutions, is of a rather recent nature, although modern society has been using computer technology for many decades with great implications (Gugerli 2022). Taking the literal meaning of "digitization" – that is, the transformation of analog into digital values – one can conclude that the digital age started at the latest with the invention and diffusion of computer technology in the mid-20th century. Therefore, the distinctive attribute of the present is obviously not that society is experiencing digitalization (of analog values) for the first time. Of course, we concede that computer technology has greatly developed since its invention and that it certainly has gained momentum with greater penetration of everyday life in the form of laptops, smartphones, and wearables, as well as the associated increase in the production and availability of data. Therefore, we do not argue that there is nothing new occurring or claim even that modern society has always been digital in some sense, as Armin Nassehi (2024) elaborated in his much-discussed book "Patterns: Theory of the

3 Crompton and Burke (2023) discuss the implications of AI technologies for higher education more generally, as do the contributions in Roumate (2023) for scientific research.

Digital Society." However, a distinctive feature of the present digital transformation lies in that society has begun to describe itself in terms of the digital, with effects on various societal sectors such as politics and higher education. In our perspective, the issue of digitalization shares some commonalities with other publicly discussed terms such as globalization: Although the globalization of the 1990s certainly was not the first globalization process in human history, it was the first era in which society created a word to describe this reality of extending patterns of communication, trade, and travel (cf. Vobruba 2009).[4] Similarly, modern civilization has conferred new meaning to the phrase "digital transformation" and organized a discourse of societal emergency around it. This has led to a common belief that digital transformation "changes everything" and that digital transformation will create a completely new world order – a one-for-one disruption of old by new – as more data, connectivity, and digital intelligence eradicate global boundaries and upend the old order. However, while the distance-diminishing effects of digital technologies blur national boundaries, national borders often coincide due to language, culture, regulatory frameworks, or sticky knowledge. Both effects apply to the higher education system, which has always been globally situated but the transmission of tacit knowledge maintains it as do people instead of tools.

Universities have been a relevant context for developing and diffusing digital technology since the mid-20th century. In the 1950s, when software had not yet been considered a product, companies and universities developed software together according to cooperative academic principles (Schrape 2021, 128). In Switzerland, the ETH in Zurich was relevant to the early years of computer research (Nef and Wildi 2007), and it was not without reason that IBM decided to establish its first research center outside the United States in the Zurich region in 1956. In the 1960s and 1970s, Stanford University and the Massachusetts Institute of Technology (MIT) played important roles in the rise and success of two major technology regions in the United States: Silicon Valley and Route 128 in Massachusetts (Saxenian 1996). Subsequently, university students and researchers have contributed to the proliferation and development of Internet-related software. Overall, universities and research institutions have been central actors in developing digital technology for decades. In addition, universities not only contribute to the research and development of computer technology, but they are increasingly incorporating digital technologies into their teaching and administrative activities, leading to contemporary universities' varying "degrees of digitization" (Selwyn 2014). For example, they have adopted learning management systems such as Moodle, ILIAS, or OLAT, some of which were developed as spin-offs from academic teaching and research activities; they have established institutional repositories for research publications; and they have implemented enterprise resource-planning software such as SAP. More recently, because

4 For instance, digital technologies for distance education were associated early on with the paradigm of neoliberal globalization (Clegg et al. 2003).

of the COVID-19 pandemic, universities invested heavily in video telephony and online chat software such as Zoom, Microsoft Teams, or Cisco Webex to cope with the social distancing measures public health authorities implemented (Williamson 2021a; Bolin 2022).

However, with the recent rise of the discourse on digital transformation, universities are expected to address this issue and the challenges and opportunities associated with it more explicitly in areas such as research, teaching, or administration. Universities respond to this expectation by increasing and showcasing activities that can be meaningfully connected with the issue of digital transformation (Selwyn 2014). To boost research capacities, the create new competence centers and chairs dedicated to topics such as digital law, digital marketing, or digital religion, while their students learn digital skills and study for degrees in the digital humanities, data sciences, or computational social sciences. As organizations, they adopt digital strategies, create digital transformation offices, and appoint vice presidents for digital transformation. Therefore, the issue of digital transformation has certainly already influenced the university landscape. While universities are, of course, well known to absorb many issues that circulate in their environments in some way, it is quite striking how comprehensively the issue of digital transformation has been addressed. Universities not only acknowledge the issue through selected activities but tend to highlight the issue and bundle many activities through strategy papers and other forms of public self-presentation, thereby implying or stating they, in fact, are digital universities – such as the University of Geneva did in their digital strategy (2018, 2019). Digital transformation seems to be an issue that not only affects certain areas and groups in universities – which may have been the case with topics such as bio- and nanotechnology (Biniok 2013; Bartlett et al. 2018; Ribeiro et al. 2023) – but possibly extends to the whole of an organization in nearly all its activities. Digital transformation has implications for universities as organizations and is considered a matter of strategic positioning (Tratschin et al., this issue).

3 Digital Transformation Changes the Boundaries of Knowledge Production

Beyond society's self-description, digital transformation has facilitated new forms of knowledge production (Nowotny et al. 2003) in various fields outside academia, such as business, state administration, rating agencies, think tanks, and many more. Digital technologies have reconfigured key practices of the academic field: In research, building on web-crawling and bibliometric analyses, digital tools and platforms continuously and automatically monitor and assess scientific endeavors and their output (Burrows 2012; Franzen 2018), leading to new forms of digital visibility, accountability, and (e)valuation. Private and for-profit actors own and control many of these services, such as Altmetrics, ResearchGate, and Google Scholar. While some

observers point to the democratizing and inclusive effects of opening the scientific field (cf. Dickel and Franzen 2015), others point critically to new forms of forced flexibility, control, and surveillance (van Dijck 2014; Desrochers et al. 2018) that emerge in digital academia.

Digital infrastructures allow academics to make scientific data and publications widely available (e. g., open data and open access) (Franzen 2018; Plantin et al. 2018). Although some of these platforms originated in open science movements aimed at democratizing scientific research, science and research funding agencies have partially incorporated these instruments into their funding requirements (e. g., through mandatory data management plans and open-access clauses). This institutional arrangement of transparency, accessibility, and accountability also reinforces the role of rankings (Espeland and Sauder 2016) for scientific institutions through the increasing availability of various data sources and their linkages, leading to new forms of competition over status and reputation (Brankovic et al. 2018; Brunsson and Wedlin 2021; Krücken 2021). Further research is needed to investigate whether this new visibility regime increases pressure on researchers at the individual level (Frey and Rost 2010). The immediate transition to remote communication through digital infrastructures during the COVID-19 pandemic also raises questions about the social, economic, and environmental costs of face-to-face scientific conferences. Digital technologies enable research collaborations that might alter previous ways of building trust and agreement through face-to-face interactions (Collins et al. 2023). At the same time, new forms of collaboration between scientists and amateurs have emerged in citizen science (Franzen 2019; Franzen et al. 2021) and crowd science (Franzoni and Sauermann 2014) projects, which digital platforms and research tools often enable. Researchers and research institutions are increasingly required to present and communicate their activities publicly, both in traditional formats and on social media (Fürst et al., this issue).

In higher education, the digital transformation is inherently connected to the rise of digital platforms for learning, teaching, research, university management, and other activities. New ecosystems of digital platforms in higher education entail the marketization and commodification of higher education data, for example, by automatically measuring and evaluating students' performance data in learning analytics systems (Komljenovic 2022; Williamson and Komljenovic 2022). The COVID-19 pandemic and its subsequent university closures further exacerbated these trends, as higher education institutions, teachers, and students globally were forcefully moved to online modes of interaction (Stanisavljevic and Tremp 2020), giving way to forms of "emergency digitization" of higher education (Cone et al. 2022). This was only possible through the widespread use of video-based teaching, teaching forums, chats, messaging services, and tutoring and examination systems. While some of these services and platforms originated in the fast-growing EdTech industry, others have been repurposed for educational contexts and higher educa-

tion institutions, including the particularly successful services of Zoom and MS Teams. Some observers have commented on this as the "uberisation" (Bolin 2022) or platformization of higher education (Williamson 2022). In parallel, new forms of knowledge certification have emerged beyond universities and other higher education institutions (e. g., Google Diplomas, massive open online courses [MOOCs], or open educational resources). This has led to a partial loss of state regulation of the access, quality, and value of university education as well as the resulting degrees (van Dijck and Poell 2015; Selwyn et al. 2015).

The diffusion of digital technologies, algorithms, and platforms in higher education over the last two decades has been associated with several new actors within and outside academia, including for-profit universities, EdTech start-ups (partly spin-offs from traditional universities, e. g., Perusall), big tech companies (e. g., Google Classroom, Microsoft Education), knowledge providers (e. g., Pearson Inc.), and venture capital firms (e. g., Emerge Education) (Siemens et al. 2015; Williamson 2017; 2018: Jarke and Breiter 2019; Williamson 2021b; Williamson and Komljenovic 2022). These organizations act as forerunners in the digital transformation of science and higher education, in collaboration with and supported by government agencies, international organizations, and think tanks (Förschler 2018; Getto and Kerres 2018; Williamson 2021a). Drawing on the narrative of disrupting education and knowledge production in the 21st century (Selwyn 2013), these new actors in higher education particularly influence the defining perspectives on what constitutes digital (higher) education, for example, through new methods and techniques of data collection and analysis, such as learning analytics systems. Beyond these material investments and financial commitments in sociotechnical systems, they have created and promoted future visions of digital (higher) education in the 21st century through white papers, media reports, policy documents, and social media activities. These include discourses of digital re-schooling (such as 21st-century skills or 4 Cs: critical thinking, creative thinking, communicating, and collaborating; see section 5) as well as of de-schooling (self-empowered learning, MOOCs, etc.) (Selwyn 2013; Saner 2019; Bolin 2022; Williamson and Komljenovic 2022). By formulating such promising futures and referring to each other's visions, they help coordinate these conceptions of digital education's discursive field and thereby shape its further development.

4 The Emergence of New Fields and the Transformation of Existing Disciplines and Research Practices

Digital transformation has led to not only structural changes at the societal level but also the proliferation of new scientific fields, disciplines, and specialties (cf. Jacobs 2014) as well as the transformation of existing ones. As sociological studies

of science and research have shown, the emergence of new fields of research and knowledge is characterized by seemingly contradictory processes of differentiation and specialization and, in contrast, recombination and aggregation (Biniok 2013; Stichweh 2013; Merz and Sormani 2016): New sub-disciplines and specialties differentiate themselves through conceptual emphases and methodological innovations, thus they hardly show any content-related references to each other. Disciplines are the sum of differentiated specializations (Campbell 1969; Lemaine et al. 1976; Stichweh 1979). The internal differentiation of science is also a mechanism by which the field responds to strong growth and increasing competition in heavily researched areas (Weingart 2001).

In this sense, there is nothing new in that the scientific field constantly produces new differentiations, disciplines, and specialties. However, the digital transformation of knowledge production, particularly the emergence of vast amounts of scientific data, immense computing capacities, and algorithmic procedures for their analysis, has accelerated change and the emergence of new (sub-)disciplines. Following Kuhn (1996), Hey et al. (2009) identify a fourth paradigm in these changing conditions of scientific knowledge production. This paradigm denotes an epochal shift in knowledge production, which was previously based on experiments (experimental science), models and generalizations (theoretical science), or simulations (computational science) toward an "exploratory science" (Kitchin 2014, 3).

In this context, several new fields of knowledge have emerged, including the data sciences (Brandt 2016; Saner 2019; 2022; Prietl and Raible, this issue), the digital humanities (Antonijević 2015; Klein 2015; Piotrowski and Kemman, this issue), and the computational social sciences (Lazer et al. 2009; Alvarez 2016; Lazer et al. 2020). These new fields combine disciplinary knowledge, theories, and expertise with new methods of data collection, storage, and analysis, mainly from statistics and computer science, a process through which the digitalization of scientific research in the second half of the 20th century facilitated. Several recent studies emphasize the role of boundaries and boundary work in the emergence of these fields, for example, for the data sciences (Saner 2022; Prietl and Raible, this issue) and the digital humanities (Klein 2015; Piotrowski and Kemman, this issue). Boundary work describes the symbolic and social demarcation of boundaries (Lamont and Molnár 2002) between scientific and non-scientific fields as well as within scientific disciplines and professions (Gieryn 1983; 1999; Klein 2015). Interdisciplinary fields are founded on permeability and the crossing of boundaries of people, ideas, methods, and epistemic practices. However, at the same time, new fields of knowledge compete with existing disciplines for resources, personnel, and space in universities (Merz and Sormani 2016), often resulting in "disciplinary turf wars" (Ribes 2019, 515; Abbott 1988).

Such new fields are often undetermined or underdefined (Piotrowski and Kemman, this issue) and therefore, they offer promising "space[s] of opportunities" (Eyal

2013, 177; Saner 2022) for various actors across social fields and scientific disciplines. Their institutionalization relies on building networks across scientific disciplines and academia to generate media attention, research funding, and demand from non-scientific employers. Although data science has been rapidly institutionalized in many universities globally over the past decade, this seems a much more difficult endeavor in the case of the digital humanities. For the latter, interdisciplinarity can be a major obstacle to its widespread adoption and institutionalization (for the Swiss case, see Piotrowski and Kemman, this issue).

In addition to the emergence of new research fields, we witness the digital transformation of existing scientific disciplines, such as precision or personalized medicine (Trajanoski 2012; Hoeyer 2019), data-centric biology (Leonelli 2014; 2016), and big-data physics (Bartlett et al. 2018). Similar to previous cases, the exponential growth of data (e. g., at CERN [European Organization for Nuclear Research] or in the Human Genome Project) and the new computational tools and methods required have fundamentally modified the way knowledge and insights are produced (Kitchin 2014; Leonelli 2014). Nevertheless, as Bartlett et al. (2018, 3) argue, "the computational aspect in biology and physics is often subjugated as a tool, a service even, to be used by those with disciplinary grounding in the sensibilities of their discipline." In the digital humanities and social sciences (Burrows and Savage 2014; Halford and Savage 2017) but also in the data sciences (Ribes 2019), struggles and conflicts over the "locus of legitimate interpretation" (Collins and Evans 2007, 120; Bartlett et al. 2018) of the central research objects can be observed between the disciplines involved. Research in the computational biosciences points to a further collaborative change in the division of scientific labor (Bartlett et al. 2018; Ribeiro et al. 2023). The widespread use of advanced digital tools and devices, such as robots, AI-assisted data analytics, and machine-learning algorithms, has significantly changed laboratory work in various scientific disciplines. The persistence of so-called mundane knowledge work has led to a digitalization paradox: Although laboratory robots and algorithmic data analysis should enable the automation of manual (e. g., pipetting) and repetitive scientific practices, they have conversely created various other routine activities for which they offer no replacement (e. g., maintenance of laboratory robots) (Ribeiro et al. 2023).

5 Digital Transformation of Higher Education Organizations

The relevance attributed to digitalization in higher education systems is mirrored in the activities of higher education organizations (Hassan 2017; Barton et al. 2019; Gilch et al. 2019; Henke and Pasternack 2020). Globally, universities declare digital transformation as a major strategic and operational issue (Getto and Kerres 2017): "In recent years, universities worldwide have been experiencing rapid impactful

changes, which are influenced by technological advancement and social e-trends towards digitalization. Like all other revolutionary changes, digital transformation involves intense adjustment/re-adjustment" (Hashim et al. 2022, 3172). Therefore, universities as organizations are adapting to the digital transformation and showing initiative in addressing the issue. For example, MIT launched the MIT Initiative on the Digital Economy (MIT Initiative on the Digital Economy 2020), while Brown University launched the Brown University Digital Transformation Project (Brown University 2021). King's College London also established a Centre for Digital Culture (King's College London 2021), and the University of Zurich launched a Digital Society Initiative (Digital Society Initiative 2019). Some universities in the Global South are also moving forward with digital strategies, such as in South Africa (Ngcamu 2019) and Colombia (Branch et al. 2020, 45).

Many studies have investigated the digitization-related aspects of higher education. Although universities often see digitization as a challenge and opportunity that affects the entire university organization, noticeably in the literature, the topic of digitization has been thoroughly examined alongside different university sub-areas. For example, many studies in higher education have examined the use of digital technologies in university teaching (Daenekindt and Huisman 2020) and topics such as e-learning (e. g., Jones and O'Shea 2004; Njenga and Fourie 2010; Pates and Sumner 2016; Bauer et al. 2020), MOOCs (e. g., Dennis 2012; Yuan and Powell 2013; O'Connor 2014; Al-Imarah and Shields 2019), and online learning platforms or open education (e. g., Murphy et al. 2013; Williamson 2021b).

Because universities have often ascribed strategic and hence, organizational significance to digitization in recent years, strikingly, there is comparatively little research that relates digitization in higher education to the university organization level. A recent large-scale review of 17,000 articles published between 1991 and 2018 in higher education-specific journals did not reveal an increasing prominence of topics and notions associated with the organizational aspects of digital transformation (Daenekindt and Huisman 2020).[5] Contributions that discuss the significance of digitization for universities tend to focus on action-oriented aspects and are aimed at university management (Getto and Kerres 2018; Barton et al. 2019; Gilch et al. 2019; Henke and Pasternack 2020; Walgenbach and Körner 2020). Although the generation and use of data and algorithms for organizational decision-making have entered universities, it is also noticeable that, from the extent of an organizational perspective, it is often assumed in a technology-deterministic way that the changes in higher education compare to those in the economy. In contrast, recent research in organizational sociology suggests that digital transformation is not organization-neutral and that the organization influences the way digitalization takes place (Büchner 2018; Graf-Schlattmann 2021; 2022). This corresponds to our observations

5 However, the analysis revealed an increasing presence of the topic of educational technologies with specific terms, such as "learning," "online," and "technology."

that universities have been fundamental in shaping the network infrastructure that has made possible today's digital technologies. Following Graf-Schlattmann (2021; 2022), we therefore understand universities' digital transformation in the sense of a gradual rather than a disruptive, revolutionary change, leading to different "degrees of digitization" (Selwyn 2014) in universities that often depend on the financial resources available as well as the political authorities and funding environments at the local and national levels.

Redrawing the boundaries of knowledge production through digital transformation (see section 2) certainly opens opportunities for established institutions of higher education organization, especially universities. They can expand beyond their traditional stakeholders and their often local or regional "publics" (e. g., students, politicians, media), enabling them to build networks with organizations in other higher education and research systems and with the new actors in EdTech, investors, government agencies, international organizations, and other knowledge providers in the new ecology of digital academia (Getto and Kerres 2018; Komljenovic 2021). Although such collaborations and reciprocal engagements have a long history in fields such as engineering, biotechnology, and computer sciences (Godin 2009), we have recently witnessed increasing popularity of the social sciences (e. g., Social Science One) (King and Persily 2020). They offer not only the possibility of new sources of funding but also potentially even more lucrative access to huge data sets from companies in different economic fields. Such engagements also enable new career paths, with individuals moving between traditional academic positions, industry, the public sector, and nonprofit organizations (Beckert et al. 2008; Ribes 2019; Safavi et al. 2018). In academic science and research, it can lead to new career opportunities for researchers through the emergence of entirely new specialties and disciplines (e. g., in the computational and data sciences, as discussed in section 3).

At the same time, digital transformation creates new challenges for universities: The multiplicity of new actors in knowledge production makes it difficult for traditional researchers and university institutions to make their specific expertise on digital transformation effective and understandable in public discourse. In various knowledge fields, the already crumbling sovereignty over methodological innovation and the focus of research is further eroding (Bartlett et al. 2018; Burrows and Savage 2014; Kitchin 2014). New actors, especially from the tech industry, can invest large amounts of financial capital with which traditional, mostly publicly funded research and higher education systems, can no longer compete. Moreover, gaining access to lucrative organizational data is often difficult or impossible due to corporate interests. These challenges not only create new inequalities in access to knowledge production between traditional and new actors in digital academia but also raise new questions. Which universities and which higher education and research systems, more generally, can even afford to invest in digital transformation? Are we witnessing a collective Matthew effect (Merton 1968; Bol et al. 2018) in

digital academia, where established, well-resourced universities are rewarded for their "excellence" (Münch 2014; Sørensen and Traweek 2022), that is, their researchers' previous academic achievements and successes? Although further research is needed to clarify the answers to these questions, it seems certain that digital transformation and the associated changes in knowledge production intensify the existing (global) competition among universities as organizations as well as science and higher education systems (Münch 2014; Arora-Jonsson et al. 2021; Brunsson and Wedlin 2021; Krücken 2021).

6 New Digital Learning Opportunities and Skill Requirements in Higher Education and Labor Markets

The last two decades have seen an explosion in the availability of digital learning opportunities, such as MOOCs and other forms of digital distance learning. Despite their discursive construction as a "disruption" to traditional higher education learning models (Selwyn 2013; Selwyn et al. 2015; Kirchner and Lemke 2019), digital learning environments are far from new phenomena: Their predecessors, such as forms of correspondence teaching and learning, date back to the mid-19th century (Holmberg 2005). In the last third of the 20th century, their development was linked to the creation of large distance-learning institutions, such as the University of South Africa, the Open University in the United Kingdom, and the University of Hagen in Germany.[6] Traditional on-campus universities have embraced this movement and have started to offer distance and more recently, online learning degrees where "students and teachers are separated by space, time, or both for the majority or the complete duration of teaching and learning" (Siemens et al. 2015, 12). In addition, new information and communication technologies enabled both synchronous and asynchronous learning opportunities, which are referred to by various terms and abbreviations (Holmberg 2005; Siemens et al. 2015).[7]

These new digital learning opportunities do not dissolve the old system but complement it. Therefore, even during the COVID-19 pandemic, classroom teaching returned to universities. However, the availability, accessibility, and mastery of digital learning tools reinforced earlier discussions about digital skills, digital divides, and potential (new) digital inequalities in many ways (Engzell et al. 2021; Laufer et al. 2021; van de Werfhorst 2021). The concept of digital skills – as well as its

6 The equivalent in the Swiss higher education system is UniDistance, founded in 1992.

7 The introduction of digital technology has also brought a plethora of terms and abbreviations, such as "online learning, web-based learning, blended learning, e-learning, learning management systems (LMS), computer-aided instruction (CAI), computer-supported instruction (CSI), technology-enhanced learning (TEL), Internet-based training (IBT), and virtual learning environments (VLE), which to a large extent all fall under a broad definition of distance education" (Siemens et al. 2015, 13).

neighboring concepts of 21st-century skills, the 4 Cs, and the key skills – is embedded in encompassing discussions about the future of labor markets (Frey and Osborne 2017) and jobs (World Economic Forum). It mainly results from discussions about digital divides due to new information and communication technologies since the mid-late-1990s, which builds on work regarding knowledge gap research since the 1970s (Zillien 2009; Ragnedda and Muschert 2017). Helsper and van Deursen (2015, 127) found that the theoretical discussions "around digital literacy and inclusion, digital skills, in particular, have gained prominence after decades of focusing on access." As broadband connections and mobile devices (laptops, smartphones, tablets, etc.) have become more widespread over the past two decades, this first dimension of the digital divide has become less important (Lutz 2019).[8] Correspondingly, policy efforts and academic conceptualizations since the mid-2000s have shifted their focus to the second and third dimensions of the digital divide, digital skills and outcomes. Nevertheless, recent sociological research has pointed to the persistence of social inequalities, such as class, gender, and race and ethnicity, which are remapped and reinforced in digital tools, such as learning platforms, algorithms, and AI systems, not least due to the forced closure of schools and universities during the COVID-19 pandemic (Büchi et al. 2021; Engzell et al. 2021; Festic et al. 2021; Hargittai 2021; Kelly 2021; van de Werfhorst 2021; Janschitz 2022).

An important function of any higher education system is to provide education to produce skilled professionals for the labor market. Therefore, building and fostering new skills has become a central topic in research on higher education and labor markets (Frey and Osborne 2017; Börner et al. 2018). Digital skills represent an attempt by higher education and labor market policies to translate qualification and skill profiles necessary to cope with the digital transformation's challenges. Despite its ambiguity, as multiple meanings remain (Helsper and van Deursen 2015), digital skills can be understood as a policy instrument to tackle skills shortages (Cappelli 2015): Numerous studies, policy reports, and other publications have pointed to the growing mismatch between labor markets' demand and supply, especially in technology- and knowledge-intensive fields, such as information communication technology, finance, insurance, and health (Börner et al. 2018; Sheldon 2020; Staatssekretariat für Bildung, Forschung und Innovation SBFI 2017; Staatssekretariat für Wirtschaft SECO 2017). While formulating practical responses to close such gaps (e. g., through common skills frameworks, investments in STEM subjects, reducing entry barrier for underrepresented groups), these publications establish new relationships between the multiple fields involved. The repeated discussions and imperatives for action to address impending skills shortages can be interpreted as collective visions about the structure and further development of labor markets and economic fields more generally (Fitzgerald et al. 2018; Saner 2019). Among

8 However, more recently, the effects of the COVID-19 pandemic have once again highlighted the importance of this dimension (Büchi et al. 2021; Engzell et al. 2021; Festic et al. 2021).

other scenarios, this includes the increasing dependency of various fields on digital platforms, cloud computing, data processing algorithms, and related ways of thinking (such as computational thinking).

7 Contributions to the Special Issue

The first contribution to this special issue, by Philippe Saner, is an investigation of the digital transformation of higher education and research policy in Switzerland. Drawing on Foucault's work and sociological discourse theories, higher education and research policies are conceptualized as a discursive field that combines conflictive and cooperative statements, strategies, investments, regulatory frameworks, and other policy measures by organizations in different sectors. Saner argues that actors in the discursive field prove powerful when they succeed in convincing others of their views and objectives in such a way that divergent, potentially contradictory visions converge. The author analyzes documents about digitalization in Swiss higher education and research policy between 1998 and 2020, a period that profound institutional change characterized, using a social science approach to discourse analysis. The analysis shows that actors in the field of higher education and research policy use open, ambiguous terms to characterize digitalization, creating a polyphony in the subject. Despite a pronounced rhetoric of process and transformation, the documents reveal a surprising continuity and stability in the discourse on digitalization. At the same time, knowledge fields such as the data sciences, AI, and robotics are framed as fundamental basic sciences for addressing the future challenges in a data-driven approach. They are considered central factors for competitiveness, not only of higher education and research but also of the economy and the nation-state.

The following two papers examine the emergence of new scientific fields in the context of digital transformation but with evidently different results. Bianca Prietl and Stefanie Raible investigate the academic institutionalization of the data sciences in Germany, Austria, and Switzerland. Their research focuses on processes of boundary work that accompany this institutionalization process to understand more clearly current transformations in knowledge production within digital academia. The authors develop a relational perspective that combines insights from the study of professions and the demarcation of science with discourse and practice theory. Empirically, the study is based on in-depth semi-structured qualitative interviews with data science professors at universities in the three countries. The analysis reveals that several lines of demarcation are discursively drawn to construct academic data science on a symbolic level. Specifically, academic data science is distinguished from industrial data analytics and, in contrast, popular notions of big data analytics. Within academia, data science is distinguished from mathematics, statistics, and computer science as well as so-called domains, each of which is presented as

limited in scope. Regarding content, the recent institutionalization of data science resembles that of engineering as a discipline, both in terms of the structuring and organization of its curricula as well as its symbolic construction. The authors conclude that the widespread demand for data science methods in both academic and non-academic domains may delegitimize other – especially non-quantifying – modes of conducting research and knowledge in these areas. Epistemological claims and symbolic demarcation from other disciplines must also be understood as central in the competition for research funding and talent.

In the third paper, Michael Piotrowski and Max Kemman conduct a qualitative study of Swiss universities to examine how institutional structures and definitions of the digital humanities interact. The authors show that the digitization of humanities research practices has led to the emergence of an identifiable field and community of digital humanities. Swiss universities have had opportunities to engage with digital methods in the humanities, and almost half of them have chosen to institutionalize digital humanities visibly. However, the authors conclude that, at least for the digital humanities, digitization does not lead to the emergence of a new discipline. Rather, they show that digital humanities practitioners reluctantly exclude digital humanities from the established system of humanities disciplines. Moreover, they show that professionalization and institutionalization take place in local contexts and lead to different institutional arrangements. Considering these findings, they argue that the emergence of new research fields, such as the digital humanities, is at least partially path dependent. How a new research field should be understood as a discipline or interdiscipline cannot be adequately predicted from research practices, institutional arrangements, or macro phenomena, such as the digitization of society and science. The authors compare the case of digital humanities with that of data science in Switzerland. These two new research fields share the same institutional landscape and are digital, interdisciplinary and only vaguely defined. However, considering these parallels, they also establish a clear difference between data science and digital humanities at the policy and institutional levels. They argue that the introduction of data science at Swiss universities is an example of the close and interconnected relationship among industry, science policy, and universities in the digital age, which has led to the successful institutionalization of data science. In contrast, the institutionalization of digital humanities is more heterogeneous and less far reaching. Therefore, the study allows for an interesting contrast between two new fields of research that closely relate to the discourse of digitalization in science.

In their paper, Luca Tratschin, Katja Rost, and Christian Leder observe that digitalization is strongly reflected in the strategic orientation and self-representation of Swiss universities. They find that these universities have a strong self-description of their positioning in relation to digitization. Against this background, they ask whether digitization partially reconfigures the relationships between Swiss universities. They conclude that the field structure has not changed radically but that some

universities have managed to change their position in relation to other universities. Swiss universities' rapid and strong uptake of digitization does not represent a disruptive event that redefines field relations but a partial repositioning of individual universities accompanies it. Furthermore, the authors observe that the field positions of Swiss universities are reflected in a different form of thematization of digitization: Although both the most dominant and the weakest players in the field of digitization regarding the extent of digitization activities are comparatively reluctant to discuss a digital identity, they note a pronounced articulation of digital identity among organizations in the midfield. They interpret universities' self-description as "digital universities" as an aspirational identity. These universities see an opportunity to raise their profile, but they have not yet been able to implement the approach.

In the final paper, Silke Fürst, Mike S. Schäfer, Daniel Vogler, and Isabel Sörensen present an empirical study on how university managers and administrators in Switzerland use social media in their active public communication. Their contribution is part of a longer systematic study on the field of higher education communication (Fähnrich et al. 2019). One striking result of their survey is the significant differences between types of higher education institutions. For example, the heads of universities of applied sciences attach more importance to the use of social media for university communication than do the heads of communication departments at research universities. However, as the study also shows, the use of social media is not considered the most important in the portfolio of media and media types used. The priority for communication managers is to ensure their universities have a good image and are covered in the daily newspapers, that is, the news media. However, using social media opens new possibilities. Universities of applied sciences, for example, use social media to engage with students, alumni, and potential new students as well as to generate likes, shares and feedback. Overall, the study shows that social media has found its way into the hands of university leaders and communications managers. In doing so, the study explores a specific facet of the digital age at universities.

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A Tamed Transformation. Debating Digitalisation in Research and Higher Education Policy in Switzerland, 1998–2020

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Abstract: In this article, I investigate the discursive field of the digital transformation of higher education and research policy in Switzerland. The qualitative analysis of political strategies and documents shows that actors in this policy field use open, ambiguous terms to characterise digitalisation. By building on this discursive strategy, the political actors aim not only to reduce uncertainty about the digital transformation as a complex phenomenon but also to build political consensus about the future development of this discursive field.

Keywords: Digital transformation, research and higher education policy, discursive field, ambiguity, polyphony

Eine gezähmte Transformation. Die Debatten über Digitalisierung in der Forschungs- und Hochschulpolitik der Schweiz, 1998–2020

Zusammenfassung: Dieser Artikel untersucht das diskursive Feld der Digitalisierung der Hochschul- und Forschungspolitik in der Schweiz. Die qualitative Analyse politischer Strategien und Dokumente zeigt, dass Akteure der Hochschul- und Forschungspolitik offene, mehrdeutige Begriffe verwenden, um Digitalisierung zu charakterisieren. Mit dieser Strategie beabsichtigen die politischen Akteure, Unsicherheiten über die digitale Transformation als komplexes Phänomen zu reduzieren und politischen Konsens über die zukünftige Entwicklung dieses Diskursfeldes herzustellen.

Schlüsselwörter: Digitalisierung, Forschungs- und Hochschulpolitik, diskursives Feld, Ambiguität, Polyphonie

Une transformation apprivoisée. Débat sur la numérisation dans la politique de la recherche et de l'enseignement supérieur en Suisse, 1998–2020

Résumé : Cet article examine le champ discursif de la numérisation de la politique des hautes écoles et de la recherche en Suisse. L'analyse qualitative des stratégies et documents politiques montre que les acteurs de la politique des hautes écoles et de la recherche utilisent des termes ouverts et ambigus pour caractériser la numérisation. Par cette stratégie, les acteurs ont l'intention de réduire l'incertitude sur la transformation numérique en tant que phénomène complexe et de créer un consensus politique sur l'évolution futur de ce champ discursif.

Mots-clés : Numérisation, politique de recherche et des hautes écoles, champ discursif, ambiguïté, polyphonie

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Se vogliamo che tutto rimanga com'è,
bisogna che tutto cambi.
(Tancredi Falconeri, «Il Gattopardo» di Giuseppe Tomasi di Lampedusa, 1958)

1 Introduction[1]

Digital transformation has been the defining topic in higher education and research (hereafter: HER) policy in recent years, both in Switzerland and elsewhere. Universities, funding agencies and political authorities have formulated strategies and drafted action plans to make comprehensible the complexity of the digital transformation and to derive political and organisational goals from it. In addition, higher education organisations, research actors and states have invested large sums in the digital transformation of HER, not least to maintain or strengthen the *competitiveness* of their respective organisation(s) (Tratschin et al., this issue; Haase and Buus 2020), as well as the entire HER system (for Switzerland, e. g. Schweizerische Eidgenossenschaft 2016, 17).

The discussion regarding digitalisation is part of sociotechnical imaginaries: Political, economic and scientific actors create visions of the future that describe and frame the reciprocal relationships between social entities and digital technologies (Jasanoff 2015; Beckert 2016; Ruppert 2018; Meyer 2019; Saner 2019). Formulating political strategies and goals and adopting subsequent measures involve both discursive and non-discursive practices. By outlining the future development of society, political actors value and allocate attention, financial and other resources (Beckert 2016; Saner 2019; Bareis and Katzenbach 2022).

This paper focuses on organisational actors' collective statements in the discourse on digitalisation of HER policy in Switzerland since 1998, a period characterised by various profound changes (such as tertiarisation, diversification and internationalisation) in this field. Such collective statements can be interpreted as "compromise products" (Emirbayer and Johnson 2008, 19) of competing positions in HER policy organisations. I argue that the statements in this field are characterised by ambiguity (Eisenberg 1984; Leitch and Davenport 2007), polyphony (Andersen 2003; Schneider and Zerfass 2019) and arbitrariness. Thanks to these characteristics, they are especially suited to open spaces of collaboration with other actors. By combining conflictual and cooperative statements, they contribute to the constitution and permanence of the discursive field of digitalisation. The future scenarios drafted in this discursive field can be analysed as a case study of a collective conception of society.

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First, the future scenarios articulate a political imperative to act to have an effect on grand societal challenges (public health, energy supply, climate change, food security, etc.) through investments in HER. In this way, different fields are put into social relations with each other. Second, the political discourse operates in a temporal dimension in that HER policy measures can shape and frame the future. In the emergence of new fields of knowledge, future visions contribute to coordinate and structure the expectations and actions of different actors (Tavory and Eliasoph 2013; Meyer 2019). In this respect, the discursive field of the digital transformation of HER policy is suitable for analysing collective visions and narratives regarding their multidimensional interactions.

In this article, I will investigate HER policy actors' strategies and documents to examine the role that societal visions of the future play in structuring digitalisation as a discursive field. The following research questions guide the analysis: How does the political discourse on the digitalisation of HER operate? How is HER framed in this discursive field? To answer these questions I draw on an existing data set on documents about digitalisation in Swiss HER policy between 1998 and 2020 (Saner and Mützel 2023). I will analyse this material using a social science approach to discourse analysis (Keller 2011; 2013), identifying the main topics and reconstructing the collective statements, strategies and investments regarding digital transformation that actors in Swiss HER policy made.

2 Theory Section

To investigate the research questions outlined, I will combine a discursive field theory approach with concepts from organisational communication to focus on the statements of collective actors regarding digitalisation in the field of HER policy. In this section, I will first introduce the concept of discursive fields (Foucault 1972; Keller 2011), in which policy goals, strategies and measures are formulated and alliances between different actors can be formed, despite possibly diverging interests. Second, I will highlight the role of ambiguity and polyphony as discursive strategies in organisational and political communication.

2.1 The Digital Transformation of Higher Education and Research as a Discursive Field

The digital transformation of society has recently gained much attention in social scientific analysis and description. It has been described as a semantic strategy (Süssenguth 2015), as a process (Grunwald 2019), as society 4.0 (Baecker 2018), as the reduction of societal complexity through regularities or "patterns" (Nassehi 2024), as a utopia (Rebhorn 2019) or in contrast, as a dystopic form of surveillance capitalism (Zuboff 2019), to mention only a few. Although these approaches

offer differing theoretical frameworks for macroscopic analysis of societal change, the scope of this article is somewhat more modest. In this work, I aim to address and interpret the discourse on the digital transformation in a specific policy field in Switzerland, that is, HER.

Following Michel Foucault, discourses can be understood as interconnected sets of statements, texts, images and symbols (as well as other materials) that, "systematically form the objects of which they speak" (Foucault 1972, 49). Discourses are based on relatively autonomous rules of formation that cannot be exclusively or deterministically attributed to specific social positions or actor interests (Foucault 1972, 42). Therefore, a discourse analysis aims to investigate and understand these rules as well as the power relations that underlie a particular system of statements. The sociology of knowledge approach to discourse analysis (SKDA) expands the notion of discourse as, "performative statement practices which constitute reality orders and also produce power effects in a conflict-ridden network of social actors, institutional *dispositifs*, and knowledge systems" (Keller 2011, 48; *italics* in original).

Building on this discourse concept, discursive fields are understood "as being social arenas, constituting themselves around contested issues, controversies, problematizations, and truth claims in which discourses are in reciprocal competition with one another" (Keller 2011, 52). The discursive field is where the differentiation of concepts, objects, modalities of expression and thematic as well as strategic choices takes place. Formulating political goals, strategies, and measures around the digitalisation of HER represents such an arena that integrates political viewpoints, strategies, investments, regulatory frameworks and other policy measures by various organisational entities (Selwyn 2013). Actors in this discursive field articulate their positions and try to convince others. Thus, a discursive field is an open space, delimited by communicative and material practices, which an actor or superordinate body does not control or rule (Keller 2013, 71). Rather, it forms a potentially conflictive and cooperative arena simultaneously.[2]

A central dimension for analysing discursive fields are power effects: The SKAD approach "[…] refers to different kinds of intended or non-intended consequences emerging out of a discursive field or discourse formation, that is the range of 'changes in the world' that are linked to the social processing of discourses" (Keller 2011, 60). This necessitates an in-depth analysis of the material and symbolic implications that results from the system of collective statements in a discursive field.

2.2 Ambiguity and Polyphony in the Construction of Discursive Fields

In organisational communication, clear and direct communication is only one possibility when the "goal is to be clear" (Eisenberg 1984, 30). In other situations, particularly during intense phases of organisational transformation and high degrees of uncertainty, of which digitalisation is a vivid example (Meyer 2019), more am-

2 In this sense, discursive fields represent promising spaces of opportunities (Eyal 2013b; Saner 2022).

biguous communication can be a viable option to accomplish organisational goals. Strategic ambiguity can "be understood as a form of discourse strategy, which […] constitutes the means by which actors achieve goals within discourse" (Leitch and Davenport 2007, 5). It allows multiple, sometimes contradictory, interpretations within discursive fields to coexist and actors with conflicting interests to achieve their respective goals.[3] Therefore, ambiguous communication can help to integrate actors with diverging intentions into a common framework to cope with complexity and reduce uncertainty.

Polyphony is another important characteristic in an emerging discursive field. Drawing on multiple fields of inspiration (from music to organisational sociology), Schneider and Zerfass (2019, 18) define polyphony in the following way:

> *Polyphony describes a state that stands for plurality and unity at once. A multiplicity of different and equal parts constitutes an ambiguous whole, which cannot be reduced to its single parts. Polyphony arises within the process of purposeful placement of the different parts and the perception of the provoked unity. It develops in a spatial as well as a temporal dimension.*

Organisational actors always speak to diverse publics, that is, multiple societal fields and are thus constituted in and by multiple narratives and discourses. They are, in Åkerstrøm Andersen's (2003) words, "polyphonic organisations". This applies in particular to political entities who permanently interact and communicate with various audiences (e. g. lobbyists, entrepreneurs, journalists, scientists, the general public) (Andersen 2003, 167–168). Therefore, political actors must communicate in many voices to legitimise and plausibilise their actions and decisions not only within the political field but also vis-à-vis other environments.

Thus, ambiguity and polyphony constitute discursive strategies to engage and include actors with different interests and goals. Their strategic openness by linking more consensual and cooperative as well as conflictual and controversial statements and practices contributes to the constitution and permanence of a discursive field. By envisioning promising future scenarios, the actors involved in a discursive field not only produce a common object but also frame and shape its further development (Beckert 2016; Saner 2019; Bareis and Katzenbach 2022).

Considering the aforementioned power effects, ambiguous, polyphonic communication represents a distinct strategy. Here, power is not understood as the concentration and monopolisation of resources or knowledge in a single entity, but as the ability to forge relationships, involve multiple actors with different interests and build consensus on controversial issues (Rose 1992; Eyal 2013a; Vedres 2022). In relation to this article's object of study, the discursive field of the digitalisation

3 Different fields have described ambiguity as a discursive strategy, including the construction of emerging markets (Suckert 2018), religion (Bauer 2011), politics (Leitch and Davenport 2007; Vedres 2022) and professions (Dorschel and Brandt 2021).

of HER, this means that actors prove powerful when they succeed in convincing others of their views and objectives, so that divergent, potentially contradictory visions of the future converge.

3 Data and Method

I reconstruct and interpret the collective statements, strategies and investments regarding digitalisation that actors make in Swiss HER policy through a social science approach to discourse analysis (Keller 2011; 2013). In doing so, I will reconstruct the interpretative schemes and the content-related structures that are articulated within the discourse. The documents and strategy papers on the digital transformation of HER policy are the material basis for this. First, I explain how I collected strategy papers in the corpus. Then I describe the discourse-analytical procedure and the process of coding the material.

3.1 The Corpus

The sample consists of documents and strategy papers that address the digital transformation in and of HER policy in Switzerland. Strategy papers form an important instrument in constructing the abovementioned discursive field: In them, different actors articulate multiple future scenarios to be achieved with political means and financial investments, linking these to various policy measures. Thus, strategy papers represent organisational actors' collective statements and compromises of their different, coexisting *wings*, convictions and world views (Emirbayer and Johnson 2008), which includes political actors such as government agencies (Andersen 2003).

The starting point for compiling the sample was the documents of the Federal Council's strategy "Digital Switzerland" (hereafter: SDS). Through these, I collected 36 strategy papers and other documents that are devoted in whole or in part to the aforementioned topic area (Saner and Mützel 2023). The actors include political institutions such as the Federal Council; the State Secretariat for Education, Research and Innovation (SBFI); the State Secretariat for Economic Affairs (SECO); the Federal Office of Communications; the ETH Board; and the Conference of Cantonal Ministers of Education, as well as scientific commissions, business associations and think tanks (see Table A1 in the appendix).[4]

The period of the documents examined ranges from 1998 to 2020, with the vast majority published after 2014. The older strategy documents were considered in order to examine continuities and ruptures in the Federal Council's strategies.

4 I did not include the digitalisation strategies of cantonal universities or universities of applied sciences as organisational actors because my research interest lies on the federal level. All documents examined, the coding scheme and the codebook are stored in the SWISSUbase data repository (Saner and Mützel 2023).

This period is marked by profound institutional change in the field of HER policy. To mention only the most important institutional changes (Lepori and Fumasoli 2010): The system of universities of applied sciences was institutionalised (Weber et al. 2010; Kiener 2013), professional teacher education was academicised (Criblez 2010; Criblez et al. 2016), several new universities were founded, the internationalisation of universities was intensified and a fundamental study structure reform was carried out as part of the Bologna Process (Bieber 2010). Finally, public financing of higher education by the federal government and the cantons was reorganised (Eckert 2019).

A central component of the political discourse on digitalisation in Switzerland is formed by the Federal Council's strategy documents, action plans and reports on the "Information Society Switzerland" (hereafter: ISS) and the SDS. Although there were certainly some prior technology policy initiatives after the Second World War (Straumann 2001; Geiss 2021), the Federal Council launched the first comprehensive strategy for dealing with "new communication and information technologies" at the end of the 1990s. The ISS was adopted in February 1998 and revised in 2006 and 2012, with goals, principles and policy areas being continuously adapted (Abun-Nasr 2009). The subsequent SDS strategy was launched in April 2016 and revised twice in September 2018 and September 2020.

The six strategy documents form a subsample within the corpus. In addition to their common authorship (i. e., the Federal Council), they formulate political visions about the future relationships between technology and society. This makes them particularly interesting for an in-depth analysis across the period under consideration. Moreover, the Federal Council's strategies address a broad, hybrid audience, indicating an ambiguous, polyphonic mode of communication.

3.2 The Analytic Strategy

All documents were coded using ATLAS.ti. In an open, inductive coding process (Flick 2016, 388–92), I coded the text passages relevant to the research question with summarizing or explanatory categories (Friese 2012, 92 ff.). In this process, a category system emerged, which I reviewed and revised in a total of three passes. By reading and coding the text passages several times, I was able to expand and differentiate the category system (cf. the coding scheme in Saner and Mützel 2023). In addition to structuring the content of the material, the inductive approach allows us to elicit the central discourse strands, themes and interpretations articulated in the documents.

The documents in the sample were primarily coded using specific terms or combinations of terms. For example, the text passages whose content is coded as "digitalisation as social transformation" very often include processual terms such as automation, modernisation, structural change, transformation, or development (see Table A2 in the appendix). To better account for the meaning and development of such terms, I developed a keyword approach to discourse analysis (Leitch and

Davenport 2007): After identifying the relevant terms in the documents and counting their relative frequencies, I aggregated them to more encompassing topics that can be evaluated and compared in an aggregate form. This approach allowed me to analyse the developments of central categories as well as the shifts in meaning in the political discourse about digitalisation of HER over time.[5] More generally, analysing keywords enables the linking of utterances, speech acts and other communicative measures on an organisational meso-level with the analysis of discursive structures on a macro-level (Leitch and Davenport 2007, 9). This is particularly interesting for the sub-corpus of strategy documents, as they formulate sociotechnical future scenarios for Switzerland over two decades. The resulting 22 topics vary from multiple conceptions of digitalisation (see section 4.1) to document- and genre-specific content (e. g., "plan, strategy, implementation") to general political topics (e. g., "equal opportunities, discrimination"; Saner and Mützel 2023).

In the following empirical part, I will concentrate on those topics that are closely related to my research question: First, I analyse the multiple conceptions of "digitalisation" in the corpus. I then turn to the objectives of Swiss HER policies regarding digital transformation. Third, I investigate multiple evaluations of the object of study. Finally, I look at the changing relationship between the Swiss political system and the *outside world* regarding digitalisation.

4 The Digital Transformation of Research and Higher Education Policy in Switzerland

4.1 The Multidimensionality and Arbitrariness of Digitalisation[6]

The discursive field of digitalisation of HER is characterised by a striking ambiguity and arbitrariness: Even though the term "digitalisation" is ubiquitous, it is not defined or explained in any of the documents examined, a finding that is supported by other studies of digital education strategies (Selwyn 2013; Förschler 2018; Haase and Buus 2020). Thus, the term remains underdetermined in the discursive field, which makes it open and connectable to multiple perspectives. Nevertheless, the following three divergent conceptions of digitalisation can be identified:

- Digitisation as the conversion of analogue into digital signs
- Digitalisation as a technology (field)
- Digitalisation as social transformation

First of all, digitisation in the literal sense refers to the conversion of analogue into digital, that is, discrete, machine-readable characters – a process that began in the

5 The comparison of certain word frequencies must be put in relation to the rapidly growing text volume of the strategy documents.

6 All quotations in the following are translated from German by the author (exceptions are indicated).

military, academic and industrial large-scale computing machines of the 1940s and continues to this day (Gugerli and Zetti 2019). The ISS used the attribute "digital" only when explicitly talking about "digital content", certificates or signatures. Otherwise, they addressed technological aspects of the information society under the acronym "ICT", that is, information and communication technologies. The SDS strategy documents build upon this understanding, but link and expand it with the now ubiquitous concept of "digital data".

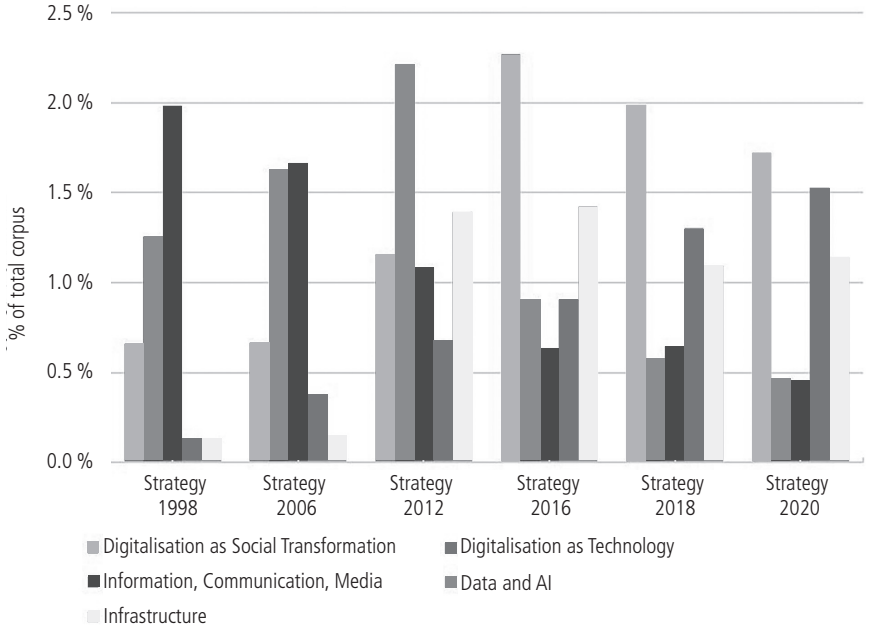
In the documents examined, the latter two conceptions are predominant. Digital technologies are understood to mean "new technologies from information and communication technology (ICT) as well as more powerful computers and network infrastructures that represent the technical basis of digitalisation" (SBFI 2017, 3). At the same time, the texts increasingly use the term as a synonym for technology per se. However, the meaning of digitalisation as a technology (field) only becomes apparent in combination with the third understanding, digitalisation as a social transformation. The term already indicates a process logic (Grunwald 2019) and is aimed at the various – political, economic, technological, organisational and other – dimensions of "digital transformation". The SDS is increasingly based on the logic of a progressive process: Digitalisation is characterised as "progressive" or "increasing" (SDS 2016, 3) and is closely linked to terms such as "development", "change", or "transformation".

4.2 The Rise of Data and Artificial Intelligence

These shifts in meaning in the discursive field can be empirically traced in the strategy documents (cf. Figure 1): The topic area "digitalisation as social transformation" increases markedly after 2006. While the term "structural change" appears only once in the ISS 2006, it becomes a central principle in the SDS 2016 ("actively addressing structural change"). From then on, "structural change" and "digital transformation" are no longer just opportunities to be seized; they turn into the main focus of political attention.

The pronounced process semantics are accompanied by a relative loss of importance of the topic "technology": Although "ICT" is the central term in the strategies on the information society, the acronym loses significance (SDS 2016) and later no longer appears at all (SDS 2018). The related topic area of "information, communication, media" experiences an even greater decline. Simultaneously, a shift can be identified from the "ICT" of the information society to "data and artificial intelligence" as well as "infrastructure" of the digital society – two policy fields that were still irrelevant in the first two strategy documents have become increasingly important in recent years and take on a significant role in the collective future designs

Figure 1 Development of Technology-Indexing Topics in the Strategy Documents 1998–2020



Source: Saner and Mützel (2023); author's calculations.

articulated in the discursive field.[7] Actors in HER policy increasingly recognise the constitutive importance of data and algorithms as operational principles in various fields. The proclamation of a new "data policy" (BAKOM 2018) thus substantiates the representation of Switzerland as a data(fied) society (Schäfer and van Es 2017; Houben and Prietl 2018).

However, the use of process semantics is not consistent: Despite the frequent use of terms such as "development" or "transformation", the same documents also speak of a "digital society" or "digital world" alongside "digital Switzerland" (SDS 2016, 17). Although digitalisation is described as dynamic and "progressive", the existence of a pre-existing digitality is also recognised. Accordingly, the documents outline a vision of a Switzerland that is already digitally structured on the one hand, while on the other hand it is subject to an unfinished, dynamic development process, that is, it is always "in the process of becoming digital". The complex, dialectical relationship between the present and the future points to the emergence of knowledge and technologies within established paths, which in turn shape further

7 Despite these shifts, the technology-indexing topics in the strategy documents remain constant with a cumulative relative share of 3.5-3.8% of all words in the corpus, except for the ISS 2012.

development. Conversely, future implementations and modes of use also change the evaluation of historical events and processes.

Furthermore, the use of the term "digitalisation" is ambiguous and arbitrary because different descriptions of society (such as "information society", "knowledge society", and "digital society") coexist, with no demarcation in previous or current reports. The synchronicity and parallelism of these terms results above all from the continuation of the Federal Council's strategies (Abun-Nasr 2009): Since they explicitly refer to previous strategies in their introductions, they therefore produce continuity between the various documents.

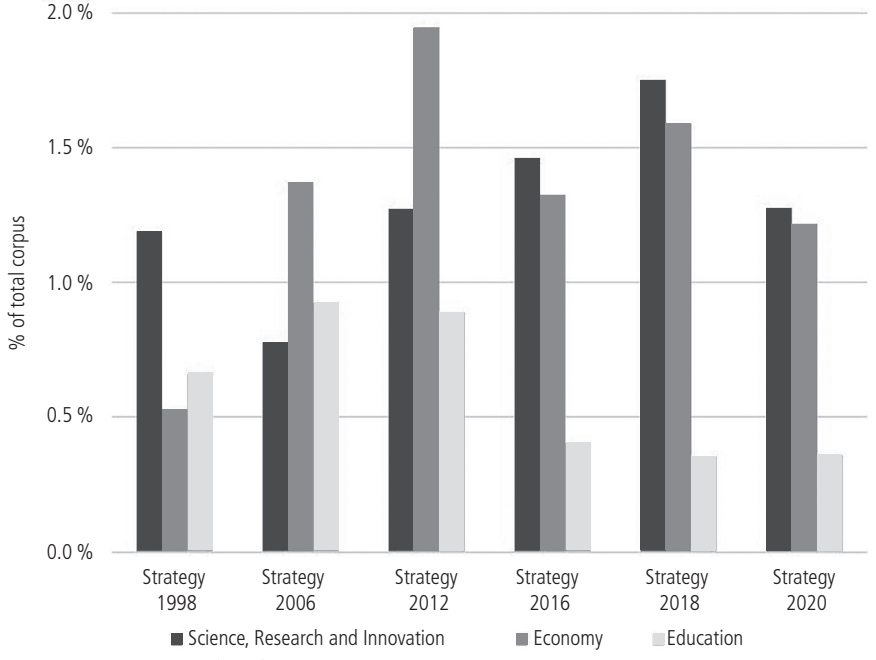
The Federal Council's strategy documents, which are aimed at a broad public, accordingly imagine the "digital transformation" as a continuous, linear development (Godin 2006) which thus becomes to a certain extent predictable and plannable. It thereby contributes to reducing the uncertainties associated with digitalisation. The strategy documents thus signal continuity precisely through the transformation process that has been embarked upon, that is, "stability through change" (Esposito 2014, 102), and transfer this into a political format with the SDS. The arbitrariness of the concept of digitalisation, organised and ordered in this way, not only allows the strategies to be connected to other actors in the sense of a boundary-object (Star and Griesemer 1989; Star 2010; Tratschin 2021), but also allows uncertainty to be dealt with and reduced (Beckert 2016; Meyer 2019). The contingencies and uncertainties of the future, which are exemplarily condensed in the multidimensional concept of digitalisation, are prospectively extrapolated through political ideas of linearity and continuity.

4.3 The Objectives of "Digital Switzerland": Maintaining Prosperity and Competitiveness through Innovation

The continuity in the political ideas on the future of Switzerland is not only expressed in the use of discursive frames; the documents also show significant overlaps in terms of content. Such overlaps are prominently evident in the fundamental objectives: The use of ICT or digital technologies to maintain Switzerland's prosperity and competitiveness marks the primary objective of the strategies throughout the period under review. The first core objective of the SDS 2016 specifies the positive economic effect by directly linking digitalisation with innovation, value creation, economic growth, and prosperity (SDS 2016, 7). The other core objective emphasises the relevance of digital technologies for the formation of political opinion and participation, the transparency and security of digital technologies, and sustainable development (SDS 2016, 6f.). In this way, the strategy's objectives establish a coherence in the content of the political objectives over a longer period and show consistency in a phase of technological, economic and social change.

The topics "prosperity", "quality of life" and "competition" are extremely constant – at a very low level – in the period studied. Alongside the technological aspects,

Figure 2 Development of Topics "Science, Research & Innovation", "Economy", and "Education" in the Strategy Documents 1998–2020



Source: Saner and Mützel (2023); author's calculations.

they form the substantive core of the discourse since they are repeatedly referenced in all strategy documents. Conversely, the linking of technological developments with HER policy becomes the most important framework for maintaining the prosperity of a knowledge-based society or economy: HER face the task of ensuring the production, distribution and transmission of new knowledge and technological innovations (Jessop 2008). Policy measures to promote and transfer scientific and technological innovations into the economic sphere are central elements of the strategy to achieve the objectives.

In the strategy documents, the increasing importance of this narrative can be seen in the prevalence of the topics "economy" and "science, research and innovation" (cf. Figure 2). Although the documents examined show education in general and the education and training of skilled workers in particular as a central focus, the topic "education" loses relevance after 2012. "Science, research and innovation", on the other hand, are not limited to the thematic field of the same name, but frame and permeate various important fields of action (such as "economy", "infrastructure", "data and artificial intelligence", etc.). In other words, the documents attributed a

transversal effect to them in the discursive field under investigation. Achieving a high quality of life and economic growth in the future through research-based innovation has become a central reference point of research and science policy efforts in recent decades (Blümel 2016; Rammert et al. 2016). In this way, strategy papers mark the cross-field connectivity of the objectives instead of specific political solutions and situate them in the desired continuity of the "digital transformation".

4.4 Opportunities and Challenges: Positive and Negative Evaluations of Digitalisation

> *For some, the digital revolution is the perfect storm brewing; for others, it is the opportunity for the next step in society's development.* (Expertengruppe 2018, 25)

The framing of digitalisation as a social transformation implies socioeconomic change and transformation, which, as contingent events in the future, are inherently fraught with uncertainties (Beckert 2016; Meyer 2019). They must therefore be made plausible and legitimised in political discourse (Jasanoff 2015). Assessments and evaluations of the future of "digital technologies" fulfil an important function here: Positive and negative evaluations of technologies coexist, which makes it possible to address and process the uncertainty of ideas about the future (Esposito 2014). Thus, the articulation of negative horizons of possibility, such as expected dangers or risks that need to be avoided or minimised, helps direct further development towards certain aspects through measures and investments in research funding (Beckert 2016, 175).

The strategy papers fundamentally frame the "digital transformation" as an "opportunity" to preserve or increase prosperity. By initially emphasising primarily the positive aspects of digitalisation, the documents signal continuity or even optimisation of the current socioeconomic situation. The frequent use of "opportunities" and "potentials" arising from digitalisation marks a "rhetoric of potentiality" (Dickel and Schrape 2015; Hänzi 2015) which largely dispenses with fixed, contoured ideas of the future; rather, it operates by opening up spaces of opportunities in which "digital technologies" can release their "potentials" beyond the horizon of existing knowledge and given sociotechnical conditions.

However, since transformations are contingent, open-ended processes, a reduction in prosperity is also possible. This is addressed indirectly, as an implicit negative horizon, if the "opportunities [...] of ongoing digitalisation" are not seized. The strategies therefore not only emphasise the "opportunities" and "potentials", but also focus on possible "risks" and "dangers" of digitalisation, especially in connection with security in "cyberspace". Simultaneously, an increased reference to issues of digital inequality, which must be prevented, and data protection can be observed.

Figure 3 Development of the Topics "Challenges, Risks" and "Opportunities, Possibilities" in the Strategy Documents 1998–2020

Source: Saner and Mützel (2023); author's calculations.

Overall, positive and negative assessments of digitalisation appear synchronously in the discursive field: The discussion of opportunities, possibilities and potentials is often followed by descriptions of possible challenges, difficulties and dangers.[8] Viewed in aggregate, the topics of "opportunities, possibilities" and "challenges, risks" develop in parallel to each other in the strategy documents (with the exception of ISS 2012), that is, there are almost equal numbers of terms with positive and negative connotations in each case (cf. Figure 3).[9] The "rhetoric of potentiality" is thus linked to the risk discourse of the digital transformation of society, the economy and science.

The SDS not only identifies positive and negative evaluations of the coming digital future, but also formulates a vision for solving the looming challenges: In order to cope with socioeconomic "structural change", characteristics induced by digitalisation such as "transversality", "interdisciplinarity" or "networking" are brought into line with those "assets" assumed to be characteristic of Switzerland such as "multiculturalism, willingness to engage in dialogue and consensus, and direct democratic processes characterised by pragmatism" (SDS 2016, 5). The strategies update the fundamentals of the Swiss understanding of the state against

8 The antagonistic logic of "opportunities" and "risks" of digital technologies is a recurring element in the documents studied.

9 For the entire corpus, however, the code "challenges" predominates by a factor of 1.3.

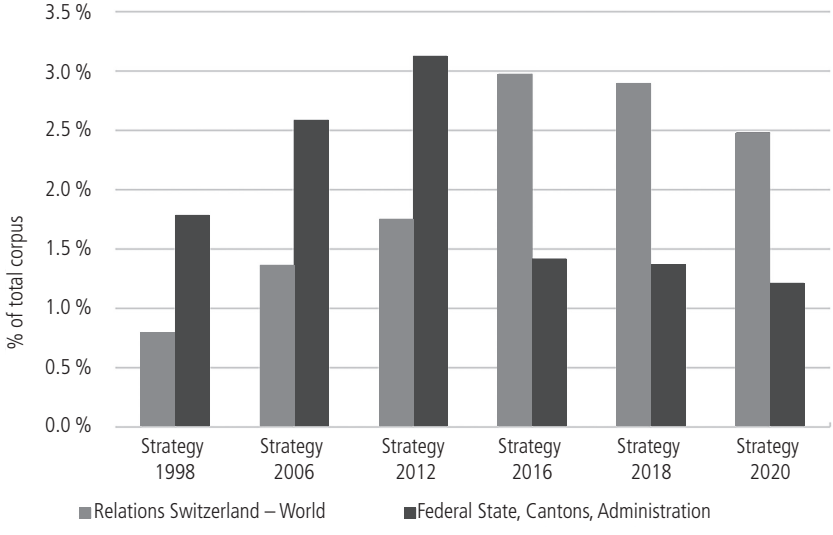
the backdrop of the rhetoric of a network(ed) society (Castells 2010). This suggests a certain continuity between current and future values that are necessary for the digital transformation. However, how these can be reconciled is not made explicit. Moreover, a techno-deterministic reading of digitalisation, which is also present in the documents, suggests that the digital transformation offers precisely no time for lengthy democratic negotiation processes. By linking them, on the other hand, the policies signal a balance between positive and negative framings, which in turn offers inclusion to heterogeneous stakeholders.

4.5 Digital Switzerland Goes International

> *Switzerland is ranked 8th in the world in digitalisation.* (Former Federal Councillor Doris Leuthard, Digital Switzerland Conference, 20.11.2017)

Finally, the strategy documents are characterised by a changed relationship between the self-referencing of the Swiss political system and political relations with the *outside world* such as other states or international organisations. While the strategies on the information society in 1998 and 2006 primarily addressed the political actors in Switzerland, the number of international references increased markedly after 2012.

Figure 4 Development of the Topics "Relationship between Switzerland and the World" and "Confederation, Cantons, Administration" in the Strategy Documents 1998–2020



Source: Saner and Mützel (2023); author's calculations.

The analysis of the topics "Relationship between Switzerland and the world" and "Confederation, cantons, administration" makes this clear: While the prevalence of both topic areas initially increases, the frequency of domestic references ("Confederation, cantons, administration") decreases sharply, while references to external actors such as other states, the European Union or international organisations increase significantly (see Figure 4).

This applies distinctly to HER: Diagnoses of the current state of the Swiss HER system in international comparison are combined with an analysis of the opportunities and challenges of digitalisation. The reports examine the current state and compare it with other nation states or the European Union. The comparisons are made on the basis of specific metrics, rankings and bibliometric procedures such as the frequencies and impact of publications, citations or patents (SBFI 2017; IDAG KI 2019, 42 ff.).

The conclusions drawn from this are usually as follows: Switzerland, or rather its HER system, is very well to excellently positioned, enjoys international recognition and is, at least in certain areas, a global leader in research (Economiesuisse and W.I.R.E. 2017; Federal Council 2016; ICTswitzerland & Economiesuisse 2011; SBFI 2017; SECO 2017a). Although problems and weaknesses are also addressed (such as the lack of equal opportunities, the low STEM quota in general and the low proportion of women in technical courses in particular), there is continuous self-assurance about Switzerland's "top position". The goal of maintaining "Switzerland as a top international location for research and innovation" becomes the central core postulate of HER policy efforts from 2012 onwards.

In contrast, the challenges of the "digital transformation" are kept open and general. The actors in the discursive field imagine innovation as well as knowledge and technology transfer as central instruments to counter the supposed "backsliding" of the research and development performance of Swiss universities, colleges, and companies in international comparison. The scenario of an imminent loss of the global "top position" forms the negative horizon against which "rapid" and "coordinated" action must be taken (SBFI 2017, 41 ff.). Although it is recognised, for example, that the two Federal Institutes of Technology (ETH Zurich and EPFL), compared to their size, have particularly numerous and influential publications in the research areas that are framed as central to digitalisation (i. e., computer sciences and engineering), the absolute number of professorships alone justifies additional financial resources in the millions for the two technical universities in an international comparison ("lack of capacity").

The increasing orientation towards international references is not induced by the political discourse on digital transformation alone: In the university field, rankings integrate universities into a global field that creates specific hierarchies and visibility (Heintz 2008; Sauder and Espeland 2009). Following this institutional logic, actors in HER policy need to legitimise their activities and funding initiatives by referring

to similar programmes in other HER systems (primarily countries in the European Union, North America and East Asia; e. g., SNSF 2015, 2018; SBFI 2017; Expertengruppe 2018; IDAG KI 2019). Mutual observation thus promotes the coordination of distributed activities across different HER systems (Parreira do Amaral 2018). As a result, the application of similar strategies and measures helps to structure and stabilise the further development of emerging fields of knowledge across nation-state and field boundaries (Zapp and Ramirez 2019; Zapp et al. 2021).

The analysis illustrates the extent to which the examined HER policy measures and the discursive means transform the goals and content of the strategies into HER policy concepts. Competences, innovation, adaptation and internationality translate the contingencies of digitalisation into processable variables that are connectable for the actors of HER policy. In the documents analysed, so-called "future technologies", such as data sciences, artificial intelligence and robotics, are framed as new fields of knowledge not only for dealing with social problems with the help of "digital technologies" but also for keeping up in the international competition for locations. However, the instrumentalist conceptions of digital technologies and a one-sided, technology-deterministic approach to progress tend to ignore many social, political and organisational aspects. The orientation towards technical and economic rationalities, on the other hand, is not new, but rather represents a central, historical guideline of Swiss HER policy since the second half of the 20th century (Gugerli et al. 2005; Honegger et al. 2007). In this respect, the discourse on HER policy remains oriented towards stability and continuity despite the changing terms and the all-transforming rhetoric of digitalisation.

5 Discussion

This paper has examined how digitalisation strategies and measures operate and how HER is framed in this discursive field. The analysis shows that actors in HER policy use open, ambiguous terms to characterise digitalisation, creating a polyphony of the subject matter: Despite a pronounced rhetoric of process and transformation, the documents studied show a surprising continuity and stability in the discursive field of digital transformation. For example, the strategies all share and refer to established, long-term political goals such as increasing the prosperity and competitiveness of science and the economy. This is all the more remarkable given that, during the same period, the Swiss higher education field underwent profound institutional changes (Lepori and Fumasoli 2010), including processes of tertiarisation, internationalisation and the reform of study structures. The "digital transformation" is imagined as a continuous, linear development (Godin 2006), which thus becomes to some extent predictable and plannable. By building on this discursive strategy, the documents aim not only to reduce uncertainty about a world perceived as increasingly

complex (Beckert 2016; Meyer 2019) but also to build political consensus in the discursive field of HER policy.

In the discursive field under investigation, HER are imagined both as driving and as driven by digitalisation, in that they permanently produce innovations. At the same time, however, they must always process and adapt the innovations of other fields. Various HER policy activities are taken as measures to promote innovation and are accordingly geared towards crossing field boundaries and, in particular, linking the fields of HER more closely with the economic field. The interpretative openness, ambiguity and polyphony of central terms such as "digitalisation", "competences" or "innovation" is not so much a weakness of the discourse as it is a structural and connecting element, and thus a strategic one: They allow actors from different fields to refer to them strategically in order to establish transversal collaborations. The discursive framing as opportunities and challenges unites divergent evaluations of digital technologies, formulating offers of inclusion for a broad audience. The staging of a collaborative process also involves actors beyond the directly involved political, technical-scientific, and economic stakeholders. In this respect, the ambiguity and polyphony of such discursive practices contribute to the coordination of actors beyond the HER policy field, resulting in power effects in the discursive field since they allow actors in other fields to coordinate their respective digitalisation strategies with the core objectives. This, in turn, stabilises the whole network around "Digital Switzerland" and strengthens the political coalition about the future development of HER (see Förschler 2018 for the German case).

The promotion of so-called "future technologies", such as the data sciences, artificial intelligence and robotics, is a central element of the new "data policy": These technologies are framed as fundamental "basic sciences" for addressing the challenges and problems of the future in a data-driven way. They are considered central factors for "competitiveness", not only of HER, but also of the economy and the nation-state as a whole (Jessop 2008). In this respect, the strategies of federal policy makers contribute to the stabilisation of such fields of knowledge, which in turn create incentives for other actors, especially economic and academic actors, to also become active in these areas. The statements, measures and investments of actors in HER policy thus have foundational effects in the spaces between the fields of politics, science and economics in which such arrangements emerge and develop (Eyal 2013b; Saner 2022).

This also manifests the close alignment with the narrative of international competitiveness, which integrates HER into economic policy interests, if not equating them. It points to the historical continuity of techno-economic rationalities in Swiss HER policy since the second half of the 20th century. By using polyphonic, ambiguous terminology and a ubiquitous rhetoric of transformation, the discourse thus shows an only supposedly contradictory orientation towards stability and continuity. In this respect, the discursive logic of process signals stability and continuity

precisely through the transformation process that has been embarked upon, in which everything remains the same because it changes (Esposito 2014; Brunsson 2017). Because digitalisation is constructed as a plannable and predictable political object, it remains a tamed transformation arranged under Helvetic conditions.

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7 Appendix

Table A1 Documents Examined

Abbrevation	Author	Title
BAKOM 2018	Bundesamt für Kommunikation	Eckwerte für eine Datenpolitik der Schweiz
BFS 2017	Bundesamt für Statistik	Dateninnovationsstrategie
Bundesrat 2016	Bundesrat	Botschaft zur Förderung von Bildung, Forschung und Innovation in den Jahren 2017–2020 vom 24. Februar 2016
Bundesrat 2018	Bundesrat	Strategie für offene Verwaltungsdaten in der Schweiz 2019–2023. (Open-Government-Data-Strategie, OGD-Strategie.)
Bundesrat 2020	Bundesrat	Der Bundesrat schafft ein Kompetenzzentrum für Datenwissenschaft. Medienmitteilung vom 13.05.2020.
Christen et al. 2020	Markus Christen, Clemens Mader, Johann Čas, Tarik Abou-Chadi, Abraham Bernstein, Nadja Braun Binder, Daniele Dell'Aglio, Luca Fábián, Damian George, Anita Gohdes, Lorenz Hilty, Markus Kneer, Jaro Krieger-Lamina, Hauke Licht, Anne Scherer, Claudia Som, Pascal Sutter, Florent Thouvenin	Wenn Algorithmen für uns entscheiden: Chancen und Risiken der künstlichen Intelligenz. TA-SWISS Publikationsreihe 72/2020
Economiesuisse & W.I.R.E. 2017	Economiesuisse & W.I.R.E.	Zukunft digitale Schweiz. Wirtschaft und Gesellschaft weiterdenken.
EDK 2018	Konferenz der Kantonalen Erziehungsdirektoren	Digitalisierungsstrategie. Strategie der EDK vom 21. Juni 2018 für den Umgang mit Wandel durch Digitalisierung im Bildungswesen.
ETH-Rat 2014	Rat der Eidgenössisch-Technischen Hochschulen	Strategische Planung 2017–2020 des ETH-Rats für den ETH-Bereich.
ETH-Rat 2016a	Rat der Eidgenössisch-Technischen Hochschulen	Der ETH-Bereich lanciert die «Initiative for Data Science in Switzerland»
ETH-Rat 2016b	Rat der Eidgenössisch-Technischen Hochschulen	Internationale Wettbewerbsfähigkeit stärken und in zukunftsweisende Forschungsbereiche investieren
Expertengruppe 2018	Expertengruppe zur Zukunft der Datenbearbeitung und Datensicherheit	Bericht der Expertengruppe zur Zukunft der Datenbearbeitung und Datensicherheit

Continuation of Table A1 on the following page.

Continuation of Table A1.

Abbrevation	Author	Title
GDS 2016	Geschäftsstelle Digitale Schweiz, Bundesamt für Kommunikation	Aktionsplan Digitale Schweiz. Massnahmen der Bundesverwaltung. April 2016. Biel: Bundesamt für Kommunikation.
GDS 2017	Geschäftsstelle Digitale Schweiz, Bundesamt für Kommunikation	Aktionsplan Digitale Schweiz. Massnahmen der Bundesverwaltung. Stand: November 2017
GDS 2018	Geschäftsstelle Digitale Schweiz, Bundesamt für Kommunikation	Aktionsplan Digitale Schweiz. Stand: 5. September 2018.
ICTswitzerland & Economiesuisse 2011	ICTswitzerland & Economiesuisse	ICTswitzerland und Economiesuisse: Digitale Agenda 2020. Auf dem Weg an die Weltspitze.
IDAG KI 2019	Interdepartementale Arbeitsgruppe «Künstliche Intelligenz» (SBFI)	Herausforderungen der künstlichen Intelligenz. Bericht der interdepartementalen Arbeitsgruppe «Künstliche Intelligenz» an den Bundesrat
ISA IG 2016	Interdepartementaler Steuerungsausschuss Informationsgesellschaft, Bundesamt für Kommunikation	Bericht 2012–2015 zur Umsetzung der Strategie des Bundesrates für eine Informationsgesellschaft in der Schweiz vom März 2012. April 2016.
ISS 1998	Bundesrat	Strategie des Bundesrates für eine Informationsgesellschaft in der Schweiz vom 18. Februar 1998
ISS 2006	Bundesrat	Strategie des Bundesrats für eine Informationsgesellschaft in der Schweiz, Januar 2006
ISS 2012	Bundesrat	Strategie des Bundesrates für eine Informationsgesellschaft in der Schweiz März 2012
Jarchow & Estermann 2015	Jarchow, Thomas & Beat Estermann	Big Data: Chancen, Risiken und Handlungsbedarf des Bundes. Ergebnisse einer Studie im Auftrag des Bundesamts für Kommunikation
SATW 2019	Schweizerische Akademie der Technischen Wissenschaften	Künstliche Intelligenz in Wissenschaft und Forschung
SBFI 2017	Staatssekretariat für Bildung, Forschung und Innovation	Herausforderungen der Digitalisierung für Bildung und Forschung in der Schweiz
SCNAT 2018	Schweizerische Akademie der Naturwissenschaften	Synthese des Workshops vom 8. Februar 2018. Bedeutung der Informatik heute – Visionen für morgen.
SDS 2016	Bundesamt für Kommunikation	Strategie Digitale Schweiz. April 2016

Continuation of Table A1 on the following page.

Continuation of Table A1.

Abbrevation	Author	Title
SDS 2018	Bundesamt für Kommunikation	Strategie «Digitale Schweiz». Vom Bundesrat verabschiedet am 5. September 2018
SDS 2020	Bundesamt für Kommunikation	Strategie «Digitale Schweiz». September 2020
SECO 2017a	Staatssekretariat für Wirtschaft	Auswirkungen der Digitalisierung auf Beschäftigung und Arbeitsbedingungen – Chancen und Risiken.
SECO 2017b	Staatssekretariat für Wirtschaft	Bericht über die zentralen Rahmenbedingungen für die digitale Wirtschaft. Bericht des Bundesrats vom 11. Januar 2017.
SEFRI 2019	Secrétariat d'Etat à la formation, à la recherche et à l'innovation	L'intelligence artificielle dans la formation
SNSF 2015	Swiss National Science Foundation	NRP 75 Big Data. National Research Programme. Call for Proposals
SNSF 2018	Swiss National Science Foundation	NRP 77 Digital Transformation. National Research Programme. Call Document
Staatslabor 2018	Staatslabor	Kurzbericht zum Workshop Aktualisierung der Strategie Digitale Schweiz vom 10. April 2018 in Bern
swissuniversities 2018	swissuniversities	Strategische Planung 2021–2024 von swissuniversities. Zuhanden der Schweizerischen Hochschulkonferenz
UVEK 2019	Eidgenössisches Departement für Umwelt, Verkehr, Energie und Kommunikation UVEK	Bericht zu den Empfehlungen der Expertengruppe zur Zukunft der Datenbearbeitung und Datensicherheit: Kenntnisnahme und weiteres Vorgehen. Stand: 15. Oktober 2019

Table A2 Aggregated Frequencies of Selected Topics in the Sample[a]

Topic	Terms	Strategy 1998	Strategy 2006	Strategy 2012	Strategy 2016	Strategy 2018	Strategy 2020
Digitalisation as social transformation	Digital*	0	0	4	22	48	61
	Automatisation	0	0	0	1	4	4
	Modernisation	1	0	0	1	1	0
	Transformation	0	0	0	10	11	19
	Change	0	1	2	5	11	14
	Transition	0	0	3	4	6	9
	Development	8	16	28	50	50	67
	Process*	1	1	11	25	20	27
	Absolute Frequency	10	18	48	118	151	201
	Relative Frequency in %	0.66	0.67	1.16	2.27	1.99	1.72
Data, artificial intelligence	Data	2	10	17	31	56	134
	Algorithm*	0	0	0	0	1	1
	Artificial*	0	0	0	1	7	10
	Intelligen*	0	0	4	6	20	16
	Smart*	0	0	5	3	9	11
	Distribut*	0	0	2	6	6	6
	Absolute Frequency	2	10	28	47	99	178
	Relative Frequency in %	0.13	0.37	0.67	0.9	1.3	1.53

[a] The topics as well as the terms are translated from the German original by the author. Source: Saner and Mützel (2023).

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Claiming Universal Epistemic Authority – Relational Boundary Work and the Academic Institutionalization of Data Science

Bianca Prietl* and Stefanie Raible**

Abstract: This article studies the rise of academic data science in Germany, Austria and Switzerland. By focusing on the boundary work that accompanies this development, we try to understand current transformations in knowledge production within digital academia and beyond. Drawing on qualitative interviews with data science scholars, we identify five lines of demarcation in claiming universal epistemic authority. This boundary work is characterized by multiple tensions and varies depending upon context and counterpart, making it inherently relational.

Keywords: Data science, academic institutionalization, discursive boundary work, epistemic authority

Universelle epistemische Autorität – Relationale Grenzziehungen und akademische Institutionalisierung von Data Science

Zusammenfassung: Dieser Artikel untersucht die akademische Institutionalisierung von Data Science in Deutschland, Österreich und der Schweiz unter Fokussierung auf die damit verbundenen Grenzziehungen (boundary work). Auf Basis qualitativer Interviews mit Data Science-Professor:innen rekonstruieren wir fünf Demarkationslinien, mit Hilfe derer universelle epistemische Autorität beansprucht wird, und zeigen, wie diese Grenzziehungsarbeit von multiplen Spannungen durchzogen ist, kontextabhängig variiert, und so als inhärent relational zu verstehen ist.

Schlüsselwörter: Data Science, akademische Institutionalisierung, diskursive Grenzziehungen, epistemische Autorität

Revendiquer une autorité épistémique universelle – Le travail relationnel de délimitation et l'institutionnalisation académique de la data science

Résumé : Cet article étudie l'essor de la data science académique en Allemagne, en Autriche et en Suisse en se concentrant sur le travail de délimitation (boundary work) qui accompagne ce développement. En nous appuyant sur des entretiens avec des chercheur·e·s en data science, nous identifions cinq lignes de démarcation dans la revendication d'une autorité épistémique universelle. Ce travail de délimitation est caractérisé par de multiples tensions et varie fortement en fonction du contexte et de la contrepartie, ce qui le rend intrinsèquement relationnel.

Mots-clés : Data science, institutionnalisation universitaire, travail sur les frontières discursives, autorité épistémique

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1 Introduction

In recent years, data science has cropped up on the academic landscape with a flurry of newly created chairs, research centers and study programs, all indicative of the increasing academic institutionalization of data science (Lowrie 2017; Saner 2019; Ribes 2019; Ribes et al. 2019; Prietl and Raible *forthcoming*; Slota et al. 2020; Saner 2022). These developments also point to the ongoing professionalization of data science (Dorschel and Brandt 2021) and of algorithmic modes of knowledge production more generally, which are diffusing into more and more areas of society, academic and non-academic (Kitchin 2014; Houben and Prietl 2018; Beer 2019; Bonde Thylstrup et al. 2019; Beaulieu and Leonelli 2022), changing the modes of knowledge production and challenging existing structures of epistemic authority (Bartlett et al. 2018; Prietl 2019a; Kitchin 2022; Jarke et al. *forthcoming*). This article studies the rise of *academic* data science in Germany, Austria and Switzerland by focusing on the complex bundle of boundary work that accompanies this development, in order to gain a better understanding of the current transformations of knowledge production in digital academia and beyond.

Data science has been applied in non-academic contexts for quite some time. It has given rise to the so-called data analytics industry (Beer 2019) and data scientists as a new branch of tech professionals (Dorschel 2021). But data science is only just taking root in academia. Our own empirical research sheds some light on the structural implementation of data science at universities and universities of applied sciences in the so-called DACH region[1]: With a total of 92 study programs in Spring 2021 and 80 newly appointed chairs in data science (out of 146 openings for data science chairs advertised between 2015 and 2021), we find ample evidence for an academic institutionalization of data science in the three countries studied. We can further depict a strong temporal dynamic with a rapid acceleration in the number of open positions in the years observed (advertised chairs in 2015: n = 8; 2016: n = 17; 2017: n = 28; 2018: n = 26; 2019: n = 35; 2020: n = 32). The chairs and degree programs in data science are for the most part situated in university departments related to STEM (science, technology, engineering, mathematics), especially in the area of computer science (e. g. 75 out of 146 advertised chairs and 61 out of 92 study programs). This organizational affiliation is also reflected on a content level, with the majority of data science professors having a background in computer science, and data science study programs focusing on computer science skills and competencies.[2] Where data science is implemented with a domain-specific focus (such as "business analytics and data science"[3] or "bio data science"[4]), there

1 DACH region includes the German-speaking countries Germany, Austria and Switzerland.
2 This might also explain why the majority of data science chairs in the German-speaking countries we studied are currently headed by men.
3 Title of a data science chair at University of Graz (Austria).
4 Title of a master's degree program at University of Applied Sciences Wiener Neustadt (Austria).

is a strong penchant for data science being institutionalized in alliance with either economic (e. g. 11 out of 26 domain-specific degree programs) or bio and life sciences (e. g. 6 out of 26 domain-specific degree programs), while there is hardly any structural affiliation with social sciences (e. g. 2 out of 54 advertised chairs with a domain-specific focus). Albeit this penchant for certain domains, we also find a palpable claim to universality in our interviews with data science scholars and even more so in brochures for data science degree programs. Here, data science is time and again presented as providing a *toolkit* of cutting-edge algorithmic methods for analyzing (big) data sets. Those tools shall allow it to produce "better" answers to a broad variety of questions stemming from heterogeneous disciplines and areas of interest (such as biology, history or industrial businesses), which are referred to as "domains". Domains thereby designate other academic disciplines or non-academic fields such as industrial organizations or areas of political activity where data science methods are applied.

As has been noted for the data analytics industry (e. g. Beer 2019), our study also demonstrates a clear expansionist tendency in academic data science's claim to epistemic authority, as the discipline increasingly asserts its relevance for academia and society as a whole. Taking into account the growing general demand for algorithmic modes of knowledge production, along with the specific call for data science by science policy as well as industry actors (Saner 2019), better understanding the epistemological claims made in the name of data science emerges as a timely and topical undertaking.

To grasp these developments, this paper explores the multiple forms of boundary work performed in staking the territory of data science, as encountered in qualitative interviews with data science professors (see section 2). It reconstructs the central lines of discursively enacted demarcation to construct data science on a symbolic level as an academic endeavour in its own right. These boundaries serve to distinguish it from other, established, disciplines within academia as well as from industrial data analytics and everyday notions of data science, especially public hypes around big data (see section 3). Finally, we reflect upon these empirical findings to better understand the implications of the academic institutionalization of data science for established structures and modes of knowledge production (see section 4).

2 Analytical Perspectives

Adopting the conflict-theoretical concept of *boundary work* as proposed for studying the emergence of professions (Abbott 1988; 1995a; 1995b) as well as the demarcation of science (Gieryn 1983; 1994; 1999) in a discourse- and practice-theoretical approach (Paulitz 2012), this article employs a relational perspective in order to explore the *discursive practices of distinction* done by data science professors. By exploring

these practices of boundary work, we aim to analyse the various discursive strategies for claiming epistemic authority and legitimacy for data science as a new, stand-alone academic endeavour. We analyse how data science is symbolically constituted within a system of established disciplines and in relation to established structures and modes of knowledge production (for the use of the concept of boundary work for the study of professions, science and knowledge, see Lamont and Molnár 2002, 177–181).

Following both Andrew Abbott and Thomas F. Gieryn we take an anti-essentialist view of data science. That means we forgo any assumptions of a core set of characteristics that make data science a profession, a scientific discipline or even something called "data science" itself. Instead, we apply a processual perspective on *how* data science is constituted, especially by means of discursively drawn (professional) boundaries. As Abbott has pointed out, professions regularly compete with each another to secure the "more or less exclusive right to dominate a particular area of work" (1995a, 551), in other words, to be solely or primarily responsible for solving a particular problem in and for society. Because it is rare for a single profession to hold a monopoly in this regard, the professional system remains fluid and in constant negotiation (Abbott 1988, 69–79), with demarcations as well as divisions of labour and professional cooperation patterns that change over time (Abbott 1995b, 872). In order for professions to solve the problems to which they lay claim, they need to develop a professional body of knowledge that enables and legitimizes their inquiry (Abbott 1988, 52). In most cases such a body consists of a rather abstract, formal knowledge system, whose administrators are to be found in the academic field, which is also why "the ability of a profession to sustain its jurisdictions lies partly in the power and prestige of its academic knowledge" (Abbott 1988, 53–54). The academic institutionalization of data science, hence, marks an important milestone in the professionalization of data science as a scholarly discipline – and as a new mode of knowledge production.

Whereas Abbott studies professional "turf wars" primarily on the structural level of actors, organizations, labour divisions and resource distribution, Gieryn proposes, while building on Abbott's earlier work, the concept of "boundary work" to focus on the *symbolic* struggle for *epistemic* authority, thereby highlighting the importance of cultural classifications and representations. Gieryn's own work centers around the question of how science becomes perceived as the sole producer of truth within an "intellectual ecosystem" (1983, 783), especially in contrast to other knowledge-producing fields such as art, religion or politics. Adopting the metaphor of cartography, he understands science as a specific territory on a cultural map that serves as a guide for members of society, especially those who decide upon the distribution of resources in the intellectual ecosystem, and shows them "where" verified knowledge is produced. This scientific terrain, however, is neither fixed in and of itself, nor is it stable over time; rather, it emerges as the result of its demarcation, as an effect of the boundary-drawing work of competing actors and/or organiza-

tions (Gieryn 1999). Put differently, science neither exists as an entity *a priori*, nor does it have any fixed characteristics in an essentialist sense. On the contrary, science represents a historically as well as locally specific phenomenon, for "[t]he boundaries of science are ambiguous, flexible, historically changing, contextually variable, internally inconsistent, and sometimes contested" (Gieryn 1983, 792). Gieryn consequently draws attention to the rhetorical processes in which scientific practices and actors are attributed certain properties and are distinguished from others in order to identify them as scientific.

Loosely referring to Foucault and Bourdieu, Gieryn (1994, 417) further stresses the connection between processes of boundary work and questions of power. This becomes clearest when he describes boundary work as a means in the struggle for "credibility, prestige, power, and material resources" (Gieryn 1994, 405), which is achieved through "social interest in claiming, expanding, protecting, monopolizing, usurping, denying, or restricting the cognitive authority of science" (Gieryn 1994, 405). For him, this power struggle takes place primarily at the symbolic level of cultural classifications and, thus, in interest-driven rhetorical negotiations, having nonetheless very material consequences. In order to succeed, scientists – whom Gieryn identifies as the prime actors in these "rhetorical games" (1994, 406) – have to draw on established cultural norms and classifications, and strive to connect new negotiations with previous negotiation outcomes.

Although not in the direct crosshairs of his focus, Gieryn does point out early on that the concept of boundary work can also be applied to study the negotiation of boundaries and the associated processes of constitution of territories *within* academia, for example in creating (sub)disciplines (1983, 79; for such an application of the concept of boundary work, see e. g. Paulitz et al. 2015). Tanja Paulitz (2012) takes up this notion in her studies of how engineering became constituted as a gendered discipline. Drawing on Foucault's reasoning on the power/knowledge nexus and Bourdieu's field theory, she extends Gieryn's concept of boundary work from a discourse- and practice-theoretical perspective, thus reframing rhetorical negotiations as *discursive practices of distinction* by actors socialized and competing within the academic field. While adhering to the incorporated norms and rules of the academic field, they also fight over the shape and form of these rules in order to position themselves favourably, especially with regards to the realm they claim epistemic authority for.

Following the analytical perspectives outlined above, we endeavour to grasp how data science scholars discursively claim epistemic authority for a certain set of problems and draw the line between their expertise and that of other – already established – actors in academia and beyond, and, in the process, contribute to the professionalization and academic institutionalization of data science. We understand boundary-making as constitutive for the academic field and its disciplines, and we

grasp our object of inquiry as both processual in character and structurally entangled with myriad power relations (see also Prietl and Ziegler 2016).

3 Empirical Approach

Empirically, we draw on own empirical research[5], especially 19 in-depth semi-structured qualitative interviews with data science professors in Austria, Germany and Switzerland. Applying the strategy of theoretical sampling (Strauss and Corbin 1996), we collected data covering the categories of gender (with an over-representation of women, 5 out of 19 interviewees), university type (research universities or universities of applied science), (technoscientific and geographic) metropoles or peripheries, generalist or domain-specific data scientists (including dominant domains such as economics as well as "niche" domains like social science). With the exception of two junior professors (equivalent to assistant professors without tenure track), our interviewees held permanent positions. The chair-based system in the DACH region grants them a high level of job security, basic financial and personal resources as well as freedom of research. However, since the turn of the century higher education governance has introduced entrepreneurial elements, especially performance- and project-based funding, pressuring universities as well as scholars to compete for third-party funding and students (Houben 2022, 323–332).

In terms of content, the interviews centered around the interviewees' own characterization of academic data science[6] for which they can be seen as representatives due to their position as data science professor. The interviews lasted two hours on average. All interviews were conducted online via Zoom (for a methodological reflection, see Raible et al. 2023), transcribed verbatim,[7] and analysed with the help of MAXQDA, applying open and selective coding strategies (Strauss and Corbin 1996). Coding was guided by our research interest of better understanding the positioning, discursive constitution, and legitimization of data science as an academic endeavour. For the purpose of this paper, we focused our analysis on the boundaries made relevant by the interviewees when presenting their understanding of data science and doing data science.

As we did not encounter any systematic country-specific differences, we do not distinguish between the three countries in the following results.

5 For the financial support of the research project "The Politics of Data Science" we would like to thank the Dr. Hans Messer Foundation.

6 Our interview guideline contained questions about the interviewees' professional and disciplinary biography, their understanding of data science, doing research and teaching in data science, cooperation and academic networks, their stance on critiques towards data science and perceptions of the future of their discipline.

7 All interviews were conducted and transcribed in German; the quotations cited below were translated by the authors.

4 Empirical Results

Looking at how our interviewees presented themselves and data science in the interviews, several boundaries stand out that we interpret as *relational* as their content and form vary depending upon context and counterpart: First and foremost are the boundaries drawn between methods-driven and applied data science (4.1) as well as between data science and its constitutive disciplines, computer science, mathematics and statistics (4.2.), but also so-called domains (4.3.). Furthermore, we witnessed boundaries drawn between academic data science in contrast to industrial data analytics (4.4.) as well as distinctions drawn between data science and everyday notions surrounding data analytics, particularly the high-publicized promises of big data (4.5.).

4.1 Ambiguous Hierarchies Within Data Science: Methods-Driven Versus Applied Data Science

> *I would describe data science as trying to draw insights from what we hope is a large [laughs] data set and then interpreting them somehow. That's the main idea of what you might call applied data science. Then there's the more methods-driven approach that is mainly focused on developing new methods. I try to strike a healthy balance.* (IV_DE_13-2, Pos. 19)

At first glance, this interview quote from a data science professor describes data science as aiming to distil insights from large data sets. As noted above, data science is frequently presented as an analytical toolkit that offers a new approach to knowledge production in multiple domains by analysing (big) data sets (Slota et al. 2020; Saner 2022). At a second glance, however, a subtle tension becomes apparent between "applied" vs. "methodological" data science. This differentiation between data science that "solely" focuses on the application of data science methods, on the one hand, and a data science that is concerned with advancing those same methods, on the other hand, surfaces in many of our interviews and constitutes an *ambiguous hierarchy* within the emerging discipline of data science.

Especially those interviewees who positioned themselves primarily as applied data scientists were strongly invested in boundary work vis-à-vis their more methods-oriented colleagues. Elaborating further, the interviewee quoted above explained:

> *Because, apart from purely methodological data science, if you say you are developing data science methods, then maybe you can do that* at home in your little office. *But as soon as you want to do something with those methods, you need to actively enter the respective domain. And at that point, at the latest, you cannot avoid working together with the relevant experts and in an interdisciplinary context.* (IV_DE_13-2, Pos. 37; our emphasis)

Here, refining data science methods is associated with isolated, non-communicative work that is separate from relevant domains and experts. This description of methods-driven data science evokes the cliché of the computer nerd: technically accomplished but socially incompetent (cf. Turkle 1986). It also reveals deprecatory notions of doing science in the ivory tower. Applied data science, in contrast, appears to bring both – supposedly mutually exclusive – skill sets together, casting off undesirable notions of scientific work while retaining the claim of epistemic authority.

At the same time, however, some interviewees voiced their admiration for data scientists who work on new algorithms, thus, marking the distinction between "applied" and methods-driven data science a hierarchical one. One professor at a university of applied sciences described her position as follows:

> *I wouldn't – well, I'm definitely not – among the top researchers [smiles], the ones refining or tinkering with new algorithms, but rather in practical applications and communicating results.* (IV_DE_08, Pos. 88)

Besides, once again, associating practical application with communication, this scholar also links research excellence with the idea of improving the very toolkit that constitutes data science. This association of excellence and prestige with methods-driven data science can also be observed in other interviews. A data science professor who works in the domain of engineering makes a deeply personal argument out of this distinction:

> *I especially feel that this project goes beyond merely applying these approaches. When I do research, it's very unsatisfying to just pull something out of the drawer [clears throat] that I've used in another context, for example, and I now apply it to the specific problem at hand.* (IV_DE_05, Pos. 68)

With not being satisfied to "just" apply ready-to-use methods, working on improving the analytical methods of data science is here again positioned as superior to their mere application – also when it comes to one's own self-image as a data scientist.

Considering the hierarchical notion underpinning the distinction between applied and methodological data science, the boundary work done by scholars on the application side of the data science spectrum seems to be stemming from a symbolically subordinate position and with a rather (self-)defensive and justifying goal. Conversely, methods-driven data science emerges as symbolically prestigious. This distinction between methods-driven and applied data science resembles the well-documented theory versus practice-boundary in engineering that served as a flexible means to distinguish academic engineering from non-academic "tinkering", but also to distinguish between theoretical versus applied areas of engineering (for theory versus practice distinctions in science and engineering, see Paulitz 2012; Paulitz et al. 2015). Discursive constructions of data science therefore seem to build upon past traditions of the symbolic construction of engineering. At the same time

the symbolic hierarchy remains ambiguous as the subordinated pol, i. e. practical application of data science, is of value in itself, not least in the context of the entrepreneurial university that calls for practical relevance of science.

4.2 One for All: Uni-Dimensional Disciplines Versus Integrative Data Science

Data science is not only structurally implemented at the intersection of mathematics, statistics and computer science (see with regards to curricula construction Saner 2019), but also described by our interviewees as the perfect synergy of these established disciplines. In their depictions, data science overcomes their respective one-sidedness by integrating the strong suits of its "parent disciplines", as well as additional interdisciplinary expertise, including social skills and domain knowledge. In drawing these distinctions, data science professors once again rely on the theory versus practice-boundary. This time, however, the distinction is manifested by drawing lines between science and the "real world", or between the technical and the social. Furthermore, while mathematics, statistics and computer science are associated with more theoretical (that is, science and technical) territory, data science is presented as integrating both – supposedly mutually exclusive – ends of the spectrum.

A smaller circle of data science professors, mainly those with a disciplinary background in mathematics or statistics, underscored the scientific and academic nature of data science – especially in contrast to "mere" computer science. Depicting data science degree courses as a breeding ground for future data scientists who would then embark on a career in academia, one interviewee argued for shaping data science in such a – scientific – way, suggesting that developing the discipline more toward computer science would not produce the talent pool that the discipline needs:

> *Because we train the young talents who go on to get their PhDs, and because I come from the field of statistics, I also have an interest in shaping data science to be more than just another word for computer science. My hope is that we can shape it in this way.* (IV_DE_06, Pos. 105)

Other interviewees, by contrast, stress the what has been called "real-world orientation" (Saner 2022) of data science. The distinction here is between data science and neighbouring disciplines, such as mathematics, computer science or statistics, which are said to be disinterested in the application of their knowledge and expertise. One data science professor specialized in biomedicine described potential students who would not be a good fit for the master's degree program in which he teaches and which is highly focused on data science methods:

> *Yes, let's say a pure computer scientist or mathematician who is not really enthusiastic about a specific application domain, I would actually advise them against it, because even at [a university, our anonymization], when you choose this degree program, you have to choose a specialization. And you*

> *should also want to do it, because otherwise why would you do data science?* (IV_DE_13-2, Pos. 83)

Whereas the "pure" mathematician or computer scientist is viewed as oblivious to the world, data science is defined precisely by openness to worldly topics. Hence, with computer science, mathematics and statistics being depicted as either too close or too distant to science and its methodological rigor, data science is presented as being both open to the "real" world yet scientific in nature.

The idea of worldly oblivion is often linked to a lack of social and communicative skills, when for instance describing "pure" mathematicians and computer scientists as less socially competent than data scientists. When asked to give an assessment about what data science entailed for her, another interviewee describes these skills as a feature of data science in contrast to computer science, the discipline that she herself studied:

> *And, of course, the basics that you bring with you from mathematics and computer science are important. But the social skills are particularly important for data science. I don't think they are that important for pure computer scientists. But for data science in particular. […] Because you have to communicate a lot. Right from the start. That means you sit down with the domain experts and you have to understand first, what the problems are that you actually want to solve with the approach?* (IV_DE_04, Pos. 41–43)

When compared to mathematics, computer science or statistics, data science is associated repeatedly with practical applications, a real-world perspective and social skills. The message being: data science can move beyond a single focus on scientific progress or technical knowledge by *also* succeeding in the real world and in the social realm. In contrast to its "parental disciplines" that are depicted as uni-dimensional, data science is portrayed as integrative, uniting technical and social skills, such as data science expertise and communication skills. By aligning the theory–practice boundary with the technical–social boundary, data science appears to "have it all". This boundary work also serves the goal of attacking the epistemic authority of those disciplines that have so far held jurisdiction over high-level quantitative data analysis.

4.3 The Great Integrator: Isolated Domains Versus Transversal Data Science

Data science is not only defined by drawing boundaries to established disciplines such as mathematics, statistics and computer science. It is also characterized by its relation to what our interviewees and the literature refer to as "domains" (Ribes et al. 2019). As stated before, domains may designate other academic disciplines or non-academic areas where data science methods are applied. Domains supply the lines of inquiry to be pursued using data science methods, along with the necessary data to do so. Thus, domains are not *part* of data science, but *constitutive* for data

science. When it comes to these domains, data science is portrayed as an advanced way of producing domain-immanent knowledge. Most of our interviewees presented their role as data scientists in relation to domains and domain experts with confidence, but also modesty, with the exception of one data science professor who rather jokingly, yet tellingly, described his experience that "using very primitive means" (IV_DE_02, Pos. 94) was often enough to make a big impression. All, however, argued that data science enables researchers to pursue a whole new set of questions that previously had not been possible to investigate. When asked about the societal benefits of data science, one interviewee spoke about deploying data science methods to other disciplines:

> *And in this respect, there are simply new possibilities to conduct research. And also to evaluate data. It just brings new energy and, of course, also new possibilities to do research in new ways.* (IV_AT_02, Pos. 2)

For many interviewees, the specific thing that data science brings to the table was opening up research for new *types* of data and unprecedented *quantities* of data that both had not been possible to analyse before.

Another strength of data science that is repeatedly put forward is its genuinely *integrative* character. While our interviewees described other disciplines and domains as uni-dimensional since they are often restricted by a specific research focus or specific theoretical or empirical approaches, they saw data science as having no such limitations because – by its very nature – it combines different disciplinary perspectives and approaches. That includes the integration of domain-specific expertise. A data science professor explained this point as follows:

> *Because I don't want to contradict my other colleagues, on the contrary, every discipline or every domain has its strengths and its expertise. But sometimes I feel like they have blinders on: like, OK, this is my focus, this is what I can do. And everything else almost becomes secondary. And as a data scientist you have to somehow manage a balancing act between: this is important here, and this aspect from a different area is important as well. You really need to juggle a bit between all the domains that are somehow connected. And you're also doing a bit of bridge-building between all those areas.* (IV_DE_11, Pos. 2)

Here, domains are presented as restricted by "blinders" and overly focused on certain approaches. Going a step further, that also makes them in need of data science's support in bringing different perspectives together by way of "bridge-building". Data science is again positioned as overcoming the weaknesses of established uni-dimensional disciplines as they investigate questions within domains. This boundary work done in relation to so-called domains furthermore presents data science as a means of revitalizing these research areas. By opening up new possibilities for

cooperation, data science is positioned as a potentially beneficial research partner. The emerging discipline is symbolically constructed as bridging the gaps between different areas of research, bringing together diverse fields and actors, and thus as a quintessentially *transversal* endeavour (see also Saner 2022), albeit one with a clear symbolic asymmetry: data science is the active partner, the one required for a domain to rise to the task, while the partner fields remain relatively passive and in need of data science.

4.4 A Matter of Interest: Interest-Driven Industrial Data Analytics Versus Value-Free Data Science

Data science professors are well aware that what is now becoming institutionalized as "data science" has long been practiced by (self-taught) data scientists in a range of industrial fields. In presenting and positioning data science as an *academic* endeavour, they also distance themselves from industrial data analytics on the one hand and (in)famous "big tech" companies on the other hand.

When asked how she came to work in data science, one professor who collaborates in several joint projects in the medical field outlined her understanding of data science:

> *And what I understand by that is not simply something like data analysis, not simply data analytics, which is often done in businesses, just analysing or describing data or exploiting data, but really the science behind it.* (IV_DE_06, Pos. 11)

By pointing out the academic and scientific character of her work, the interviewee distinguishes her perception of data science versus "mere" data analytics. Whereas she presents the latter as highly outcome-driven, to the extent of "exploiting" data, she finds the edges of the former in its scientific character. Subtly, a boundary is drawn between non-academic and academic data science based on the distinction of interest-driven vs. interest-free, with the reference to "exploitation" evoking notions of (economic) interests as a driving force behind data analytics. Depicting academic data science as "really" all about the science symbolically links it with established notions of impartial, value-free science, similar to pursuing *l'art pour l'art*.
This idea of doing data science as a goal in and of itself, independent from economic or business interests, was also brought up by another interviewee who linked this argument even more strongly to prevalent scientific ideals of free research (and speech):

> *We also saw at Google recently how they just fired a researcher, […] because she wrote something that Google didn't like. And I wouldn't see that in academia, these restrictions. I don't have a company behind me where I have to be careful to toe the company line or anything.* (IV_AT_01, Pos. 2)

At the same time, Google and other "big tech" companies, often referred to as the "usual suspects" (IV_AT_01, Pos. 2) and therefore in no need of an introduction, are also portrayed as Goliath-like competitors with whom academic data science simply cannot compete. Due to the economic, technical and human resources available to them, it is an accepted view that these companies are able to do a level of data science that is out of reach for any university data scientist. Our interviewees noted the perceived superiority of big tech companies with mixed feelings, admiring some achievements and possibilities, while also remaining sceptical about potential threats, especially due to the monopolistic positions of these enterprises. One data science professor reflected on their influence, not only on the institutionalization of data science as a discipline, but also on society as a whole:

> *They were able to anticipate very well what will be in high demand, what – maybe they can also steer it, what people want, that's always such a question. But solutions are often offered for really urgent problems or [problems that] are made urgent – I don't know, it is difficult to judge, I think, but that is of course an issue that these are the solutions that people then use.* (IV_DE_05, Pos. 52)

As the argument develops from "offering" solutions to urgent problems, to "making" these problems urgent in the first place, to finally diffusing solutions to potentially fabricated challenges, this quote clearly has a critical undertone: doing data analytics in non-academic contexts is once again linked to (economic) interests and academic data science, on the other hand, is positioned as interest-free.

In terms of available resources, industrial data analytics, especially the opportunities in "big tech" companies, are presented as superior to academic data science. But the latter is seen as adhering to scientific values, especially those of non-partisan and value-free research, independent from economic interests or company concerns. This distinction between academic data science and industrial data analytics aligns closely with the science–non-science boundary of central interest to Gieryn (1999), situating it along the axis of value-free versus interest-driven data analysis.

4.5 A Question of Honour: Public Hype Versus Serious Data Science

Although all interviewees – little to our surprise – pointed out the advantages of data science, claiming its rightful place in the academic field, they were also critical towards common public perceptions and ideas about data analytics. Many explicitly distanced data science from public (and sometimes, academic) discourses surrounding big data, AI and data science, which they described as "hype" and even hyperbole, both with potentially perilous consequences.

One repeated distinction we found was the one between data science and big data. An interviewee described his path into data science as paralleling the develop-

ment from earlier big data hypes towards the supposedly much more (self)reflexive and, thus, serious endeavour of data science:

> *I think data science somehow came out of big data. [...] Early in 2010 and in the 2010s and so on, there was a lot of hype: big data. [And we all thought] there's just so much data now and we don't need to look after it or anything, it's just all there. All we need to do is analyse and then we'll get what we're looking for. But that was really all hype in the end. It didn't turn out that way. Instead, it took a different turn [we found out that] the data has to be looked at very well. The distortions, the biases have to be found. And it's not possible to find something in the data that's not there. So basically, all the things we've known since the dawn of statistics. It became clear that it all applies to big data as well. And that's when we started moving toward data science.* (IV_AT_01, Pos. 2)

In this historical narrative, data science is not only presented as self-reflexive and self-critical – in other words, aware of biases and reflecting on its method and data choices – but, having "overcome" big data, also as capable of advancement and self-improvement.

Another interviewee drew comparisons between past (and present) promises made in the name of "multimedia" and artificial intelligence. Linking these hypes with economic interests, he hoped for data science to "normalize" and become a solid part of (computer) science:

> *So, whoever did multimedia got money. [...] That's exactly how I see it. […] And that's also how I see AI. So, AI is a farce, data science is a part of AI. It's a part of computer science, of course. Yes, it has a certain validity. But there is a certain belief in hype. […] My hope is that it won't end up in the same bucket we put multimedia in today [...] My fear is that it might end up like that. But my hope is that it will be normalized and data science will just be a normal part of working in different domains. And a solid part of computer science.* (IV_DE_14, Pos. 35 and Pos. 153)

Looking at the boundary work done to distinguish data science from hype, data science is positioned as a serious and robust scientific enterprise in contrast to dubious, exaggerated and untrustworthy promises. Some of our interviewees also brought up the problematic role of some data science scholars who fuel unrealistic promises that eventually lead to disappointment but also endanger the epistemic authority of academic data science:

> *What I think is more likely to happen is that we start to over-promise, in the sense that it's all very simple: you press a button and then a perfect decision, your perfect decision model, your perfect prognosis comes out, which is then also fully understandable and totally explainable and free of error and*

> *anyone can do it. You do a weekend course on, well, on Coursera and then everything works. But the thing is, we are very, very, very, very far away from that. […] Because they* [scholars appropriating the label data science; the authors] *are travelling under the wrong flag and with the wrong label. And I'm really afraid of that. That they'll say, this is it and we're publishing it. Because, well, it sounds very nice, fancy and all that. So somehow, it's all new and there's a lot of hype behind it, but then maybe it's no longer true in detail.* (IV_DE_03, Pos. 88)

As the above quote shows, unrealistic promises are problematic not only because they eventually lead to disappointment, but also because they undermine the epistemic authority of data scientists. They suggest that everyone could ultimately do data analytics in the blink of an eye, an implication that belittles the expertise and skills necessary for serious data analytics. Again, boundary work involves contrasting public perceptions of data science against academic data science along the line between unrealistic and serious or untrustworthy versus reliable.

The boundary work observed above, undertaken to distance data science from commonly held public notions surrounding data analytics or data science, can also be interpreted as proactive engagement with critical voices and public concerns, especially with questions of bias that have gained considerable public attention in recent years and even lead to regulatory attempts aimed at responsible companies and technologies (Andrews et al. 2017; Prietl 2021).

5 Discussion

This paper set out to study the boundary work accompanying the academic institutionalization of data science in order to understand current developments in the structures and modes of knowledge production in society.

As we have shown, there are several lines of demarcation discursively drawn by data science professors to construct academic data science on a symbolic level. In claiming a place for data science in academia, data science is distinguished from industrial data analytics on the one hand and popular notions of (big) data analysis on the other. Compared to industrial data analytics, which is presented as driven by – mainly economic – interests, academic data science is associated with long established ideals and norms of doing science, especially those of value-free and interest-free research for the sole sake of advancing science and knowledge. In critically distancing academic data science from what is often referred to as "hypes" surrounding big data and AI, it is furthermore positioned as a serious, trustworthy and reliable scientific endeavour, one that is even capable of self-critique and self-improvement. *Within* academia, data science is distinguished from its "parent disciplines" – mathematics, statistics and computer science – as well as from so-called

domains that are each depicted as being uni-dimensional and limited in scope. In contrast data science is characterized as "having it all", being "real-world oriented" as well as scientific, technical as well as social, generalist as well as domain-specific. The boundary work done to distinguish data science from mathematics, statistics and computer science primarily serves the goal of positioning data science *in place of* these established disciplines, thus attacking their epistemic authority. By comparison, the boundary work done in distinction to so-called domains emphasizes the transversal openness of data science and the promise of bringing new energy into the research agenda of domains, thus, positioning data science as a beneficial partner for joint (research) projects. Last but not least, referring to the theory–practice boundary or pure–applied science boundary, hierarchical lines are being drawn within data science itself, positioning methods-driven data science as symbolically superior to applied data science.

Following David Beer's (2022) argument that *tensions* are constitutive of algorithmic thinking, we can see that the boundary work done to constitute data science is also quite charged. Whereas when distinguishing data science from mathematics, statistics or computer science, it is viewed as an applied, worldly and socially competent discipline, these ascribed characteristics change once the focus is turned onto itself. Within data science, an emphasis on methods and the scientificness of academic data science are used to establish a hierarchy between methods-driven and application-oriented data science. Robert Dorschel (2021) argued that data scientists are constructed as *hybrid professionals*: they integrate supposedly mutually exclusive characteristics such as being technically skilled and socially capable, or exploiting data while also caring about privacy and ethics. Our analysis goes a step further in demonstrating that the boundary work done to symbolically construct academic data science is more than just inherently tense and hybrid; it is flexible and above all *relational*, yet in no way arbitrary. We observed a pronounced flexibility of boundary work in terms of content. Data science was linked at one moment to theory and "pure" science, and at the other to the seemingly contrasting elements of practice and applied research. These variations, however, are by no means random; they become understandable once they are set in relation to the respective context and subject of distinction: The specific form, content and references that boundary work draws upon vary depending on what (or whom) data science is being related to, and whether that relation is one of distinction or connection (for a similar finding with respect to the symbolic construction of engineering in renewable energies, see also Prietl 2019b, 108–109).

Content-wise, data science's constant balancing act around the theory–practice boundary furthermore resembles the symbolic construction of engineering as a discipline (Paulitz 2012; Paulitz and Prietl 2013). Thus, it seems that data science not only builds on the tradition of engineering when it comes to the structuring

and organization of its curricula (Saner 2022), but also in how it is symbolically constituted.

What are the implications of these findings on a profession in becoming for established structures and modes of knowledge production in society? What social demarcations (Lamont and Molnár 2002) could result from the symbolic boundaries depicted? The professionalization and academic institutionalization of data science might affect the (academic) "system of professions and disciplines" and how "turf" is (re)divided among different actors in several ways: the epistemological claims made in the name of data science primarily attack established disciplines, and destabilize their epistemic authority as the guardians of high-level quantitative data analysis. Said disciplines include statistics, mathematics, and computer science, but also quantitative social science. While at first glance offering possible collaborations, data science also challenges the former "sole" epistemic authority of experts in other disciplines – now also symbolically reduced to domain experts in contrast to the seemingly limitless mandate of data scientists. More generally, the widespread demand for data science methods in academic as well as non-academic "domains", might delegitimize other – especially non-quantifying – modes of doing research and knowing in these areas. At the same time, scholars working with data science methods or collaborating with data scientists might see their standing rise. As Gieryn has already pointed out with regards to the distinction of science versus non-science, these symbolic struggles need to be understood as having serious material consequences. In short, actors compete for epistemic authority for good reason: epistemic authority is *the* key asset when competing for (research) funding and talent.

Looking ahead to future avenues of research, studying reactions to the rise of data science in different domains where data science methods are now applied could be one interesting angle. Interdisciplinary contexts in particular could offer an insightful setting to research the "turf wars" between data scientists and representatives of other – established – disciplines as they negotiate epistemic authority and disciplinary boundaries. Considering the importance of cultural representations for claiming epistemic authority and how performative promises drive (technological) research (Borup et al. 2006) and technology implementation in organizations (Raible 2022), further research on the role of *expectations in technology development* might also be revealing in the context of data science, especially discovering how data scientists balance tensions surrounding narratives of hopes and promises, on the one hand, and (self-)critical assessments of hypes and containment of unrealistic expectations, on the other.

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Institutional Arrangements in the Absence of Disciplinary Definitions: Digital Humanities in Switzerland

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Abstract: The digitalization of research practices in the humanities has led to the emergence of the field of digital humanities (DH). DH has made significant progress in institutionalization, while remaining underdefined. Through a qualitative study of Swiss universities we explore how institutional structures and definitions of DH interact. We show that underdefinition enables flexibility in institutionalization, while the local contexts that lead to diverse institutional arrangements may necessitate the underdefinition of DH.

Keywords: Digital humanities, institutionalization, interdisciplinarity, academia, Switzerland

Institutionelle Arrangements in Abwesenheit disziplinärer Definitionen: Digital Humanities in der Schweiz

Zusammenfassung: Die Digitalisierung der Forschungspraktiken in den Geisteswissenschaften hat zur Entstehung der Digital Humanities (DH) geführt. Trotz erheblicher Fortschritte bei ihrer Institutionalisierung bleiben sie unterdefiniert. Unsere qualitative Studie an Schweizer Universitäten untersucht die Wechselwirkung zwischen institutionellen Strukturen und Definitionen und zeigt, dass Unterdefinition Flexibilität bei der Institutionalisierung ermöglicht, während lokale Kontexte, die zu vielfältigen Arrangements führen, diese möglicherweise erfordern.

Schlüsselwörter: Digital Humanities, Institutionalisierung, Interdisziplinarität, Universitäten, Schweiz

Arrangements institutionnels en l'absence de définitions disciplinaires : les humanités numériques en Suisse

Résumé : La numérisation des pratiques de recherche en sciences humaines a mené à l'émergence des humanités numériques (HN). Malgré le progrès significatif dans leur institutionnalisation, elles restent sous-définies. Notre étude qualitative des universités suisses explore l'interaction entre structures institutionnelles et définitions, montrant que la sous-définition permet une flexibilité dans l'institutionnalisation, tandis que les contextes locaux qui conduisent à la diversité des arrangements peuvent la nécessiter.

Mots-clés : Humanités numériques, institutionnalisation, interdisciplinarité, universités, Suisse

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1 Introduction[1]

The digital transformation enables and requires new research practices in the humanities. For example, the Europeana newspapers thematic collection[2] gives researchers access to over 18 million newspaper pages, of which about 10 million pages are available as digital full texts (Oberbichler et al. 2021; Bunout et al. 2023). To make use of such resources for research in the humanities, and more specifically historical research, new methods and tools are required, which are often developed through cross-disciplinary collaborations between historians and computer scientists. The field resulting from the encounter of humanities disciplines with computational methods is known as *digital humanities* (DH).

Although we write about "a field known as DH," discussions about the definition and boundaries of this field are still ongoing. In fact, many DH scholars have argued that DH is simply "undefinable" and that, whatever its nature, it is certainly not a discipline and should not be one. Yet, since the term was introduced by Schreibman et al. (2004), DH has made rapid and significant progress in institutionalization (chairs, degree programs, learned societies, conferences, journals, etc.). Such institutionalization can be seen as ongoing professionalization and stabilization into a disciplinary form (Terras 2006; Jacobs 2013, 135–136; Klein 2013). These observations lead us to the following research question: *how do institutional structures and definitions of digital humanities interact?*

We explore this question by analyzing how digital humanities is realized in Swiss institutional structures. Switzerland provides a compelling case study for such an analysis: as of this writing, there are only five universities that have created professorships with the explicit denomination *digital humanities*. Each of them has different institutional structures that host these digital humanities professorships, but they are still sufficiently similar for mutual recognition. Our aim is to investigate how these professors of DH identify their own contributions as well as those of their peers, how they thereby identify (disciplinary) boundaries of digital humanities, and how identifications can possibly be explained by institutional structures.

This paper is organized as follows. We first discuss the problems underlying our research questions: we give an overview of discussions around definitions of DH (Section 2), how DH acts as a discipline as well as an interdiscipline (Section 3), followed by a discussion of institutionalization of interdisciplinarity in Section 4. We then move to our approach toward our research question. In Section 5 we discuss several studies conceptually related to ours. In Section 6 we discuss how we interviewed professors of DH in Switzerland and analyze these interviews through the lenses of boundary work and the emergence of research fields through local configurations.

1 We thank the interviewees for their time and their willingness to share their thoughts with us and the anonymous reviewers for their helpful feedback.

2 https://www.europeana.eu/collections/topic/18-newspapers, consulted 27.06.2023.

In Section 7 we provide brief descriptions of the local organizations of DH at each of the research universities we have investigated. In Section 8 we analyze how our interviewees identified contributions to DH and how they understand DH. Finally, in Section 9 we reflect on our findings, present our conclusions and how these relate to the scope of this special issue.

2 Debates on Digital Humanities

When discussing institutional arrangements for digital humanities (DH), the first question to address is: what is DH? DH has gained a reputation of struggling to define itself, and articles trying to define DH have become something of a genre. The assessment of Kirsch (2014) still appears accurate today:

> *Despite all this enthusiasm, the question of what the digital humanities is has yet to be given a satisfactory answer. Indeed, no one asks it more often than the digital humanists themselves. The recent proliferation of books on the subject – from sourcebooks and anthologies to critical manifestos – is a sign of a field suffering an identity crisis, trying to determine what, if anything, unites the disparate activities carried on under its banner.* (Kirsch 2014)

The volume *Defining Digital Humanities* (Terras et al. 2013) collects over twenty essays on this topic and can be regarded as the standard reference on the question. The editors clearly state in their introduction to the volume the practical need for a definition:

> *Why would one define an academic field? From one perspective such definitions have an obvious practical and utilitarian purpose: we must be able to define and describe what it is that we are doing not only to colleagues and students but to university management, funding agencies and the general public.* (Terras et al. 2013, 1)

Nevertheless, most contributors – and the editors themselves – seem to come more or less to the same conclusion as Kirschenbaum (2014, 15): "we will never know what digital humanities 'is' because we don't want to know nor is it useful for us to know." Yet even though many in the field do not seem to mind or may even celebrate the alleged undefinability as a feature of an all-inclusive "big tent," "[d]efining digital humanities is an activity that shows no signs of slowing down" (Callaway et al. 2020, 11).

In the context of this article, we do not aim to contribute to the debate on the definition of DH. For a more extensive and critical analysis of this debate, as well as a proposed definition, see Piotrowski (2018; Piotrowski and Fafinski 2020). In this paper, it is taken as a background to explore how underdefinition of a field of

research may interact with its institutionalization. In the next section we, therefore, consider traits of disciplines and the extent to which these may be applied to digital humanities.

3 Characteristics of Disciplinarity

Can DH – or one of its manifestations – be considered a discipline? To answer this question, we first need to clarify what we mean by *discipline*. In their review of attempts to define what disciplines are, Sugimoto and Weingart (2015) find that despite not finding a single authoritative definition, several characteristics are common to the various definitions. First, the way research is communicated using disciplinary jargon and in recognized journals. Second, the existence of a social group that collaborate and recognize one another. Third, the *aboutness* of a discipline, in the sense that there are certain topics or problems that are commonly recognized as interesting. Finally, they note that institutions remain of importance, mainly as part of the training and hiring market. Krishnan (2009) stresses that only through institutionalization disciplines can endure from one generation to the next. A discipline is therefore typically founded by the creation of a professorial chair dedicated to it in an established university.

We can see that certain orientations of DH satisfy many, if not most of these requirements. There is undeniably a body of knowledge accumulated in specialized journals such as *Digital Scholarship in the Humanities* (DSH), *Digital Humanities Quarterly*, or *Digital Studies/Le champ numérique*. Monographs such as McCarty (2014), anthologies such as *Debates in the Digital Humanities*, or textbooks such as Van Hooland et al. (2016) or Jannidis et al. (2017) document the research methods specific to the field. There are associations (ADHO, EADH, Humanistica, DHd, AIUCD, ACH, etc.)[3] and national and international congresses. And finally, there are no longer just "centers" – service rather than research units – but also departments, institutes, professors, degree programs, and students.

Yet what DH may lack is a commonly recognized intellectual agenda; its aboutness or specific object of research and specialist knowledge. Liu (2012) notes that DH has failed to develop its own cultural criticism to thrive as a humanities discipline. McCarty (2012) worries that DH may have adopted too much of a service role towards the humanities, providing digital tools and methods for scholars of the humanities to conduct their disciplinary research. Yet other authors have argued that the success of DH is exactly because of its tight connection and relevance to

3 ADHO: Association of Digital Humanities Organizations; EADH: European Association for Digital Humanities; Humanistica: the francophone DH association; DHd: Digital Humanities im deutschsprachigen Raum (the germanophone DH association); AIUCD: Associazione italiana per l'informatica umanistica e la cultura digitale (the Italian DH association); ACH: Association for Computing in the Humanities (the US DH association).

the humanities. Edmond (2016) attributes the success of DH to implemented research infrastructures that have reached large audiences. Eve (2020) even argues *against* institutionalization of DH; he warns that "the banishment of DH to its own departmental area is a problematic move," worrying that DH will lose its relevance if it no longer serves the humanities. Likewise, Lässig (2021) argues that digital history can only be successful when useful to history at large.

Perhaps the closest identification of a disciplinary aboutness comes from Svensson (2011, 53) when he argues that the "digital" constitutes the shared "boundary object" of DH. Yet in confronting the digital as an object of interest to the humanities, DH necessarily depends on methods, concepts, and tools from outside the humanities. Luhmann and Burghardt (2021) conclude that "DH is simultaneously a discipline in its own right and a highly interdisciplinary field, with many connecting factors to neighboring disciplines – first and foremost, computational linguistics, and information science."

As such, we find that DH exemplifies institutional traits commonly associated with disciplines, as well as traits associated with interdisciplinary spaces. In the next section, we, therefore, shift our focus on the institutionalization of interdisciplinarity.

4 Institutionalization of Interdisciplinarity

While universities have traditionally been organized into distinct faculties or departments that reflect disciplinary boundaries, this is not to deny that these structures allow some flexibility for interdisciplinary practices on the individual level. What occurs when interdisciplinarity becomes institutionalized is that those practices become visible in the organization and social sphere of the university (Klein 2013). Likewise, digital humanities can be traced back further than its institutionalization. Yet a question is whether these practices should be institutionalized as a new disciplinary unit or into an interdisciplinary space.

Small (1999) compellingly shows that this question cannot be settled *a priori* of the process of institutionalization. How interdisciplinary practices become institutionalized is not an inherent aspect of those practices, but instead dependent on local contexts. Using the example of African-American studies, Small (1999) demonstrates that institutionalization is, at least to some extent, path-dependent. Path dependency entails that phenomena can at least partially be explained by historical and contextual factors. How research is organized and even the making of scientific discoveries are in part path-dependent (Hollingsworth 2006). As such, Small (1999) finds that how African-American studies were institutionalized is partially dependent on which scholars were present at the university, what structures already existed for institutionalization, and how the university operates in the larger institutional and societal context.

In his study of the Luxembourg Centre for Contemporary and Digital History (C^2DH), Kemman (2021) demonstrates the path dependency of institutionalization of digital humanities: After debates on whether to embed this center in the Institute for History or to establish a new structure that is entirely independent from the university, it was ultimately decided to establish an *interdisciplinary center*, a type of institutional structure that already existed at the university and which could serve as a reusable model. Lässig (2021) more generally notes the path dependency of DH institutes as dependent on whether the university holds sufficient (financial) resources and personnel for large collaborative digital projects. It is thus very likely that institutionalization of digital humanities is partially path-dependent, and thereby contingent on local contexts of universities.

Small (1999) furthermore shows that an advantage of interdisciplinary institutionalization is that scholars need not choose between their original discipline and the new emerging (inter)discipline. It provides an interesting opportunity for scholars to engage with this new research field, while remaining footed in the safe havens of their disciplinary home. This aligns with the findings of Bensaude-Vincent (2016), who found that scholars did not give up their disciplinary identities, but instead configured and aligned their intellectual agendas in order to maintain their disciplinary identities. She calls this the "resilience of disciplinary identity," (Bensaude-Vincent 2016, 54–56) and subsequently argues that disciplines by themselves never stabilize, but that they are continuously shifted and reconfigured. As such, she finds that scholars often prefer not to become institutionalized into a new (inter)discipline, as it is not strictly necessary for pursuing their research interests.

Likewise, disciplinary identities have proven resilient in DH. Svensson (2011) has characterized DH as "a humanities project," suggesting that DH practices are conducted from disciplinary identities. Most historians in digital history identify as historians, with only a small minority identifying as *digital* historians (Kemman 2021; Lässig 2021). Kemman argues that historians participating in digital history may actively try to prevent the formation of a new discipline, as they emphasize the need for digital history to ultimately contribute to historiography (2021, 144). Because digital humanities aims to provide value to the wider humanities, Pidd (2022, 306) moreover argues that institutionalization "always requires digital humanities to transform into a broader subject domain in order to increase its relevance to its institutional stakeholders: management, colleagues, and of course students."

The institutional structures most often associated with DH are probably the *center* and the *lab,* rather than the typical academic department. Correspondingly, most publications concerned with institutionalization of DH focus on these types of structures. Fraistat (2012, 281) notes that "[t]he emergence of the digital humanities as a coherent field was accompanied by and partially a result of the evolution of the Humanities Computing Center as an institution." However, the term "center" covers a multitude of very different types of structures, which have very little in

common: "some are primarily service units, some primarily research, some a mixture of both" (Fraistat 2012, pp. 282–283). Warwick (2012, 194) identifies two main origins of DH centers: most older centers have "emerged from a background of service computing, in other words, providing IT support to academics." Newer DH centers, on the other hand, have "emerged because different research projects had come together and formed a centre." Here we thus have a different aspect of path dependency, which is related to, among others, dichotomies such as "research vs. service." Warwick (2012, 194) mentions issues with tenure and promotion and warns that "without a strong teaching presence, or, ideally, a full Masters programme, it may be difficult for digital humanities to establish itself fully as a 'proper' academic discipline" (Warwick 2012, 213).

5 Related Work

We have outlined the debates on the definition in Section 2; in Sections 3 and 4 we have given an overview of work on the institutionalization of interdisciplinary fields, DH in particular. In this section, we look at related work in a narrower sense, i. e., work that studies research questions that are in some respect similar.

To the best of our knowledge, there is no work on our specific research question; definitions of DH and institutional structures for DH are usually discussed separately. The closest is perhaps the book by Klein (2015), which dedicates a chapter each to the definition and the institutionalization of DH (again, the center is taken as the prototypical form of institutionalization). She also discusses the tension between teaching, research, and service, as well as issues of recognition and prestige that arise when an emerging field becomes "professionalized." However, her description of "patterns of affiliation" (Klein 2015, 10) is effectively an outside view on the status quo. With respect to institutional structures, her focus is on DH as an example of an interdisciplinary field. However, in this paper we aim to explore the interaction between how digital humanities are identified through the institutions in which they are enacted.

If we look beyond DH, Small's study of the emergence of African-American studies at the universities of Harvard and Temple is conceptually closer, as it explores how interdisciplinary practices *become* institutionalized (Small 1999). He shows that local configurations – including the definition of the field – may lead to very different results. Whether African-American studies ought then to be understood as a discipline or as an interdiscipline can thus not be answered independently from its local contexts.

Another inspiring study outside of DH is Li Vigni's analysis of *complexity science* (2021). The author examines self-perception and context of complexity scientists and, like we do, employs semi-structured interviews; though much larger in scope with 170 interviewees. As an interdisciplinary field struggling to define itself, the field of

complexity science shows some parallels to DH, albeit its institutionalization appears to be even weaker than that of DH. Complexity science is primarily institutionalized outside of universities; the prime example (and origin) being the Santa Fe Institute.

In contrast, Saner (2019) studies the rather successful implementation of *data science* as a new field in higher education in Switzerland. We thus share the same institutional landscape. As an academic field, like DH, data science is also "digital," interdisciplinary, and only vaguely defined. As a consequence, he finds that "[a]ccording to their traditions and profiles, universities have opted for different strategies when implementing new degree programmes" (Saner 2019, 373), and that they are located in different departments (typically either computer science or business and economics); institutional choices thus reflect local conditions, as well as disciplinary and departmental affiliations of initiators. However, Saner's analysis also demonstrates a stark difference between data science and DH on the political and institutional level: he notes that the introduction of data science in Swiss universities can be seen "as an example of close and interconnected relations between industry, science policy and universities in the digital age" (Saner 2019, 375), which is strongly driven by business lobbies, motivated by a discourse of urgency, and involving significant financial incentives to universities.

6 Materials and Methods

We explore the institutionalization of DH by analyzing the Swiss landscape as a case study. We do so through a qualitative research design. Researchers of five different research universities who hold a professorship explicitly designated as *digital humanities* were included in this study. We interviewed four professors (1 female, 3 male); the fifth professor is the lead author of this paper. While he is part of this population of DH professors in Switzerland, our analysis of the interviews focuses on the responses from the other four professors to ensure the described responses reflect our qualitative research design. It is the nature of things that a large portion of research in emerging interdisciplinary fields is done by people who have a wide variety of official affiliations, appointments, and positions. In this paper we are specifically interested in the institutionalization of one such field, i. e., how informal arrangements are stabilized, adapted, or displaced. Our selection of interviewees is thus not to devalue the contributions of scholars who do not hold explicit DH positions; rather, is necessary to observe how *explicit* positions – as perhaps the most manifest expression of institutionalization – reflect and contribute to discursive understandings of DH.[4] In these interviews, we have focused on three broad topics:

4 Examples of research groups in Switzerland that arguably contribute to DH without being explicitly labeled as such include the Chair of Computational Linguistics at the University of Neuchâtel (UNINE), the Institute of Computational Linguistics at the University of Zurich (UZH) or, also at UZH, the Department of History's Digital History Lab.

1. the local organization of DH,
2. the interviewees' individual understanding of DH and its relation to the local structures, and
3. how their research is recognized and evaluated and how they recognize and evaluate the works of others.

We analyze these interviews through two conceptual lenses. First, the concept of *boundary work* (Gieryn 1983), which describes the discursive work of scholarly communities to establish boundaries of what does and what does not contribute to their scholarly enterprise. Through such discursive work, communities not only identify their scholarly enterprise, but simultaneously aim to legitimize the existence of their community as separate from other communities. We would thus expect professors of DH to establish discursive boundaries that legitimize the existence of DH institutions. Even with DH being underdefined, as we showed in Section 2, we might expect professors to discuss the question of "who's in and who's out" (Ramsay 2013).

Second, we consider the idea that new research fields emerge through *local configurations* (Merz and Sormani 2016). In their volume, Merz and Sormani (2016) argue that new fields of research compete with existing disciplines for resources, personnel, and space in research institutions. Therefore, they suggest exploring "how policy, place, and organization are made to matter for new research fields to emerge" (Merz and Sormani 2016, 2). As DH emerges in Switzerland through local configurations, we would thus expect this, as noted in Section 4, to be at least partly path dependent.

7 Digital Humanities in Switzerland

As explained above, we are only looking at institutionalized DH. Our main criterion is the existence of *professors of digital humanities*, as their appointment represents a significant long-term commitment in both research and teaching.

Switzerland has 12 publicly funded universities: 10 cantonal universities and 2 federal institutes of technology. In the above sense, DH is currently institutionalized at (in alphabetical order) the universities of Basel (UNIBAS), Bern (UNIBE), Geneva (UNIGE), and Lausanne (UNIL), as well as at EPFL, the Swiss Federal Institute of Technology in Lausanne.

As outlined above, we focus on the *current* situation rather than its historical development. A historical study of the institutional establishment of DH in Switzerland would be valuable, in particular with respect to its path dependency. Yet at this point it would be difficult to access the necessary information, such as minutes of faculty meetings, as it is still too recent. We mention only a few publicly available key dates here to enable readers to temporally situate the development.

The first appointment of a professor of DH was made by EPFL in 2012 (tenure-track assistant professor). In the same year, UNIBE advertised a position (assistant professor without tenure track), which was filled in 2013. UNIBAS advertised an open-rank professorship in 2014, but an appointment (on the level of full professor) was only made in 2017. Meanwhile EPFL advertised an unspecified number of "faculty positions" in DH, and UNIL advertised two professorships; all these positions were filled at the end of 2016 (EPFL appointed two professors, in digital musicology and in experimental museology). Finally, UNIGE advertised a professorship in 2018, which was filled in 2019.

The professorship at UNIBE was advertised (and filled) again in 2019, this time as a tenure-track assistant professorship, after the original hire left for a full professorship at the University of Vienna. The professorship at UNIBAS was advertised again in 2022, after the previous holder of the position had accepted a professorship at the University of Mainz.

As of this writing, degree programs in digital humanities are offered at UNIL, EPFL, and UNIBAS (in the order of their establishment).

In the rest of this section, we describe the institutional structures for DH at the five universities. The descriptions are based on the interviewees' responses to the question "How is DH institutionalized at your university?" and on publicly available information, in particular the universities' Web sites.

Table 1 Overview of Organizational Structures

University	Faculty-level	Department-level
EPFL	College of Humanities	DH Institute
UNIBAS	Faculty of Humanities and Soc. Sciences	DHLab
UNIBE	Faculty of Humanities	Walter Benjamin Kolleg
UNIGE	Faculty of Arts	Chair of DH
UNIL	Faculty of Arts	Department of Language and Information Sciences
	Faculty of Social and Political Sciences	Institute of Social Sciences, STSLab

Source: Authors' research.

Table 1 attempts to give a high-level overview. The terminology used by universities to describe their institutional structures differs widely; we use "faculty-level" and "department-level" to refer to the two organizational levels below that of the university as a whole. Table 1 thus makes the institutionalization appear more regular than it really is; in particular, the department-level structures differ substantially in their organization and tasks, which should become clear from the following descriptions.

EPFL

As an institute of technology, EPFL in principle does not offer humanities programs and does not do research in the humanities. However, engineering students are required to take courses from the Social and Human Sciences (SHS) Program, which are primarily taught by instructors from UNIL. In 2002, the College of Humanities (CDH) was created to coordinate this program. The CDH is now also host to two institutes, one of which is the *Digital Humanities Institute* (DHI),[5] which was established in 2015 (i. e., three years after hiring the first professor in DH and the creation of the Digital Humanities Laboratory). The DHI consists of five laboratories: the Digital Humanities Laboratory, the Digital Musicology Laboratory, the Laboratory of Experimental Museology, the Social Computing Group, and the Laboratory of the History of Science and Technology. Since 2017, the DHI offers the EPFL's MSc program in digital humanities. Apart from the fact that the CDH is not a regular "school" (i. e., faculty) and its relatively small size, the organization of the DHI corresponds to the normal organization of disciplines at EPFL.

University of Basel

At the University of Basel (UNIBAS), digital humanities is institutionalized in the Digital Humanities Laboratory (DHLab) of the Faculty of Humanities and Social Sciences. It comprises two professorships, one of which is currently vacant (see above).[6] The DHLab has its roots in scientific photography and was founded in 1924 as "*Abteilung für wissenschaftliche Photographie*" (Laboratory for Scientific Photography) of the Department of Chemistry in the Faculty of Science. Around 1981, the head of this unit became interested in digital photography. One of the current DH professors joined in 1985 during his PhD in physics and developed an image processing facility in the department of Physics. At one point, the lab started working on the digital preservation of cultural objects, which started its engagement with museums and archives, and thus with humanities research. Around 1996 the Faculty of Humanities and Social Sciences approached the lab, realizing that digital sources were the future for humanities research. After three years of negotiation, the photography lab was moved from the sciences to the humanities, so 2001 can be seen as the start of DH at Basel. The DH Lab is part of the faculty, but outside of the other departments, answering directly to the dean. Since 2019, the DH Lab offers an MA program in digital humanities.

University of Bern

At the University of Bern (UNIBE), the DH professorship is part of the Walter Benjamin Kolleg (WBKolleg), an inter- and transdisciplinary research and teaching institution of the Faculty of Humanities. Originally, the primary mission of the

5 The other is the Institute for Area and Global Studies (IAGS).

6 The other professor, whom we interviewed, was not appointed but promoted and is therefore not mentioned above.

WBKolleg, founded in 2015, was to provide the infrastructure for the promotion of networking among young scholars through the Interdisciplinary Research and Graduate Network and the Graduate School of the Arts and Humanities. It also hosts two research centers, the Center for Global Studies and the Center for the Study of Language and Society. Furthermore, it provides support for cooperation with other faculties and universities. DH is not organized as a center, as centers are always interfaculty, but as a professorship. The professorship in DH was originally part of a cluster hire in 2012 in view of a proposal for a National Center of Competence in Research (NCCR), the largest type of collaborative research project available in Switzerland, which also requires structural investments by the applicant institutions. Since the proposal was unsuccessful, the position was moved to the WBKolleg. While the WBKolleg is part of the Faculty of Humanities, it is largely independent and has its own administration, board, and president.

University of Geneva

At UNIGE, the Chair of Digital Humanities is part of the Faculty of Arts. It was created in the fall of 2019 and is attached directly to the dean's office of the Faculty of Arts, i. e., it does not depend on any department, highlighting its interdisciplinary outlook. UNIGE currently does not offer an MA program in DH, but the Chair offers modules on the BA and MA level and a *Certificat de spécialisation en humanités numériques,* a post-master's specialization worth 30 ECTS.

University of Lausanne

The creation of the two DH professorships at UNIL was in the context of an NCCR proposal (ultimately unsuccessful). A joint commission recruited two tenure-track assistant professors in digital humanities in 2016: one in the Faculty of Arts and one in the Faculty of Social and Political Sciences (SSP). At the same time, an MA program in digital humanities was instated, which also started in Fall 2016. In contrast to the situations at the other universities discussed above, these professors are integrated into the regular institutional structures of the respective faculties. In the Faculty of Arts, the attachment is to the Department of Language and Information Sciences, which has been offering a program in computer science for the humanities since 1992. In the Faculty of SSP, the professor of DH is attached to the Science and Technology Studies Laboratory (STS Lab) in the Institute of Social Sciences. The MA program in digital humanities is jointly offered by the Faculties of Arts, SSP, and Theology and Sciences of Religion; it is directed by a scientific committee composed of two members from each of the faculties. Unlike regular programs, it is not attached to any department or institute. Between 2018 and the end of 2022, UNIL and EPFL shared the UNIL–EPFL dhCenter, a "research platform" with the mission "to facilitate, support, and promote digital humanities research, education, and innovation." (https://dhcenter-unil-epfl.ch/en/about/, consulted 15.09.2023.)

We do not discuss this impermanent structure here, as researchers were only affiliated with it through membership, not employment.

From the descriptions above, it is clear that the five universities have chosen to institutionalize DH in quite different ways. Depending on the point of view, different groupings can be identified. For example, EPFL can be said to stand out, not only because it is an institute of technology, but if one discounts the fact that the College of Humanities is not a faculty of humanities, it has probably the most conventional institutional structure for DH: an institute of digital humanities can be understood as an affirmation of DH as a discipline. On the other end of the spectrum is UNIL, which has not created any institutional structures: the two professors of DH are even housed in two different faculties.

UNIBAS, UNIBE, and UNIGE can be seen as lying between these two extremes: digital humanities is housed in an institutional unit that is either dedicated to digital humanities (the UNIBAS DHLab and the Chair of Digital Humanities at UNIGE) or – in the case of UNIBE – is dedicated to interdisciplinary research. However, these institutional structures are clearly marked as interdisciplinary by being outside the regular institutional structures associated with the established disciplines.

This could ultimately also be said of the institutionalization at EPFL: the Digital Humanities Institute (or its labs individually) could theoretically also be part of the School of Computer and Communication Sciences. Why this is *not* the case is possibly another example of the path dependency of institutionalization and can probably only be understood historically.

In this view, the case of UNIL is perhaps exceptional in a different sense. Unlike the other universities, with the Department of Language and Information Sciences and the STS Lab, the two faculties at UNIL had already host units that were clearly interdisciplinary, related to DH, and fully integrated into the regular institutional structures. With respect to the Computer Science for the Humanities part of the Department of Language and Information Sciences one may even argue that DH had already existed in a fully institutionalized form, albeit under the older name of "humanities computing."

8 Analysis of the Interviews

This section reviews the interview regarding the relationship between local institutional structures and interviewees' personal understanding of DH (see Section 6 for the methodology used). We were specifically interested to what extent the professors of DH felt that the local institutional structures (which had been largely created by others), their perception of DH, and their personal conception of DH.

Given the small number of interviewees (4), our analysis is on the one hand necessarily anecdotal; on the other hand, the interviewees actually represent a large

part of the total population of professors of DH as defined in Section 6. The small number of interviewees has also prompted us to partly summarize and anonymize the responses, especially since many of our questions concerned issues of (scholarly) identity. Some of the questions we asked were:

- What would you say is your disciplinary identity?
- How well does your institutional affiliation match your disciplinary identity?
- Does your local organization match your idea of DH?
- Do you consider DH a discipline?
- Would you say that *all* your research contributes to digital humanities, or does it depend on the project or research question?

The last point concerns both the understanding of DH and the recognition and evaluation of DH, an issue which we also addressed explicitly:

- Has DH been a problem or an opportunity in evaluation, recognition, and funding?

All but one of the interviewees identified as DH scholars; the one who did not noted that they "had identity problems even before becoming a professor in DH," remarking: "I still don't feel comfortable going to DH conferences or publishing in DH journals." Those who did identify as DH scholars stressed that they are no longer a physicist, historian, or computer scientist. One interviewee remarked:

> *It would also be quite hard to go back to being a historian. All my work contributes to DH, so I am not hireable to a position as a historian. I'm too far away from that, at least for the moment. I have left the safe historian haven some years back.*

Despite the different institutional structures, to our surprise all interviewees considered their institutional structure suiting them personally *and* fitting their understanding of DH. They thus did not see reasons to change the institutional structures.

However, regarding the definition of DH and the question of whether it is a discipline, three of the four interviewees struggled. Only one respondent outright answered that "it is a new field" and gave both a definition and a rationale for why a definition is needed:

> *This openness has had a negative aspect on its definition as a structured field and in the long run can be problematic for a solid academic anchoring. I believe it makes sense to define Digital Humanities as a new field focusing on large or dense cultural datasets, which call for new processing, interpretation, and visualization methods. […] By focusing on these large datasets of cultural data, digital humanities is becoming a well-structured field with specific objects of study.*

One interviewee said that "from the outside, it is a discipline with chairs, conferences, journals, etc. But from the inside it is concerned with interdisciplinary questions." According to this scholar, the interdisciplinarity is due to the fact that, in order for DH to remain relevant to humanities disciplines, DH scholars must participate in disciplinary debates:

> *If we don't participate in disciplinary debates, our colleagues will no longer take us seriously. In short, it is a discipline, but we have to work much more than the others since we have to stay active in another discipline (or more) as well.*

"Interdisciplinarity" was also mentioned very frequently by the other two respondents. One said that DH was "a high-level auxiliary science" with an "interdisciplinary core, but that core is not a discipline." This professor stressed their work "does not contribute to history or literature, but to DH," and that they "just collaborate with these other disciplines." They stressed that "DH does not have standalone problems", but that it "always has to contribute to a humanities discipline, otherwise it is just computer science."

Despite having a background as a historian, the other professor's response was surprisingly similar, stating that there are certain questions "at the heart of DH," and other questions that must be addressed in interaction with other disciplines. Both also agreed that DH is "a connecting hub," bringing different disciplines together. While they admitted that "DH has its own core that is outside of the humanities disciplines," they were very clear regarding its non-disciplinary status. The rationale given was:

> *It is interdisciplinary by nature, which makes DH not really a discipline. But it is difficult to say what it truly is then. It is complex, but the institutional structure allows that we keep it complex and don't resolve the question of what DH is. […] DH is not just applied computer science for the humanities.*

The inclusivity of the field is often stressed in DH. This notion relates to the question of whether or not DH is a discipline in its own right; some authors reject the status of discipline on the grounds that it would exclude some people. We, therefore, asked our interviewees to what extent they see others contributing to DH without being explicitly organized as such and whether they are in DH or doing DH research.

All interviewees agreed in principle on the openness of the field and that also scholars outside of institutionalized DH can contribute to it. For example, one interviewee commented: "So someone can identify instead as a computational linguist, but they might still contribute to DH and appear in DH conferences." Another remarked that "Many researchers do DH without knowing it."

But two interviewees also stressed the ambivalence of many humanities scholars vis-à-vis DH and "the digital:" "Some colleagues say the digital is evil, they fear

it, don't understand it, and don't see it as humanities. That still exists and is very loud. But more and more researchers are interested in digital methods." The other noted with respect to a Swiss university without institutionalized DH that "you see a variety of scholars interested in DH questions who can be brought into DH discussions. DH is sometimes very appealing to some people, but others want to distance themselves from the term."

Despite the declared openness of the field, interviewees also noted a certain opportunism; thus, there is also some ambivalence on the side of DH professors:

> *Some scholars only call themselves DH when it is beneficial, e. g., for funding, and otherwise call themselves historians. But they still contribute to DH with their research.*

Interestingly, the one professor who did not identify as DH scholar, here expressed a very clear idea of discipline:

> *When you realize there is a real discipline, you realize there are standards of what is understood as relevant. When colleagues are not aware of the standards, their work cannot become part of the discipline. Standards such as TEI, authority files, how to do work, etc.: that ensures that it talks with the discipline and is reusable.*

Unlike some funding bodies in other countries, the Swiss National Science Foundation (SNSF) does not recognize DH as a field, i. e., it is neither on the list of disciplines, nor is there targeted funding. The interviewees generally see this as a problem:

> *Funding is still a problem because we are in-between. I cannot just select a discipline in the SNSF. There is no DH in the SNSF, so I have to select a humanities discipline. This is still a problem in funding; the funding agencies don't understand what DH is.*

Another concurred:

> *This is one of the main challenges. When I apply for funding from the SNSF, I have to apply as a historian, even though I don't identify as a historian anymore.*

This professor found it easier to obtain funding through cooperation with GLAM (galleries, libraries, archives, museums) institutions:

> *Most of my funding comes from the GLAM sector, mostly in the form of cooperations where we develop something for them or together with them. Then usually that is used for some research question. This work leads to DH papers proper, with questions on how to structure the data etc., rather than humanities questions. Our partners then also really see it as DH research, not just as an instrument toward humanistic research.*

The same interviewee also observed:

> *If you are looking for money for infrastructures, then the DH aspect is very helpful. There is no problem to attract funding for infrastructures for the humanities under the label of DH.*

The difficulties in obtaining funding for DH also apply when DH is understood as being closer to informatics:

> *Most of our SNSF projects are either Division II [mathematics, natural and engineering sciences] or interdisciplinary. Direct DH funding is still very rare.*

What is specifically meant here by "interdisciplinary" is the SNSF's Sinergia funding scheme for "interdisciplinary, collaborative and breakthrough" research. This scheme requires a collaboration of two to four research groups *from different disciplines* and is thus not an alternative to regular (i. e., disciplinary) project funding, as it imposes additional requirements. For Sinergia, the SNSF defines interdisciplinary research as "research across disciplinary boundaries,"[7] whereas, as discussed above, DH is an inherently inter- or multidisciplinary field in itself – as Moles (1995, 159) remarked, "la multidisciplinarité n'existe réellement qu'à l'intérieur du cerveau d'un même individu."

The tenured professors did not comment on personal evaluation. One tenure-track professor reported that they will be able to obtain their *habilitation* – as a prerequisite for tenure – in DH:

> *The university has accepted that I represent the DH field and that I can get tenure as such, rather than as a historian with a specialization in digital methods. There is also already a colleague with a habilitation in musicology and DH, so this has already been recognized.*

We thus observe that professors of DH in Switzerland find their institutional structures to be in line with their understanding of DH and do not want to change them. Instead, they appreciate the unorthodox institutional structures and the vague denotation of DH because it gives the freedom to make of DH what they want and collaborate with whomever they want. Therefore, they generally avoid defining DH and agree with one another that anyone can contribute to DH regardless of their discipline. Downsides of this approach to DH are, however, that our interviewees struggled with their disciplinary identities and experienced difficulty in obtaining funding from SNSF, as DH is not recognized as a discipline or area of research. Nevertheless, none of the interviewees linked this lack of recognition to a lack of definition on the part of DH. In the next section, we review these findings to discuss our research question.

7 https://www.snf.ch/en/HzVMPWm96mz69ZJ8/funding/programmes/sinergia, consulted 27.06.2023.

9 Conclusions

To conclude, we return to our research question: *how do institutional structures and definitions of digital humanities interact?*

From our case study of Swiss DH institutions, it appears that institutionalization of DH is at least partly path dependent. Existing structures for DH emerge through historical reasons such as past decisions and existing (interdisciplinary) structures which could embed DH institutes or professorships. Our interviewees moreover held no desire to change or revolutionize these structures, but instead opted to work within the given boundaries to the best of their abilities. This has led to a diverse landscape of institutional structures for DH in Switzerland, underscoring the dependence of emerging research fields on *local configurations* and contingencies (Merz and Sormani 2016).

These findings provide a compelling ground for comparing DH to the institutionalization of African-American studies as described by Small (1999). Based on his analysis, we anticipated that the diversity of structures would be reflected in a diversity of definitions of DH. More specifically, we anticipated that visibly institutionalized forms of DH in independent, department-like research units – offering legible career trajectories – would lead to stronger notions of DH as disciplinary compared to less clearly institutionalized forms. Yet we cannot distinguish such a clear dependence of disciplinary understanding on institutional structures in our interviews. Instead, interviewees from different universities largely agreed that they preferred not to strictly define what DH is. They agreed that scholars from outside DH may still contribute to DH – and may even do so unknowingly. In contrast to the concept of boundary work, where legitimization of a scholarly enterprise is conducted through *separating* it as exclusive from other communities, in this case, legitimization of DH occurs through the *inclusive* notion that various communities may contribute to its enterprise indirectly and even unknowingly. Interviewees perhaps purposefully kept DH "undefinable," for which we see two (pragmatic) reasons.

First, coming up with a strict definition of DH may necessitate questioning and eventually changing institutional structures to align with that definition (i. e., the definition shaping the structure, rather than vice versa). When there are clear boundaries to DH, this may require changes to how other researchers become part of DH institutes through training and hiring and how they are evaluated as providing relevant expertise. Yet as noted, none of our interviewees desired to change their institutional structures.

Second, strict definition of DH may necessitate strict boundaries of which research problems are of interest and which scholars provide relevant opportunities for collaboration. Aligning with the freedom valued by our interviewees, an inclusive notion of interdisciplinary DH enabled them to collaborate with whomever they wanted: within the university, with scholars at other universities, or with organizations

outside of academia (notably, GLAM institutions). Furthermore, several interviewees noted they desire to make meaningful contributions to research in the humanities, which requires collaboration with scholars from the established humanities disciplines. Renouncing disciplinary aspirations of DH could thus be seen primarily as a "goodwill message" to the established humanities disciplines, signaling that DH does not intend to compete with them. We can, therefore, conclude that the continuing professionalization and institutionalization of DH in Switzerland as well as on an international level is unlikely to lead to a clearer shaping of DH definitions.

In short, in relation to our research question we conclude that the underdefinition of DH enables flexibility in institutional structures, while the diversity of institutional structures (resulting from the diversity of local contexts) may necessitate underdefinition of DH.

One topic that we did not discuss in our interviews was scholarly societies. One of the traditional ways of gaining official recognition for a field of research is for interested researchers to found a learned society, which can then lobby on behalf of the community. In the Swiss context, the Swiss Academy of Humanities and Social Sciences (SAGW/ASSH) brings together 62 societies and foundations in the humanities and social sciences and also represents them at the State Secretariat for Education, Research and Innovation (SERI).[8] There is currently no Swiss DH society, and Swiss DH researchers are active in DHd (the German language society), Humanistica (the French language society), or AIUCD (the Italian society). Given the small percentage of Swiss members, Swiss research politics are of little interest to these societies. Nevertheless, the underdefinition of DH (at least in part to allow for cooperation with traditional humanities disciplines) and the multilingualism of Switzerland (and the willingness to continue to participate in societies in neighboring countries and language communities) are likely to be important obstacles to the formation of a Swiss DH society, despite its potential political benefits. In addition, SAGW is organized in seven disciplinary sections (such as history and archeology, art history, linguistics and literature, etc.), which is at odds with both the interdisciplinary nature and the intentional underdefinition of DH.

Finally, this brings us to the research questions of this special issue, in particular: through which processes do new research fields emerge and how do they affect the established system of disciplines?

It is safe to say that that digitalization of research practices in the humanities has led to the emergence of an identifiable field and community of digital humanities. Nearly all Swiss universities have seen opportunities to engage with digital methods in the humanities, and five have opted to visibly institutionalize DH. Yet we conclude that, at least for DH, digitalization does not lead to a singly identifiable emergence of a new research field, let alone a new discipline. We show that practitioners of DH

8 SAGW is not a funding body as such, although it is mandated by SERI to administer and coordinate funding for certain types of long-term projects (e. g., certain scholarly editions).

hesitate to close off DH from the established system of humanities disciplines. We furthermore show that professionalization and institutionalization occur through local contexts, leading to various institutional arrangements. We, therefore, conclude that the emergence of new research fields, such as DH, is at least partially path dependent. Yet how to understand a new research field as a discipline or an interdiscipline cannot adequately be predicted neither from research practices, nor from institutional arrangements, nor from macro-phenomena such as digitalization of society and scholarship.

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Digitalisation as Distinction? Identity Articulation and Tacit Competition in the Swiss University Field, 2010–2020

Luca Tratschin*, Katja Rost**, and Christian Leder*

Abstract: This article examines how digitalisation is used for organisational distinction in the field of Swiss universities for the period 2010–2020. It shows that digitalisation does not fundamentally challenge the order of the Swiss university field but triggers competitive dynamics that are accompanied by different forms of identity articulation. The article concludes that the interplay of competition and identity articulation of actors is complex and must be analyzed in the context of relative field positions.

Keywords: Digitalisation, universities, positioning/distinction, competition, field

Digitalisierung als Distinktion? Identitätsartikulation und implizite Konkurrenz im Feld Schweizer Universitäten, 2010–2020

Zusammenfassung: Dieser Artikel untersucht, wie die Digitalisierung zur organisatorischen Distinktion im Bereich der Schweizer Hochschulen im Zeitraum 2010–2020 genutzt wird. Er zeigt, dass die Digitalisierung die Ordnung des Schweizer Hochschulfeldes nicht grundsätzlich in Frage stellt, sondern Konkurrenzdynamiken auslöst. Der Artikel zeigt, dass das Selbstverständnis als digitale Universität mit relativen Wettbewerbspositionen im Feld verbunden ist.

Schlüsselwörter: Digitalisierung, Universitäten, Positionierung/Distinktion, Wettbewerb, Feld

Numérisation comme distinction ? Articulation des identités et concurrence tacite dans le champ des universités suisses, 2010–2020

Résumé : Cet article examine comment la numérisation est utilisée pour la distinction organisationnelle dans le champ des universités suisses au cours de la période 2010–2020. Il montre que la numérisation ne remet pas fondamentalement en cause l'ordre du champ universitaire suisse, mais déclenche des dynamiques compétitives. L'article démontre que l'auto-conception en tant qu'université numérique est liée à des positions relatives dans le champ.

Mots-clés : Digitalisation, universités, positionnement/distinction, compétition, champ

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> *One of UZH's goals is to position itself (…) as a center of competence for reflection on digital transformation.* (University of Zurich 2019, 17)

> *With the advent and generalization of digital technology, the academic world is undergoing profound transformations. The Rectorate [of the University of Geneva] intends to play an active role in these transformations.* (University of Geneva 2016, 33)

> *With his work, [Frédéric Kaplan] contributes significantly to positioning EPFL as a leading institution in the field of digital humanities.* (EPFL 2019 online)

1 Introduction[1]

Digital transformation as an issue has taken hold in many areas of society, such as politics (Porcaro 2017), mass media (Santos et al. 2019), business (Ziyadin et al. 2020) and higher education (Benavides et al. 2020), and its implications have been discussed extensively using terms such as "fourth industrial revolution" (Schwab 2017), "big data" (Liu et al. 2020) or "artificial intelligence" (Bughin et al. 2017). While modern society has been using digital technology for many decades, the most distinctive feature of the present issue of digital transformation lies in the fact that society has begun to describe itself using the term "digital" (Schrape 2021, 81). Digital transformation, as a long-standing socio-technological process, has become reflexive, allowing members of society to make new sense of present challenges and opportunities in many fields of activity. This is also true for higher education and research, where digitalisation has become a major issue (cf. Bowen 2015; Barton et al. 2019; Henke and Pasternack 2020).

As the introductory quotes from the annual reports of Swiss universities illustrate, universities as core organisations of research and teaching are not just addressing digital transformation as an issue among many others. Rather, they view it as a key

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arena in which they need to position themselves (cf. Getto and Kerres 2017). This is reflected in the ubiquitous aim of Swiss universities to take a position on this issue and develop a distinct profile. Taking this observation as a starting point, in this exploratory empirical analysis, we investigate the rise of digital transformation as an issue in the field of Swiss universities. In particular, we address the questions of how these universities have adopted this issue and how it affects their relational positions.

We adopt a field-theoretical perspective and are interested in the connection between actors' identity articulations and competition in organisational fields. In doing so, we also show that field-theoretical perspectives have so far been strongly characterised by two thrusts: one that focuses on isomorphism through cultural categorisation (following the early contributions of neo-institutionalism) and the other that focuses on explicit distinction through conflict (especially following Bourdieu). Following Simmelian perspectives, we argue for a greater focus on competition as a mechanism of differentiation in organisational fields, which should be distinguished more clearly from conflict.

2 Fields, Competition and Digitalisation

While digitalisation as an issue encompasses nearly all fields of society, its content and implications are shaped differently within societal fields such as the economy, politics or health. In the field of universities, it is mainly observed through the lens of its implications for universities' core activities, such as research and teaching. While digitalisation is a society-wide issue, it is being shaped in a specific way in different fields of activity. We conceptualise this observation with regard to higher education by arguing that the rise of the issue field of digitalisation can be witnessed within the organisational field of universities. Under fields, we understand social spaces that are marked by a "mutual awareness among participants in a set of organizations that they are involved in a common enterprise" (Martin 2003, 27). Therefore, membership in organisational fields is constructed through the interaction and mutual recognition of organisations (cf. Wruk et al. 2020, 136).

While organisational fields emerge around similar services and products and "constitute a recognized area of institutional life" (DiMaggio and Powell 1983, 148), issue fields are integrated by a common attention object and by different positionings of actors towards this issue (cf. Hoffman 1999, 351). While issue fields can potentially exist without a corresponding organisational field or can overlap several organisational fields, the emergence of an issue field within an organisational field is a possible scenario (cf. Furnari 2018). It is analytically expedient to distinguish between the organisational field of Swiss universities and the issue field of digitalisation because digitalisation constitutes a "game of position" (Fligstein 2013) between universities that are marked but not necessarily determined by already pre-established

relations. In this vein, Wruk et al. (2020, 135) pointed out that issue fields can dramatically change practices within an organisational field, thereby altering the relational positions of organisations within that field (Litrico and David 2017, 988). Digitalisation as an issue field is marked by heterogeneous activities, since the quest for research funds, relevant course offerings for students or the pursuit of organisational status creates different opportunities for positioning. These activities are then "pulled together" (Clark 1983, 32) in different university organisations as aspects of their general pursuit of digitalisation.

By investigating how the issue of digitalisation affects positions among universities in the Swiss field, we build on and contribute to two converging research streams within field theory that are marked by different core assumptions: the tradition of new institutionalism with a strong emphasis on mutual observation and a field-theoretical perspective with a stronger focus on contentious and direct interactions.

DiMaggio and Powell's (1983) field theory in the neo-institutional tradition has traditionally focused on isomorphic forces and their effects on organisations. While this literature distinguishes between different mechanisms of isomorphism (i. e. coercive, normative and mimetic), diffusion processes leading to isomorphism are thought to be driven strongly by cultural ties (i. e. mutual observations incited by common membership in a social category) rather than through relational linkages (i. e. direct interactions) (Strang and Meyer 1993). In addition to a focus on processes based on shared membership in a social category, field studies in the vein of the new institutionalist tradition tend not to focus on the entire field structure but usually investigate how organisations deal with isomorphic pressures (Baier 2017, 56). As a result, they traditionally focus more on the similarities rather than on the differences associated with the field structure (Baier and Schmitz 2012). To be fair, recent work has also investigated and shown how isomorphic mechanisms create differences instead of similarities within fields (Thornton and Ocasio 1999; Meyer et al. 2005; Reay and Hinings 2005; Wooten and Hoffman 2017). A main mechanism for the creation of differences and changes is identified in the fact that isomorphic forces in organisational fields may be contradictory, since organisations may be embedded in different contexts of mutual observation (i. e. in different fields). For example, Hüther and Krücken (2016) used the example of European universities to show that differences in orientation to local, national and global contexts of higher education can lead to differences among universities. Similarly, Kodeih and Greenwood (2014) showed how the competing logics of the Grande Ecole approach and the model of the International Business School created different responses and positionings in French business schools. Again, the mechanisms of differentiation are examined less against the background of a relational field structure and more against different contexts of observation. This plurality of observational contexts then leads to a situation in which universities are confronted with competing logics (e. g. different conceptions of appropriate organisational goals and forms). These

explanations illustrate precisely that the normal expectation in neo-institutionalism is that reciprocal observations in a single reference group of organisations tend to lead to isomorphism.

A stronger interest in general field structures and the related differences can be seen in a tradition that draws more explicitly on Bourdieu's work. This stream of work emphasises more strongly that a key feature of social fields is that they create a differential structure of positions that is accompanied by "struggles" for positions within those fields (Martin 2003, 23). In this tradition, a field is marked by direct interactions between field members and fewer indirect observations. Bourdieu himself, for example, in "homo academicus", his study of the French academic field, was interested in the "contradictions and the conflicts of which the academic field is the site and which are at the very root of the ongoing changes through which it perpetuates itself" (Bourdieu and Wacquant 1992, 89). Within the framework of the more recently developed theory of strategic action fields, Fligstein and McAdam (2011, 16) discussed how a "bitter fight" enhanced the position of a dean within the university community, and Taylor (2016) studied the Mercer heresy trial "as part of a larger contest for the nature of academic work" (361), showcasing the strong focus on direct and conflictual interactions in fields. In times of field change, triggered by new issues, events or "exogenous shocks" (Fligstein and McAdam 2011), an overt fight between different field actors would be expected, eventually ending, at least temporarily, in a settlement (cf. Litrico and David 2017).

We contribute to this literature with our case of the issue of digitalisation because it does not fit these two standard perspectives. While we do see active positioning and the creation of differences between universities in our case, this is not based on direct interactions but rather on reciprocal observations informed by a sense of competition. Reciprocal observations in this case do not lead to isomorphism, as expected from the standard perspective of neo-institutionalism, but to difference, which – contrary to usual field perspectives – is not based on direct struggles in our case. While both research traditions are familiar with the concept of competition, neo-institutionalistic accounts do not put it at the centre of their research programmes (cf. Hasse and Krücken 2013), while the other tradition tends not to distinguish clearly between the two social forms of conflict and competition (cf. Karstein 2012, 266).

Following Simmel's sociological thought, we can more clearly differentiate between direct conflict and competition as an indirect form of social struggle (Simmel 1992, 325–339; Werron 2010). While, in conflict, actors engage directly with each other, competition is more strongly marked by a common orientation towards a desired object that is in the hands of a third party. This common orientation leads to strong dynamics of mutual observation and positioning to obtain the desired good. This strong mutual awareness without direct interactions is what distinguishes competition from direct forms of struggle, such as dyadic conflict.

Research has shown that university systems in general (cf. de Boer et al. 2007, 40), as well as in Switzerland in particular (Lepori and Fumasoli 2010, 812), have become much more competitive in the wake of new public management reforms that have led to the creation of quasi-markets by state actors (Enders et al. 2015). Almost all activities of universities are now imbued by a strong sense of competition – be it for students, third-party funds, placement in rankings or highly reputed researchers – leading to strong dynamics of mutual observation and positioning. While we are empirically interested in the way digitalisation is used for mutual positioning in the Swiss university field, we conceptually plead to integrate competition more strongly into field theory to understand the creation of differences. While one could distinguish conceptually between "fields" (marked by isomorphism or direct struggles) and "competitive arenas" (marked by indirect observations), as Christine Musselin did in a recent overview of the field of higher education studies (Musselin 2021), such a distinction is empirically not fruitful because field dynamics such as the creation of difference can be shaped by competing isomorphic forces, conflict and competitive positioning.

Based on such a strong focus on competition, we argue that the issue field of digitalisation is marked by "multiple competitions" (Krücken 2021) in which universities are constructed as key actors through relational activities. We show that this issue field is not disrupting pre-established relations within the Swiss university field, in which case conflict and an overt field crisis would have been expected. Rather, we are dealing with an issue that can largely be adopted to extant field logics within a field with well-protected borders, leading to a somewhat moderate shift in field dynamics. We are thus observing a game for positions which is marked by moves and countermoves producing incremental changes and different positionings. These different types of positionings that we uncover in our research can add nuance to the literature that asserts a close link between competition and organisational actorhood (Arora-Jonsson et al. 2020; Hasse and Krücken 2013). This literature argues that competition and organisational agency are closely linked because competition requires organisational capacities to act collectively, something that is – among other things – rooted in organisational identity (Brunsson and Sahlin-Andersson 2000) and calls to study the interplay between competition and actorhood more strongly (Hasse and Krücken 2013). According to Brunsson and Sahlin-Andersson, endowing an organisation with identity means "emphasizing its autonomy, and defining its boundaries and collective resources (…) [and] also involves *the idea of being special, of possessing special characteristics*, at the same time as being part of a highly general category, the organization" (2000, 724, our emphasis). Our case indicates that the generally plausible nexus of competition and enhanced reflexivity as actors endowed with an identity can materialise in complex ways in concrete competitions, as indicated above. While we find a broad recognition of digitalisation as a competitive issue within Swiss universities, we find different degrees and types of

representations of organisational actorhood. While the organisations that are highly competitive and those that are more niche players do not show much effort to strongly link digitalisation to their overall organisational identity, the group of universities in between these two poles tend to invest quite heavily in presenting themselves as digital universities (i. e. as universities that address digital transformation as a cross-sectoral issue), which are tackling this issue head on. Additionally, the extent of identity articulation depends on whether organisations have successfully repositioned themselves in the relational space of digitalisation relative to their general field position or whether they remain more or less in the same place. We interpret this observation to mean that a sense of actorhood through identity articulation in competition is not necessarily evenly distributed among competitors in a field but rather shaped by contingencies of competitive dynamics within the field itself.

3 Case, Data and Methods

3.1 Swiss Field of Universities

The case of Switzerland is particularly suitable for our investigation of positioning activities in the context of a relational field structure, as its smallness allows us to examine all field actors and their positionings in detail. In larger national fields with hundreds of universities, our exploratory approach (section 3.2) would be more difficult. The Swiss higher education system is mainly a publicly funded system, except for a few minor players. It has been a binary system since the mid-1990s and is differentiated into a university sector, comprising traditional research universities, and a non-university sector, comprising universities of applied sciences and those of teacher education. While there has been an ongoing political debate on academic drift on part of the non-university sector and vocational drift on part of the university sector (Böckelmann and Nagel 2018), the categorical differences between the two sectors are quite stable in many ways (Lepori et al. 2014). While there is an encompassing field of Swiss higher education institutions that includes universities of applied sciences and those of teacher education, we focus only on Swiss research universities, since they constitute a "recognized area of institutional life" (DiMaggio and Powell 1983, 148), as evidenced, for instance, by similar entrance requirements (a maturity certificate from a Gymnasium), a shared research mission (in contrast to universities of applied sciences and teacher education) and similar organisational forms (faculties/departments and chairs/professorships) that are shaped by scientific disciplines and traditional professions and not by vocational fields, as is the case with universities of applied sciences. Such commonalities, as well as arenas where university members meet regularly, lead to a constant flow of information between them. Based on these observations, we conceive of the Swiss university sector as an organisational field characterised by mutual awareness and

relative positioning. Of course, the Swiss university sector is, again, embedded in higher-level fields, such as the European field of universities or the global field of world universities. However, in the case of digital transformation, the national level is vital, as many incentives and pressures are created to adopt this topic in the Swiss context, such as Swiss government agencies, local labour markets and the national public. Therefore, we focus on Swiss universities in our study.

The Swiss field of universities comprises 12 universities, of which the two federal institutes of technology (ETH Zurich and EPFL) are funded by the Swiss federal government and remaining 10 universities are mainly funded and regulated by their cantonal governments. The latter consist of universities of different sizes (ranging from ~3000 to 30,000 students) with different profiles. While the older universities can be considered full universities that cover a wide range of disciplines, from humanities to natural sciences, the more recently founded universities, such as the University of Lucerne (UniLu) or the Università della Svizzera Italiana (USI), tend to focus on a few subject matters.

While Swiss universities have traditionally been viewed as being roughly equal in the quality of education they offer, we can still see certain stratification, mainly (but not exclusively) in their reputation as research institutions. While the two federal institutes of technology have had special status as elite institutions in engineering and natural sciences for a long time, a sense of stronger stratification of positions in the Swiss field of universities may recently have been fostered by global trends in the university sector, such as the rise and proliferation of university rankings. Thus, while the Swiss university field has traditionally not been considered a strongly stratified system, such as higher education in the United States or France, there is still a hierarchy of positions that reflects the age, size, disciplinary orientation and global standing of universities.

3.2 Data and Methods

Our analytical interest was to make the field of digitisation visible in the case of Swiss universities. In particular, we were interested in the positioning of universities in this field. To do this, we proceeded in two subsequent steps. First, we collected annual reports of all Swiss universities published between 2010 and the beginning of 2020 and coded them inductively to understand the dynamics of the rise of the digital transformation issue and the way the universities translated it. Since the documents in general did not distinguish clearly among the concepts “digitisation ”, “digitalisation” and “digital transformation ”, we did not do it either. Furthermore, we did not explicitly include dynamics that additionally arose from the Covid-19 pandemic, since the question of how the pandemic influenced digitalisation at universities would have to be examined separately in more detail. The analysis of annual reports provided us with a comparative view of the importance and temporal dynamics of the uptake of the digitalisation issue. Since annual reports can be considered central

documents of both external and internal self-representation that follow a similar (i. e. annual) publication rhythm in all universities, we obtained a comparative view of the importance the universities placed on the digitalisation issue. In addition, we collected strategy documents and web content to obtain a more detailed picture of the way Swiss universities are implementing digital transformation. Similar to the annual reports, we examined and coded this material inductively, guided by the principles of qualitative social research (cf. Strauss 1987). Based on this analysis, we attempted to create an initial interpretation of the way the universities are positioning themselves in terms of digital transformation. Second, we built on this document analysis by using activities identified in these documents as central to the universities' digitalisation efforts as indicators of digitalisation. Concretely, we developed a set of indicators, collected data for these indicators and created a dataset based on this analysis. For instance, we identified the creation of digital officers as an indicator of digitalisation efforts by the universities and collected data on the creation of such positions by Swiss universities. The basic idea was to make visible whether and to what extent the universities are active with regard to the selected indicators. We then used this dataset to conduct a multiple correspondence analysis (MCA) of the selected variables (Roux and Rouanet 2010; Husson et al. 2017; Hjellbrekke 2018). This statistical method is suitable to model social spaces and the relative positioning of actors, as Pierre Bourdieu (1987; 1988) showed most prominently in his field analyses. The basic logic of the MCA method is that it reduces a large amount of categorical data to a few dimensions. These dimensions can then be used to create a social space in which individuals and variable values (i. e. categories) that are similar to each other are located close to each other, while dissimilar individuals and categories are located farther apart. This allowed us to visualise the multiple competitions for digitalisation that are pulled together in university organisations in a two-dimensional space. To contextualise this analysis, we also conducted an MCA based on general descriptors for the Swiss higher education sector (for a description of the data, see Table A1 in the Appendix).

4 Digital Transformation in the Field of Swiss Universities

4.1 Rise of the Digital Transformation Issue in the Swiss University Field

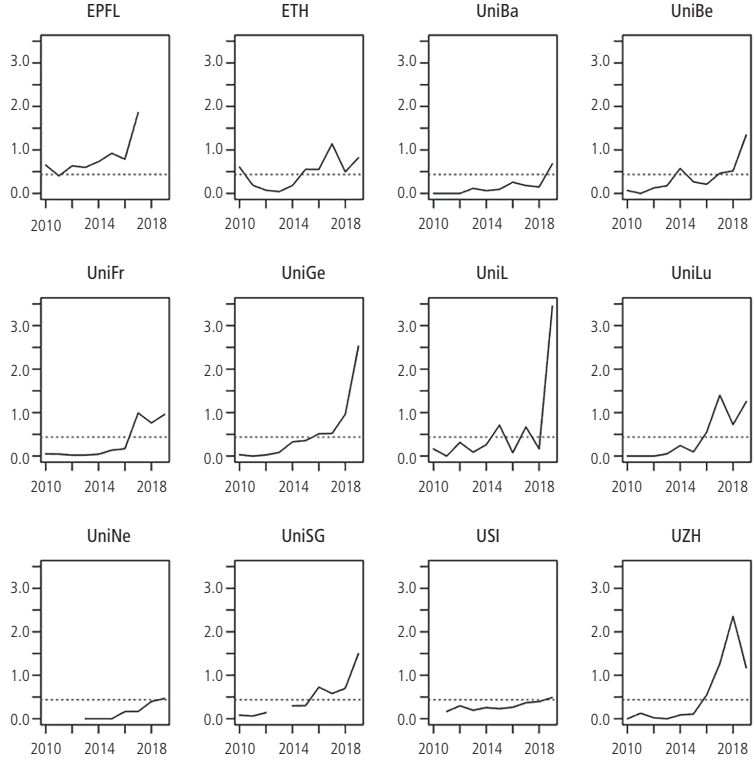
While a wide range of communication channels have certainly helped diffuse the issue of digital transfomation in the university sector, in publicly funded systems, such as the Swiss case, the political sector is assumed to act as a central conveyor belt of society-wide discourses towards the university field. This is because the state, as the primary sponsor, plays a decisive role in shaping the scope of action in such systems. In Switzerland, the federal government responded to the issue of digital transformation with several strategy papers that emphasised education and research

for the digital future of Switzerland (Swiss Confederation 2018; 2020). This translated to higher education policy through more specific state agencies, such as the State Secretariat for Education, Research and Innovation (2017), and intermediary organisations, such as the Swiss Science Council (2019). In 2014, the ETH Board (2014) declared big data and information technologies a priority in its strategic planning of 2017–2020 (50–51). The issue of digital transformation was not only adopted on a strategic level alone but was also connected to new funding schemes. A central funding tool of the Swiss government for the higher education sector, the so-called project-based contributions ("Projektgebundene Beiträge PgB"), dedicated two large programmes to digitalisation in university development: open science (P-5) and digital skills (P-8). The Swiss National Science Foundation (SNSF) created the funding scheme "digital lives" and dedicated a national research programme to the issue of big data (NRP 75) and one to the issue of digital transformation (NRP 77). Furthermore, the SNSF claimed to have funded more than a thousand research projects that deal with digitalisation by the end of 2019 (SNSF 2020). Additionally, below the level of the Swiss federation, state governments have dedicated large funds to digital initiatives in higher education in research, teaching and innovation. The parliament of the canton of Zurich, for instance, has earmarked over 300 million Swiss francs for the digital initiatives of its higher education institutions in the next decade (sda/tif 2019). The canton of St.Gallen mounted an IT educational offensive backed by 75 million Swiss francs to cope with digital transformation, including the creation of new study programmes in computer science at the University of St.Gallen (UniSG) (Hertler 2017). However, the universities did not just react to higher education and research policy; actors from the university sector themselves have played an active part in shaping higher education policy in the realm of digital transformation. If we look at the career of the digitalisation issue in the annual reports of Swiss universities, we notice that the word "digital" has risen in prominence since 2014, which means that universities did not only react to a political discourse that was already taking place (Figure 1). At least in some instances, such as the two national research programmes on big data (NRP 75) and digital transformation (NRP 77), one could even argue that there were successful attempts by academic actors to mobilise resources for their research interests. Digitalisation is strongly marked by entrepreneurial activities by members of higher education, expanding the activities of universities (cf. Kindel and Stevens 2021).

The issue of digitalisation has grown in importance since 2014, although the dynamics seem to differ from case to case. For instance, while the University of Neuchâtel (UniNe) or USI has experienced moderate growth, we can see a strong increase in the issue of digitalisation at the University of Geneva (UniGe) and University of Lausanne (UNIL) from 2018 onwards (Figure 1).

The assessment gained from the analysis of the annual reports that digitalisation gained momentum in 2014 can also be supported by the fact that the ETHs accepted

Figure 1 Rise of the term "digital" in annual reports of Swiss universities



Note: Relative prominence of the term "digital" in annual reports of Swiss universities in relation to entire word count (per thousand) (solid line) in comparison to average prominence of "digital" in all annual reports from 2010–2019 (dotted line).

the mandate from the federal government in 2014 to expand their competencies in the fields of big data and data science. Two of the most prestigious Swiss universities have taken up the issue of digitalisation and attributed great importance to it. For this reason, too, it can be argued that, in 2014, the topic of digitalisation appeared on the agenda of the university field. Already one year later, UZH's annual report mentions the establishment of a working group for a "Digital Society Initiative", which then led to the official start of this initiative in the subsequent year (University of Zurich 2015, 2016).

While the visibility of digitalisation at UniSG's annual reports has been increasing since 2014, in 2015, the university set up a special thematic focus on digitalisation on its website, consisting mainly of video interviews with faculty members on the

subject, as well as texts describing research projects that in one way or another address the issue of digital transformation. While UniSG has since increasingly discussed digital transformation in its research, teaching and administration, the topic gained another boost in 2019 when the university announced the appointment of three new professors with a denomination for digital transformation. That year, it also became clear that the canton of St. Gallen would fund an IT education initiative that led to the establishment of a new department of computer science at UniSG.

In 2017, an increased prominence of the topic of digital transformation was observed in the annual reports of the University of Fribourg (UniFr) and UniLu. UniFr described itself as a "université numérique" and showcased how it is responding to digital transformation in the realms of research, study programmes and administration. In the same year, UniLu acknowledged that digital transformation was an important competitive issue in higher education and concluded that its strong profile in the social sciences and humanities equipped it to address this issue. Both universities later proceeded to take up digitalisation more strongly, with selected measures. For example, UniFr appointed a vice rector for international relations, digital transformation and interdisciplinarity, while UniLu offered a master's programme in computational social sciences at the Faculty of Humanities and Social Sciences in 2019 and focused on digitalisation in the area of teaching. Although UniNe did not show a comparable increase in the coverage of digital transformation in the 2017 annual report to the universities mentioned, this was an important year in terms of digital self-expression. This year, UniNe responded to digital transformation in its organisational strategy by calling for the development of a "digital campus" and the consolidation of its competencies in the field of big data, as well as the development of "Culture 4.0 ", "Literacy 4.0" and "Work 4.0" themes. It was these smaller and more niche-oriented universities that took up the topic of digital transformation rather quickly after the agenda was set by large, research-intensive universities.

While the other large Swiss full universities Basel, Bern, Geneva and Lausanne also started to address digital transformation in their annual reports from 2014 onwards, they reacted strongly to this topic from 2018 onwards, leading to a significant increase in the prominence of the topic, as can be seen particularly impressively in the case of Lausanne and Geneva (Figure 1). This boost in the importance of digital transformation in the annual reports of these universities and, to a more moderate degree, in the reports of Basel and Bern was accompanied by a new approach to this issue. Now, digital transformation is seen as a key aspect of the universities' identities, as evidenced by stand-alone strategy papers on digital transformation. Digital transformation has already appeared in public strategy papers of Fribourg, Neuchâtel and the ETH Zurich. However, there is a shift in the way the topic is discussed in that it first gains considerable prominence by being visible not only in the annual reports but also in specific strategy documents. Second, these documents now address digital transformation as an issue much more systematically and in detail.

Third, digital transformation is being addressed as a cross-cutting issue pertaining to and connecting, at the same time, all areas of activity within the universities (i. e. the organisation and its administration itself), as well as activities in research, teaching and the third mission. While they do not inherently develop new ideas on digital transformation, they do bring together the multitude of subtopics related to digitalisation that one finds selectively realised and often somewhat disconnected in other universities and attempt to weave a coherent and holistic fabric of digital transformation. As relatively latecomers, they can now tap into a multi-faceted repertoire of digital transformation collectively elaborated by the earlier adopters and connect them in an organisational strategy, thereby articulating a digital identity.

Based on our analysis, we find that universities portray their positional activities against the backdrop of a general perspective on higher education as a competitive setting. Digitalisation seems to be mostly relevant because it allows universities to mobilise relevant resources through this topic, such as additional research funds, students or public attention (i. e. to secure competitive advantages through skillful positioning on the topic). It thus sparks multiple competitions in which Swiss universities act as key competitors. Universities explicitly define digitalisation as a realm of competition, for instance, in UniLu's (2017, 38) statement that "today, digital educational offerings are an important element in educational competition" (own translation) or in the UniBa (2015, 27) aim to modernise its IT infrastructure to "increase the competitiveness of research and teaching increasingly based on digital information" (own translation). These self-descriptions of the universities indicate that digitalisation not only creates newly perceived opportunities but also necessitates for universities to position themselves towards this emerging issue. They might want to generally advance their status as research institutions, to attract students who want to study topically relevant subject matters or to vie for public visibility as relevant actors in the field of digitalisation.

While, on a very general level, these digitalisation activities share some similarities, we find that the universities "translate" (Czarniawska and Sevón 2011) these activities differently with regard to their position in the field structure. Instead of copying each other directly, they tap into a common repertoire of digitalisation to create strategic differences. We, therefore, see the creation of considerable differences and not isomorphism, as neo-institutionalist accounts of field dynamics would usually argue. The definition of the situation as competition and the mutual observation motivated by it forms incentives to systematically create differences with regard to other universities and not to copy them directly to conform to general organisational myths (cf. Meyer and Rowan 1977). Thus, the universities present themselves as organisations and not as local instantiations of a university as an institution (cf. Frank and Meyer 2020). While universities create differences and try to position themselves differently from other universities, they do not do this by entering into contentious interactions with other universities. It does, therefore, not fit neatly to

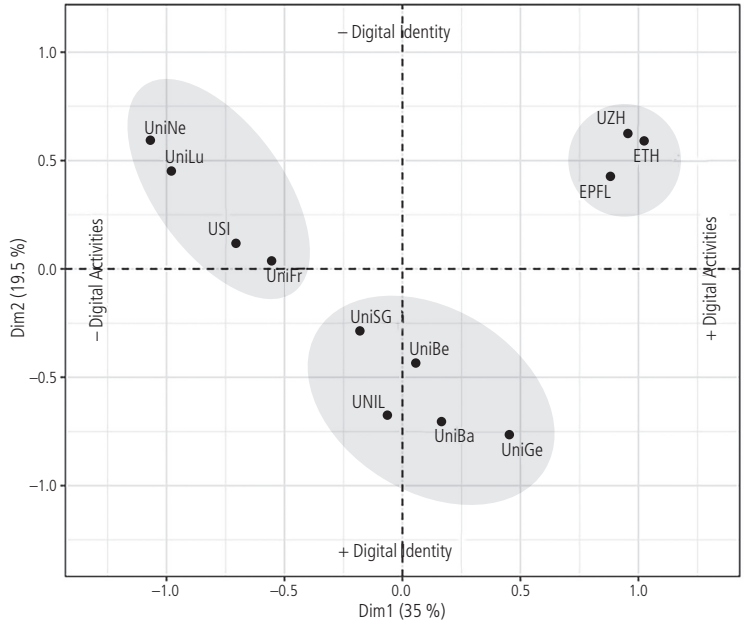
typical accounts of field theories with a strong focus on conflict (i. e. the Bourdieu-inspired strand of literature). Swiss universities do not contest other positionings and interpretations of digitalisation but do compete rather "tacitly" to find their niches in this issue field. A plausible explanation is that the field of universities is already consolidated and access to this field is strongly protected, for instance, by accreditation. So far, Swiss universities have hardly had to fear new players who fundamentally threaten the order of the field. Although there are alternative educational offerings, such as Google's Data Analytics Certificate, this does not yet pose a threat to university educational offerings in Switzerland as a whole – at least we did not find any evidence of this. However, on other issues where new players are actually claiming a stake in the field, we note much more contentious behaviour, such as the response of universities to the demand of universities of applied sciences to be allowed to offer doctoral degrees (cf. Gächter 2011). In addition to the fact that digital transformation leaves field boundaries rather intact, an additional factor creating a disincentive for struggling directly over the issue may be that universities regularly need each other as cooperation partners in national programmes (e. g. in the NCCR programmes of the State Secretariate for Education, Research and Innovation). Thus, it is not a very attractive option to act antagonistically towards each other, especially since the field is so small and there is not a large choice of potential partners. We therefore expect that digitalisation will create more contention in university fields that are less protected from newcomers and that are larger, thereby reducing the social cost of selective antagonisms. Based on these considerations, we expect that whether we see direct conflict in fields or rather indirect competition and corresponding positioning activities depends on scope conditions such as the ones mentioned above.

4.2 Positional Shifts From the Organisational Field to the Issue Field of Digitalisation

While the above analysis primarily examined the explicit communicative positionings of Swiss universities based on a document analysis, this section additionally focuses on the structural aspects of digital transformation in the field of Swiss universities. As described in the section on data and methods, we used a document analysis to identify meaningful variables to capture digital transformation in the areas of research, teaching, third mission and organisation within universities. In the area of research, for example, we identified research projects that claim to address the topic of digitalisation. In the area of teaching, we identified, among other things, study programmes that deal with digital transformation. For the third mission, we used indicators such as partnerships with Swiss Digital Days or the media presence of a university on the topic of digital transformation. In the area of organisation, we identified, for example, whether a university has published a digitalisation strategy, whether it has created specific units or positions explicitly related to digitalisation or whether the university offers a campus app (for a complete list of variables, see

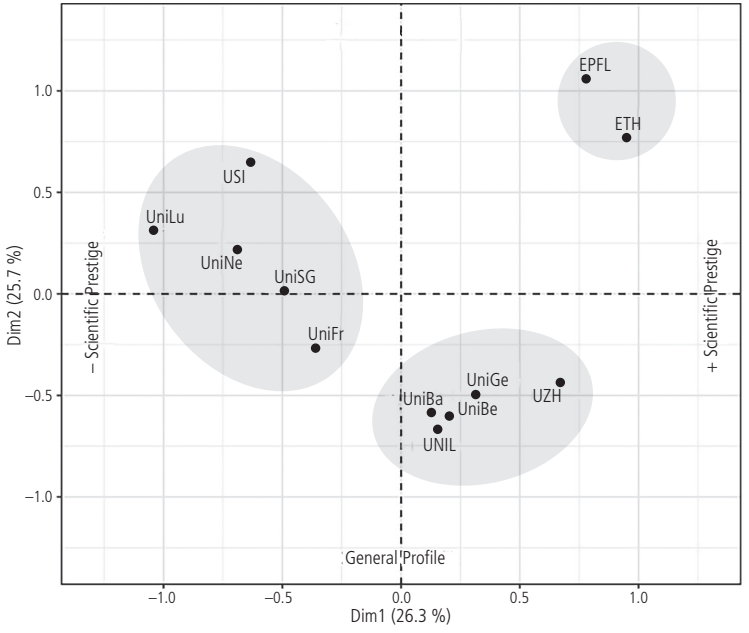
Table A1). Figure 2 presents the cloud of universities created by an MCA of these variables, showing which universities are similar (shorter distances) and which ones are rather different (larger distances). An interpretation of the distribution of variables within this space indicates that the horizontal dimension creates a continuum between universities that are less active in digitalisation activities in all areas (i. e. organisation, research, teaching and third mission) and those that are very active in all areas (Figure 2 from left to right). The most distinctive contribution to the vertical dimension is the variable "digitalisation strategy". This means that universities that have a dedicated digitalisation strategy tend to be situated in the lower half of the field, and those that do not have such a strategy are found in the upper half. This signifies that universities in the lower half relate digitalisation to all areas of activity and systematically link them with one another. Thus, they reconceptualise their overall organisational identity in the mirror of digitalisation. In contrast, the digitalisation activities at universities in the upper half are more focused and not as strongly related to each other and organisational identity. An additional cluster analysis supports the MCA results and reinforces the visual impression that closely situated universities can also be statistically interpreted as belonging to separate groups. At the left end

Figure 2 Issue field of digitalisation



Note: multiple correspondence analysis with results of cluster analysis superimposed.

Figure 3 Organizational field of Swiss universities



Note: multiple correspondence analysis with results of cluster analysis superimposed.

of the field, we can identify universities that have only a relatively low weight in the issue field of digitalisation and do not strongly link their organisational identity to digitisation (UniNe, UniLu, USI and UniFr). At the right end of the field, we see universities that have the greatest weight in this issue field but also only link this issue, to a limited extent, to their organisational identity (EPFL, ETH and UZH). In the midfield, however, we find universities that articulate their digital identities more strongly (UniSG, UniBe, UNIL, UniBa and UniGe).

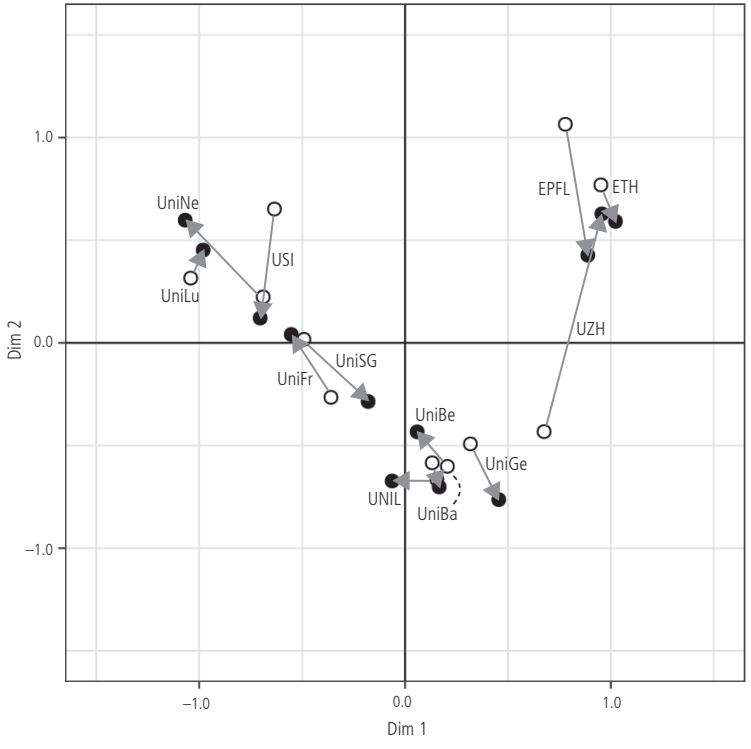
To relate these positions in the issue field of digitisation to the positions in the organisational field of Swiss universities, we made the latter visible using a multiple correspondence analysis with recourse to suitable variables such as age, size, funding, Nobel Prize winners associated with the university or the presence of different faculties (for the complete list, see Table A1).[2] In the general organisational field, we see an ordering of space that distinguishes between universities with lower scientific prestige (from left to right) and those with higher scientific prestige. In contrast, the vertical logic distinguishes universities with a specialised profile (top)

2 For a comparable modelling strategy for the German field of universities, see Baier and Schmitz (2012).

from those with a more general profile (bottom) (Figure 3). Again, an additional cluster analysis provides statistical plausibility for distinguishing the three groups of universities that emerge in the MCA. Thus, we find a group comprising smaller niche universities (USI, UniLu and UniSG) and some full universities (UniNe and UniFr) (far left), a group of larger cantonal full universities in the lower half (UniBa, UniBe, UniGe, UNIL and UZH) and the two federal institutes of technology (EPFL and ETH) in a separate cluster in the upper right.

To examine the direction and extent of the universities' positional shifts from the organisational field to the issue field of digitalisation, we superimpose the cloud of universities from the two MCAs (Figures 2 and 3) and connect their respective positions with arrows, using their positions in the organisational field as the starting point and that in the topic field as the end point (Figure 4). The comparability of

Figure 4 Universities' positional shifts from the organizational field to the issue field of digital transformation



Note: We did not interpret Dim 1 and Dim 2 because the representation is based on the superimposition of two different fields.

the two spaces is somewhat limited because they are based on different variables. The mere fact that we observe changes in the positions of universities from the organisational field (Figure 3) and the issue field (Figure 2) would not tell us much since we would not expect them to have the same coordinates in the two spaces in the first place. If the directions and distances of the shifts of universities between the two fields are largely identical, it would not make sense to argue that there are actual positional shifts of universities, since in that case, the entire field would have changed in the same way, and the difference would only be an effect of the different variables that created the two spaces. In this case, we would have to argue that the two fields are structurally identical. However, if we find different directions and distances between the universities' positions, we could argue that the field structure has indeed changed because the universities would have changed their positions relative to each other to different degrees and in different directions.

Figure 4 shows that the universities have changed their positions in dissimilar ways from the organisational field to the issue field of digital transformation; they have travelled different distances in various directions. In this figure, we can identify a group of universities that have made positional gains in the issue field of digitalisation with respect to the general organisational field (USI, UniSG, UniBa, UniGe and UZH). However, only UniSG and UZH have actually changed their group affiliation, with the latter showing the most striking positional gain. A second group consists of universities that have moved from the right to left, which in some sense indicates positional losses (EPFL, ETH, UniBe, UNIL, UniFr, UniNe and UniLu). In this group, however, no university has changed its group belonging. Thus, when it comes to group membership, we can argue that there are, so far, only "winners" in the issue field of digitalisation (UniSG and UZH). However, we must also recognise that not making positional gains could mean "losing" for the universities remaining in their old peer groups.

An interesting observation can be made in the group of full universities with medium scientific prestige (UniBe, UniBa, UNIL and UniGe). While the other groups show different types of positional shifts, here, all universities cover only short distances from their general field position to their position in the thematic field of digitisation. This is remarkable considering that it is these universities that invest the most in digital identity articulation; that is, they are the ones talking most actively and publicly about digital activities as a cross-cutting issue that affects the entire university. Because of this public affirmation of the issue of digitisation, one might assume that they would travel the greatest distances from their positions in the organisational field to those in the issue field of digitisation, when, in reality, they are the most inert.

One explanation is that the issue of identity is of greater importance for full universities since they are organisational brackets for a greater variety of disciplinary and professional activities than universities with a more specialised profile (at the top right and the top left of the field of universities). This explanation is supported

by the observation that digitalisation represents a boundary object for universities that allows them to relate heterogeneous activities to one another (Tratschin 2022). According to this interpretation, digitalisation should be particularly attractive for highly heterogeneous universities (e. g. full universities). However, based on this explanation alone, we would also expect UniNe, UniFr and UZH to display similar behaviours. While they also talk publicly about their position in digital transformation, they do not connect this issue so strongly with that of organisational identity by crafting and publishing digital strategies.

A more complete explanation also takes into account that this identity talk is aspirational in that it tries to bridge a gap between the present situation, marked by modest responses to digitalisation, and a desired organisational state through enhanced identity articulation towards digitalisation. While universities with more pronounced positional gains (i. e. UniSG and UZH) may generally feel no strong need for public digital identity articulation, those with larger positional losses (e. g. UniFr and UniNe) might be discouraged from strongly emphasising their digital identity in the public. In contrast, actors in the middle of the field who remained somewhat static in the game for positions may feel compelled to address this issue head-on and emphasise their agency in this issue more strongly for both internal and external audiences.

One could argue that this strong identity articulation is a case of inconsequential organisational talk that tries to compensate for the low activity. While these dynamics cannot be completely dismissed, decoupling is usually not a permanent solution (Hasse and Krücken 2013) and "aspirational talk" is consequential for organisational dynamics (Christensen et al. 2013). This is attributable to the fact that organisational self-representations generate corresponding expectations among organisational members as well as external audiences (cf. Stichweh 2014, 231). Thus, while one could interpret identity articulation as mere window dressing, we prefer to interpret it as aspirational identities that may make a difference by at least partially reshaping the activities within the organisation. This interpretation is clearly supported by activities that could be observed at the respective universities in connection with digitalisation strategies.

5 Conclusion

This article shows that digitalisation partially reconfigures the relations among Swiss universities. Although the field structure itself has not changed radically, according to our MCA, some universities have repositioned themselves and, in some cases, have even changed their group membership in the positional space we reconstructed. Furthermore, different types of self-representations as organisational actors are associated with digitalisation activities. While both the most dominant and the weakest players in the digitalisation field are comparatively reticent in terms of talking about

their digital identity, we see a pronounced identity articulation among the organisations in the midfield, which, according to our analysis of the annual reports, were also the latest to address the topic. In future research, it would be interesting to give more nuance to the relation between competition and organisational actorhood and to ask, for example, in what sense and in what way actors and their identities are constructed in competition and how competitive structures feedback on the identity of actors in other cases. Our study only sheds light on one possibility of how competitional dynamics and structures affect the efforts of organisations to enhance their status as organisational actors differentially.

Our study also suggests that it is important to examine more closely under which conditions organisations adopt issues similarly, leading to isomorphism, and under which conditions they create differences through conflictive or competitive positioning within fields. A stronger integration of existing field perspectives and related explanatory approaches would contribute to a more comprehensive theoretical framework and thus facilitate a more nuanced understanding of different interorganisational dynamics. For instance, we would expect conflictive field activities to occur, especially in the early stages of a newly developing field or when a fundamental change occurs in pre-existing fields (e. g. when new actors enter a field). In contrast, we would expect more "tacit" competition to occur in mature fields when its boundaries remain relatively stable and central field logics are not questioned.

There are certainly some limitations of our exploratory study that result from our case selection. One limitation relates to the specificities of our case. First, we cannot expect digitalisation to be taken up in the same way in other university systems. For instance, we hypothesised that this issue can be taken up more controversially in national contexts with less strongly protected field boundaries, especially when new actors threaten the positions of established field actors. Similarly, it can be assumed that, in larger systems, where not all universities have to be considered cooperation partners simultaneously, more overt conflict and less "silent" competition could be observed.

Another potential limitation relates to the contextualisation of our case. We focused on the context of Switzerland and did not consider the embeddedness of the Swiss university field in the European or international field. While these contexts also constitute a relevant observation space for Swiss universities, we assumed that the national field is the most relevant context in this case – especially as this is a relevant governance context and as most resources for digitalisation flow from the national level (e. g. funding by governance agencies, attention of the national public and prospective students).

Against the background of the empirical limitations of our study, comparative studies on the realisation of digitalisation in different national university fields, as well as studies that investigate dynamics in transnational fields of higher education, would be particularly promising. Additionally, it would be interesting to investigate

whether other issues trigger similar dynamics in university fields – particularly the issue of sustainability, which we consider to have similarities with the issue of digitalisation since it is also strongly addressed by Swiss universities, is attributed a high social relevance and is a highly malleable issue that can be related to all areas of universities' activities.

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Appendix

Note: All statistical analyses were implemented with R. In addition to R base functions, we used the FactoMineR package for the multiple correspondence analysis and cluster analysis. For visualisation, we additionally used the functions of the Factoextra and ggplot2 packages.

Table A1 Variables of Digital Transformation in Swiss Universities

Variable	Data source
General	
Year of foundation	Self-description of universities
Number of students	Federal Office for Statistics
University sponsor (federal, cantonal)	Self-description of universities
Funding in Swiss francs	Federal Office for Statistics
Nobel Prize winners associated with university (yes / no)	Own research based on the official website of the Nobel Prize
Winners of Marcel Benoist Prize associated with university (yes / no)	Own research based on the website of the Marcel Benoist Foundation
Business school ranked in financial times (yes/no)	Financial Times Ranking
Number of startups (2010–2020)	Startup-Monitor Switzerland (startup.ch)
Number of patents (2010–2020)	European Patent Office (espacenet database)
Media visibility in leading Swiss newspapers (number of articles in leading Swiss newspapers) (2010–2020)	Swissdox.ch (online database)
Faculty for humanities and social sciences (yes / no)	Organisation charts of universities
Faculty of law (yes / no)	Organisation charts of universities
Faculty of economics (yes / no)	Organisation charts of universities
Faculty of natural sciences (yes / no)	Organisation charts of universities
Faculty of medicine (yes / no)	Organisation charts of universities
Faculty for engineering (yes / no)	Organisation charts of universities
Research (digital)	
Number of research projects in NRP 75 or 77	P3 database of SNSF
Number of basic research projects funded by SNSF with focus on digital transformation	P3 database of SNSF0
Teaching (digital)	
Number of B.A. study programmes dedicated to digital transformation according to self-description	Own research (based on universities' websites and survey)
Number of M.A. study programmes dedicated to digital transformation according to self-description	Own research (based on universities' websites and survey)
Participation in PgB P-8 "digital skills" (Leading House / Partner)	Own research (based on universities' websites and survey)
Number of continuing education programmes related to digital transformation: certificate of advanced studies	Own research (based on universities' websites and survey)
Number of continuing education programmes related to digital transformation: master of advanced studies	Own research (based on universities' websites and survey)
Third Mission (digital)	
Teaching (digital)	
MOOCs (Yes / No)	Universities' websites and relevant platform providers (edX, Courseara, Future Learn, Swissmoocs)

Continuation of Table A1 on the following page.

Continuation of Table A1.

Variable	Data source
Number of startups on big data or machine learning (2010–2020)	Startup-Monitor Switzerland (startup.ch)
Partner of Swiss Digital Day (Partner/no Partner)	Data provided by Swiss Digital Day
Media visibility in leading Swiss newspapers (number of articles related to digitalisation) (2010–2020)	Swissdox.ch (online database)
Organisation (digital)	
Published digital strategy (Yes/No) (2010–2020)	Own research
Digital transformation as an issue in organisational strategy (Yes / No) (2010–2020)	Own research (document analysis)
Presence of positions dedicated to digital transformation in the administration (Yes / No)	Own research (based on organisational charts and annual reports)
Presence of university centres dedicated to digital transformation (Yes / No)	Own research (based on organisational charts and annual reports)
Availability of a Campus app (Yes / No) (2020)	App stores (Apple and Google)
Presence on social media channels (LinkedIn, Twitter, Instagram, YouTube and Facebook. Values from 0 to 5, where 0 = no channels and 5 = all channels) (2010–2020)	Own research on social media channels

Source: own compilation.

Swiss Journal of Sociology, 49 (3), 2023, 567–588

Beyond the News Media Logic? Analyzing the Social Media Orientation of University Leadership

Silke Fürst*, Mike S. Schäfer*, Daniel Vogler*, and Isabel Sörensen*

Abstract: Building on scholarship on the mediatization of organizations, we propose a conception of the social media orientation of organizational leaders and apply it to higher education. Based on an online survey of 276 leaders of Swiss higher education institutions, we show that social media platforms have made their way into university management and communication but are still not as important as news media. The study discusses differences between university types and uses the literature on new public management to derive influencing factors.

Keywords: Social media, public communication, new public management, higher education institutions, mediatization of science

Jenseits der Medienlogik? Analyse der Social Media-Orientierung von Hochschulleitungen

Zusammenfassung: Anknüpfend an die Forschung zur Medialisierung von Organisationen entwickeln wir ein Konzept, um die Social Media-Orientierung von Führungskräften zu erfassen und wenden dieses auf den Hochschulbereich an. Auf Basis einer Online-Befragung von 276 Mitgliedern von Schweizer Hochschulleitungen zeigen wir, dass soziale Medien Einzug in das Management und die Kommunikation von Hochschulen gehalten haben, journalistische Medien aber nach wie vor wichtiger sind. Die Studie diskutiert Unterschiede zwischen Hochschultypen und zieht die Forschung zu New Public Management heran, um Einflussfaktoren zu identifizieren.

Schlüsselwörter: Soziale Medien, öffentliche Kommunikation, New Public Management, Hochschulen, Medialisierung der Wissenschaft

Au-delà de la logique des medias ? Une analyse de l'orientation de la direction des universités vers les réseaux sociaux

Résumé : Nous appuyant sur la recherche sur la médiatisation des organisations, nous proposons un concept permettant de saisir de l'orientation des cadres vis-à-vis des réseaux sociaux et l'appliquons au domaine des hautes écoles. Sur la base d'un sondage en ligne auprès de 276 membres de la direction de hautes écoles en Suisse, nous montrons que les réseaux sociaux ont marqué leur entrée dans la gestion et la communication des universités, mais restent moins importants que les médias d'information. L'étude examine les différences entre les types de hautes écoles et utilise la littérature sur la nouvelle gestion publique pour déduire les facteurs d'influence.

Mots-clés : Médias sociaux, communication publique, nouvelle gestion publique, hautes écoles, médiatisation de la science

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1 Introduction

Higher education institutions (HEIs) have changed considerably in recent decades. Two crucial elements of this change play a role in this study: First, HEIs are increasingly incentivized to communicate with external stakeholders and publics to legitimize themselves and position themselves well in competition with other universities (Peters et al. 2008; Friedrichsmeier and Fürst 2012; Krücken 2021).[1] While news media still play an important role in HEI communication (Lo et al. 2019; Vogler and Schäfer 2020), the rise of digital media has created additional possibilities for and increased the importance of public communication. Social media platforms, such as Facebook, are increasingly used by HEIs to enhance their public visibility and connect with stakeholders (Linvill et al. 2012; Metag and Schäfer 2017; Atakan-Duman et al. 2019; Metag and Schäfer 2019; Sörensen et al. 2023). Second, universities have moved from being collegiate to more strongly managed institutions, manifested in a move toward new public management (NPM) reforms and, with it, a strengthening of internal leadership, growing competition and goal orientation, and increased expectations addressed to the university as a whole (de Boer et al. 2007; Friedrichsmeier and Fürst 2012; Kiener 2013; Krücken 2014; Marcinkowski et al. 2014; Blümel 2016; Krücken 2021; Fürst et al. 2022a). This "transformation of universities into organizational actors, which are able to act strategically and position themselves with regard to their competitors" (Krücken and Meier 2006, 242) also impacts HEI communication efforts. University management has increasingly interpreted external communication as an important leadership issue and has centralized and strongly influenced the objectives, strategies, and resources of this communication (Friedrichsmeier and Fürst 2012; Marcinkowski et al. 2013; Elken et al. 2018; Schwetje et al. 2020; Ferris and Waldron 2021).

This study contributes to the emerging scholarship on digitalization in higher education (Scott 2015, 71; Tratschin 2021) in several ways: While a few studies have examined the perspective of university leadership on communication in general (Engwall 2008; Friedrichsmeier and Fürst 2012; Marcinkowski et al. 2013; Scheu and Olesk 2018; Ferris and Waldron 2021), there is a lack of analyses on university leadership's views on social media. Drawing on mediatization studies, this paper develops a concept of the social media orientation of university leaders and relates it to their orientation toward news media. Furthermore, as little is known about the role of social media in higher education systems outside Anglo-American countries or about potential differences between types of HEIs, this study analyzes Swiss universities, compares different HEI types, and analyzes the factors influencing the social media orientations of HEI leaders.

1 In this article, the terms higher education institutions (HEIs) and universities are used as synonyms.

2 Theoretical Background: Mediatization, New Public Management, and Organizational Actorhood

Drawing on mediatization studies in communication research and sociology (Donges 2008; Peters et al. 2008; Raupp 2009; Weingart 2012; Marcinkowski et al. 2013; Pallas et al. 2016; Scheu and Olesk 2018; Scheu 2019), this paper develops a concept of the social media orientation of HEI leadership. Mediatization research, firstly, considers media as instruments used by organizational actors to observe their environment, including competitors, in terms of what is expected from organizations within their field and others' perception of their organization. Organizations, secondly, are also conceptualized as using media as a means of communicating with their organizational environment and of influencing relevant stakeholders. They monitor the media to identify what topics resonate with different publics and could be useful to attract public attention. It is furthermore assumed that organizational actors have an idea of good, successful communication for their organization and anticipate and adapt to media logic(s) to achieve it. Thirdly, according to mediatization theory, both the monitoring and the use of media for public communication lead to repercussions for and changes in the respective organizations. The specific rules or logics of media influence how organizations are represented, how organizational actors perceive changes in and expectations of their organizational environment, and how organizational actors adapt to these rules and expectations.

So far, the mediatization of organizations has been analyzed mainly with respect to news media and the logic of journalistic news selection and presentation (see, e. g., Donges 2008; Raupp 2009; Marcinkowski et al. 2013; Esser and Strömbäck 2014; Pallas et al. 2016; Scheu and Olesk 2018; Scheu 2019). However, social media also come with specific logics of content creation, distribution, and usage. This includes norms of what forms of representation and interaction are considered successful and good. "When social media platforms emerged in the early 2000s, their primary pursuit seemed to be *connectedness*" (van Dijck and Poell 2013, 8, emphasis in original). Since then, engaging in dialogue with other users (Linvill et al. 2012; D'heer 2018) is an often-emphasized form of successful social media use. Moreover, social media logic is characterized by so-called *popularity* or engagement metrics, such as the number of likes or shares (van Dijck and Poell 2013; Klinger and Svensson 2015; Mau 2019). "Quantified measurements institutionalize certain 'orders of worth'" (Mau 2019, 11), with high engagement metrics on social media typically used as benchmarks for successful and good communication.

We therefore propose a concept of an organization's (and its leaders') social media orientation that takes all three above-mentioned aspects into account: observing the external perception of the organization via social media, understanding good and successful organizational communication in terms of social media logic,

and adapting the working practices and routines of organizational actors to social media (for more information, see Sections 3 and 4).

To understand the social media orientation of university leaders, we must account for the fundamental transformations of higher education systems over the past three decades. NPM reforms in Switzerland, as in many other countries (Braun 1999; de Boer et al. 2007; Kiener 2013; Altrichter 2015), have led to an increased importance of public communication and reputation building for HEIs (Friedrichsmeier and Fürst 2012; Marcinkowski et al. 2014; Vogler 2020b; Adam 2023). Many HEIs feel the need to emphasize their performance and impact in research and teaching, and also engage in third mission activities or knowledge transfer (Kiener 2013; Krücken 2014; Lepori et al. 2014). Due to an "increasing dependence of external and competitive funding sources" (Morphew et al. 2018, 1077), HEIs also increasingly compete for student enrollments (Engwall 2008; Altrichter 2015; Lafuente-Ruiz-de-Sabando et al. 2018; Meier 2019; Krücken 2021). Overall, HEIs must deal with a multiplication of their organizational objectives and increased expectations from society and various stakeholders (Friedrichsmeier and Fürst 2012; Meier 2019; Morphew et al. 2018). Objectives are an essential characteristic of organizations. Through the definition of goals, organizations can specifically direct the deployment of personnel, resources, and measures – and thus reduce complexity (Schimank 2002; Kühl 2020, 44–47). Organizational objectives that have become more important in recent decades due to NPM reforms, such as engaging in knowledge transfer or attracting more students, may also influence the social media orientation of university leadership.

Another feature of NPM reforms is that the number and importance of HEIs' external stakeholders have increased (de Boer et al. 2007; Leder 2022). Until the 1980s, state authorities and political actors were the main stakeholders of HEIs and largely responsible for ensuring their legitimation (Krücken and Meier 2006; de Boer et al. 2007; Marcinkowski et al. 2013). In contrast to this strong state regulation, NPM reforms have brought about increasing autonomy for HEIs and, with it, the need to legitimize themselves in the eyes of "diverse, proliferating, and often demanding stakeholders" (Freed 2018, 1). Such legitimation pressures have led to a stronger orientation toward stakeholders and a growing importance of public communication (Marcinkowski et al. 2013; Marcinkowski et al. 2014; Lafuente-Ruiz-de-Sabando et al. 2018). Research in this area argued that news media in particular have gained importance. As HEIs strive to connect with various stakeholders, it has become more important for them to monitor media coverage to assess societal expectations and gain visibility in news media to reach different groups simultaneously (Marcinkowski et al. 2013; Lo et al. 2019; Scheu 2019). However, whether the diversification of stakeholders might also lead to a stronger social media orientation has not been examined.

NPM reforms have also brought about increased competition between HEIs. Krücken (2021) speaks of "multiple competitions" here, for example, for research funding, student enrollments, ranking positions, or media visibility (Friedrichsmeier and Fürst 2012; Meier 2019; Leder 2022; Adam 2023). These competitions are fueled by higher education policy but are also reinforced by HEIs' "permanent mutual observation" (Friedrichsmeier and Fürst 2012, 58, see also: 52–53). As Krücken (2021, 164) puts it, the competitors are "observed by the competitors themselves," meaning that HEIs monitor what other HEIs in their country, as well as in other countries, are doing and accomplishing. This monitoring is often driven by metrics, which allow actors – although in a simplified and abstract way – "to see themselves and others as in a mirror" (Krücken 2021, 169; see also Mau 2019). As social media provide metrics-based platforms for monitoring, communicating, and promoting, university leadership's observation of other HEIs might stimulate their social media orientation.

In the wake of NPM reforms, university leaders have also become more powerful and important for managing and representing their organizations (de Boer et al. 2007; Blümel 2016; Meier 2019). Traditionally, universities were characterized by "strong state authority and an equally strong academic oligarchy" (Hasse and Krücken 2013, 189), with professors dominating decision making, departments and schools being highly influential, and centralized management having very limited power (Clark 1983). This governance has been transformed since the 1990s with NPM reforms, albeit to varying degrees across regions and countries (Braun 1999; de Boer et al. 2007; Fumasoli and Lepori 2011; Blümel 2016; Meier 2019). Overall, the above-mentioned features and consequences of NPM – a strengthened university leadership; increased competition between HEIs; greater accountability for the actions, decisions, and performances of the university as a whole; the multiplication of organizational objectives and societal expectations; and the growing importance of public communication and reputation building – can be conceptualized as a "transformation of universities into organizational actors" (Krücken and Meier 2006, 242). The concept of organizational actorhood has been widely adopted in higher education research (Bloch 2021) and highlights the changes brought about by new governance, with a university now understood as an "integrated, goal-oriented entity that is deliberately choosing its own actions and that can thus be held responsible for what it does" (Krücken and Meier 2006, 241).

Accordingly, the identity of a university is now "part of an ongoing construction process" (Hasse and Krücken 2013, 188–189) that includes the development of missions, objectives, and strategic means (Fumasoli and Lepori 2011), such as reputation management and the use of diverse communication channels to represent the university as an integrated entity and promote its diverse activities, decisions, and achievements. As part of the increased centralization of decision-making power, university leaders have gained more influence on their organizations' public com-

munication. They increasingly see public communication as a leadership issue and strongly influence the objectives, strategies, and resources of their organization's communication teams (Bühler et al. 2007, 82; Friedrichsmeier and Fürst 2012; Marcinkowski et al. 2013; Elken et al. 2018; Schwetje et al. 2020; Ferris and Waldron 2021). University leadership and central communication departments not only have a large impact on how the university as a whole is represented in public but also often stimulate researchers to engage in public communication and contribute to the university's societal impact (Marcinkowski et al. 2014; De Jong and Balaban 2022; Fürst et al. 2022a).

In the following section, we show that the existing research has revealed that university leadership has a strong orientation toward news media and the university's coverage in the media but that little is known about leadership's social media orientation.

3 Literature Review: The Role of Social Media in HEI Communication

Higher education institutions (HEIs) are increasingly incentivized to communicate with external stakeholders and publics. Media relations are of particular importance, as many studies have shown (e. g., Friedrichsmeier and Fürst 2012; Borchelt and Nielsen 2014; Scheu and Olesk 2018; Lo et al. 2019). HEIs strive to gain visibility in news media coverage, and often measure and evaluate this visibility in terms of the number of news reports (Engwall 2008; Peters et al. 2008; Friedrichsmeier and Fürst 2012). News media are also considered to be HEI stakeholders and to have influence on the decision-making processes of university leaders, as well as on their assessment of how their organizations are perceived by others (Marcinkowski et al. 2013; Scheu and Olesk 2018).

In the last decade, however, the role of digital and social media for the public communication of scientists and universities has increased. More and more researchers use social media to disseminate their research results to diverse publics, connect with other researchers, share and discuss ideas, and enhance their visibility and reputation within and beyond the scientific community (Yeo and Brossard 2017; König 2020; Thiele and Luethje 2021). However, this use of social media differs between countries and disciplines, with many researchers remaining reluctant to use social media due to a lack of time or incentives (König 2020; Koivumäki and Wilkinson 2022). Overall, the decentralized use of social media includes posts not only by individual researchers but also by research institutes. However, compared to news media, social media tend to play only a marginal role in the public communication activities of research institutes (Entradas et al. 2020).

At the central level of HEI communication, social media are used to enhance the public visibility of the university as a whole and to directly connect with di-

verse stakeholders, in particular students, alumni, journalists, and businesses (Lo et al. 2019; Metag and Schäfer 2019; Vogler 2020a). A recent Swiss study of social media communication (Sörensen et al. 2023) showed that HEIs use their central social media accounts mainly to communicate with their own staff and students, while societal stakeholders (actors from politics, media, culture, business, etc.) are secondary targets of HEIs' social media posts. Regarding topics of communication, universities of applied sciences (UAS) and universities of teacher education (UTE) in Switzerland address mainly organizational matters (e. g., financing, governance) and teaching (e. g., courses, student projects), while research universities (RU) focus on organizational matters and research (e. g., scientific results, collaborations). These findings indicate that the central communication departments of Swiss HEIs use social media communication mostly complementary to other channels, reaching specific audiences and addressing topics that are less suited to attract visibility in news media (Fürst et al. 2021).

Early studies showed that many HEIs across the world did not use social media platforms and that if they did, they typically did not allow user feedback or tended to abstain from dialogue with users (Linvill et al. 2012; McAllister 2012; Davis III et al. 2015). Studies from recent years have revealed that most HEIs, including Swiss ones (Sörensen et al. 2023), now use social media platforms such as Facebook, Instagram, and Twitter (now called X, but henceforth referred to as Twitter) (Atakan-Duman et al. 2019; Lund 2019; Fähnrich et al. 2020). Since 2020, more than 70 % of all Swiss HEIs have been active on Twitter and Instagram, and more than 80 % have a Facebook account. RU use Twitter the most, with an average of more than 1100 posts per organization in 2020, while UAS use both Twitter and Facebook to a similar extent (around 600 tweets and 650 Facebook posts on average in 2020). UTE use Facebook the most (around 130 Facebook posts, 110 tweets, and 80 Instagram posts on average in 2020). When considering all three platforms, UAS and RU show a large output (with 1602 and 1551 social media posts, respectively), while UTE post significantly less (319 social media posts) (Sörensen et al. 2023).

Despite this widespread use, and although user dialogue is considered a core feature of social media, scholarship suggests that HEIs often use social media to disseminate information without fully utilizing its interactive potential (Metag and Schäfer 2017; for an overview, see Metag and Schäfer 2019; VanDyke and Lee 2020). There is some evidence that HEIs evaluate their social media activity in terms of engagement metrics, such as the number of likes and shares (Kaplow 2019; Raupp and Osterheider 2019). Moreover, PR practitioners in communication departments use social media "to monitor public opinions of certain groups," for instance, to "get an idea of how students view their university and which topics interest them" (Lo et al. 2019, 565).

Very few studies have shed light on university leaders' views on social media. Leaders of US colleges, universities (Ferris and Waldron 2021), and community

colleges (Davis III et al. 2015) seem to see social media as important tools for communication, mostly to disseminate organizational information and less for dialogue (Davis III et al. 2015) – but scholarship on these matters is scarce.

Overall, scholarship in the field has several limitations (Metag and Schäfer 2019). First, many studies date back to the early 2010s, when the use and diffusion of social media were only beginning. Second, many studies on the social media use of HEIs focus on Anglo-American countries, with little research on the Swiss case (Metag and Schäfer 2017; Sörensen et al. 2023). Third, analyses comparing different types of HEIs are scarce, both with regards to social media use (Sörensen et al. 2023) and in general (Lueg and Graf 2022, 24). Fourth, social media use is rarely analyzed in the context of HEIs' larger communication efforts, such as media relations. Fifth, findings on the role of social media are based mostly on content analyses and surveys or in-depth interviews with communication professionals and researchers (Metag and Schäfer 2019; Fähnrich et al. 2020; Koivumäki et al. 2021; Sörensen et al. 2023). In contrast, little is known about the perspective of university leaders, despite their increased decision-making power within the organization and strong influence on the work of central communication departments (see Section 2).

The social media orientation of university leaders – comprising the observation of external perceptions via social media, an understanding of good communication in terms of social media logic, and the influence of social media on managerial work – is therefore a crucial indicator of the role and importance of social media for the management and central communication of the organization. Therefore, this study asks:

> RQ1: How strong is the social media orientation of Swiss university leaders compared to their news media orientation?
> RQ2: Does the social media orientation of Swiss university leaders differ between HEI types?
> RQ3: Which factors influence the social media orientation of university leaders?

Existing findings indicate that large HEIs, as indicated by the number of students, and HEIs with more financial resources are more active on social media (Metag and Schäfer 2017). We use structural information about HEIs to test whether this also influences the social media orientation of university leaders. Moreover, we build on the findings and conceptions regarding new public management (see Section 2) and test whether the social media orientation of university leaders is influenced by HEI objectives, HEI stakeholders, perceived competitors, and the observation of other HEIs.

4 Method and Data

The analysis is based on a study conducted between September 1 and November 1, 2020, and part of a larger research project investigating HEI communication in Switzerland (https://c3h.ch/en).[2] We surveyed all members of the executive management at all 42 Swiss HEIs, including 14 RU, 10 UAS, and 18 UTE (sometimes also called colleges of education).[3] While the former typically have a long history and cover a broad spectrum of disciplines, UAS and UTE were founded in the 1990s and 2000s and specialize in applied research and teacher education, respectively (Lepori 2008; Kiener 2013; Altrichter 2015; Leutwyler et al. 2017; Truniger 2017).

Based on publicly available information from the 42 HEIs, we compiled a database of the contact details of all members at the highest level of university management. Due to the heterogeneity of organizational structures in the Swiss higher education system, two selection criteria were used: The management unit should a) have a mandate for the entire organization and b) be at the highest level in the executive decision-making chain (for more information, see Fürst et al. 2022a). The positions of these university leaders are typically called rector / president, vice-rector / vice-president, and prorector / director.

A pretest with 14 participants was conducted to assess the comprehensibility of the questionnaire and enhance its quality (see Fürst et al. 2022a, 521). Then, 508 contacts were invited via email to participate in the online survey (319 UAS leaders, 101 RU leaders, and 88 UTE leaders). The questionnaire was available in German, French, and Italian because the HEIs are located in three linguistic regions of Switzerland. Twenty-seven leaders on our contact list could not be reached or did not work in their positions anymore. Of the 481 leaders successfully contacted, we received 276 responses from 39 Swiss HEIs (response rate: 57.4 %). This response rate is slightly higher than in a previous survey of German university leaders (Marcinkowski et al., 2013) and very satisfactory in light of general response rates to online surveys (Hooker and Gil de Zúñiga 2017).

The following analyses are based on 35 variables, including two variables with structural information about HEIs and 33 survey items.[4] The *social media orientation* of university leaders was operationalized as an index consisting of four items with a seven-point scale from 0 = "not at all" to 6 = "very much" (Cronbachs alpha = 0.80), measuring the observation of external perceptions via social media, conceptions of good social media communication, and the influence of social media on managerial work (see Table 1). To put social media orientation in context, we also measured the

2 The project was funded by the Swiss National Science Foundation (SNSF) under Grant Agreement No. 184992.

3 For more information on the sample, see the online appendix (https://doi.org/10.5167/uzh-234478, pp. 6–7).

4 See the online appendix with the original wording of the questions in German and an English translation: https://doi.org/10.5167/uzh-234478.

news media orientation of executive board members (six items with a seven-point scale from 0 = "not at all" / "not at all important" to 6 = "very much" / "very important," Cronbachs alpha = 0.74, see Table 2). In accordance with previous studies on the mediatization of HEIs, we conceived a high amount of media visibility as the dominant understanding of good communication (Peters et al. 2008) and added questions about news media as potential HEI stakeholders (Marcinkowski et al. 2013).

The independent variables used in the regression analyses to address RQ3 were informed by studies on the social media use and public communication of HEIs (Section 3) and new public management in the higher education sector (e. g., Marcinkowski et al. 2013; Krücken 2021; see Section 2). In addition to data on HEI structures (see Table 3 based on BfS 2020), with the *number of students* as an indicator of HEI size and the *total revenue* of an HEI as a measurement of its financial resources (Metag and Schäfer 2017; Schwetje et al. 2020), we used survey data on HEI objectives, the importance of HEI stakeholders, perceived competitors, and the observation of other HEIs to test for factors influencing leaders' social media orientation (Table 4).[5] Regarding *HEI objectives*, we included five items that measure goals related to mediatization and NPM reforms: University leaders were asked to what extent their organization has focused on the goals of generating a good image and public reputation, recruiting more students, acquiring research funds, achieving knowledge transfer and impact on society, and performing well in rankings in the past five years (on a seven-point scale from 0 = "not at all" to 6 = "very much"). With respect to *HEI stakeholders*, university leaders rated the importance of the following 11 stakeholders: university staff, students and prospective students, alumni, the general population, politicians and public administration at the cantonal level, politicians and public administration at the national level, small- and medium-sized corporations, large corporations, local and regional news media, national news media, and international news media (on a seven-point scale from 0 = "not at all important" to 6 = "very important"). For the regression analyses (Table 4), we used an aggregated measurement of political actors (aggregating two items), corporations (aggregating two items), and news media (aggregating three items), thereby including one variable for each stakeholder group. *Perceived competitors* were measured with three items asking university leaders with which universities they compete: other Swiss HEIs of the same type (e. g., UAS), all HEIs in Switzerland, or HEIs in other countries (on a seven-point scale from 0 = "not at all" to 6 = "very much"). *Observation of other HEIs* was also measured with three items, asking university leaders how much they remain up to date with changes and developments at other organizations in the HEI landscape. Using a seven-point scale (from 0 = "not at all" to 6 = "very much"), we asked how closely university leaders monitor other Swiss HEIs of the same type, all

5 Descriptive data on the independent variables can be found in the online appendix, Table 5–Table 8: https://doi.org/10.5167/uzh-234478.

HEIs in Switzerland, or HEIs in other countries. Regression analyses were performed separately for all HEI types, comprising RU, UAS, and UTE.

The respondents were also asked about the *HEI type* for which they worked, revealing that the sample of this study comprised 172 UAS leaders, 54 RU leaders, and 47 UTE leaders (three respondents did not indicate the HEI type). These numbers reflect that the size of university leadership differs significantly between types of HEIs in Switzerland (see Fürst et al. 2022a, 523).

5 Results

Our data regarding RQ1 show that university leaders across all types of Swiss HEIs consider social media to be important for their organizations' communication and for monitoring their environment (Table 1). The most important feature of social media for them is the potential to engage in dialogue with social media users (M = 3.8 on a scale from 0 = "not at all" to 6 = "very much"), which is valued by leaders of all HEI types. University leaders also indicate to use social media to inform themselves of how others talk about their organization (M = 3.5). In comparison, university leaders consider it less important for their organization to gain many likes and shares

Table 1 Descriptive Data for *Social Media Orientation* of University Leaders, Compared Across HEI Types

Items	All respondents (n = 266–270)	UAS (n = 168–169)	UTE (n = 45–47)	RU (n = 52)
	M (SD)	M (SD)	M (SD)	M (SD)
Monitoring how others talk about my HEI on social media	3.5 (1.8)	3.8* (1.7)	3.1 (2.0)	3.0* (1.9)
Many likes and shares as good communication practice	3.1 (1.6)	3.3* (1.5)	2.6* (1.6)	2.8 (1.6)
Dialogue with social media users as good communication practice	3.8 (1.3)	3.9 (1.2)	3.7 (1.2)	3.4 (1.6)
Topics discussed on social media influence my own work	2.9 (1.4)	3.1* (1.4)	2.7 (1.5)	2.5* (1.4)
Index of social media orientation (Cronbachs α = .80)	**3.3 (1.2)**	**3.5* (1.1)**	**3.0* (1.3)**	**2.9* (1.5)**

Note: M = arithmetic mean; SD = standard deviation. UAS = universities of applied sciences; UTE = universities of teacher education; RU = research universities. The surveyed university leaders replied on a seven-point scale from 0 = "not at all" to 6 = "very much." Significant differences calculated by Kruskal-Wallis nonparametric test (*p ≤ .05, **p ≤ .01, ***p ≤ .001)..

on social media (M = 3.1). They ascribe a medium level of influence on their own managerial work to topics discussed on social media (M = 2.9).

However, the results on the news media orientation of university leaders reveal that social media are not the most important communication channels (Table 2). News media are considered to be more important, still, especially with respect to the monitoring of external perceptions; university leaders use news media to inform themselves of how their organization is represented in public (M = 4.9). They also consider it important to attract much attention from news media (M = 4.5) and perceive the topics discussed in news media to have a rather large influence on their own managerial work (M = 3.9). University leaders understand news media as important stakeholders, with local, regional, and national news media (M = 3.8) being more important than international news media (M = 2.7). The orientation toward news media is strongest for RU leaders and lowest for UTE leaders. In sum, the news media orientation of leaders across all HEI types is more pronounced than their social media orientation.

This also holds true when we shed light on different types of HEIs and address RQ2 (Table 1). The social media orientation of UAS leaders is the strongest and

Table 2 Descriptive Data for *News Media Orientation* of University Leaders, Compared Across HEI Types

Items	All respondents (n = 268–271) M (SD)	UAS (n = 167–169) M (SD)	UTE (n = 46–47) M (SD)	RU (n = 52–54) M (SD)
Monitoring how news media report about my HEI	4.9 (1.2)	4.8 (1.2)	5.0 (1.2)	5.0 (1.0)
Attracting a lot of attention from news media as good communication practice	4.5 (1.2)	4.6* (1.2)	4.2* (1.1)	4.5 (1.3)
Topics discussed in news media influence my own work	3.9 (1.1)	3.9 (1.1)	3.9 (1.0)	3.9 (1.1)
Local and regional news media as HEI stakeholders	3.8 (1.3)	4.2 (1.1)	4.0 (1.3)	4.3 (1.1)
National news media as HEI stakeholder	3.8 (1.4)	3.8 (1.3)	3.2* (1.7)	4.2** (1.1)
International news media as HEI stakeholder	2.7 (1.8)	2.9*** (1.8)	1.7*** (1.4)	3.2*** (1.6)
Index of news media orientation (Cronbachs α = .74)	**4.0 (0.9)**	**4.1* (0.9)**	**3.7* (0.9)**	**4.2* (0.8)**

Note: M = arithmetic mean; SD = standard deviation; UAS = universities of applied sciences; UTE = universities of teacher education; RU = research universities. The surveyed university leaders replied on a seven-point scale from 0 = "not at all" / "not at all important" to 6 = "very much" / "very important." Significant differences calculated by Kruskal-Wallis nonparametric test (*p ≤ .05, **p ≤ .01, ***p ≤ .001).

differs significantly from the orientations of UTE and RU leaders. Across all questions, UAS leaders show the highest level of agreement, with social media's potential for dialogues being the most important feature (M = 3.9). In contrast, RU leaders consider the influence of social media on their own managerial work to be rather low (M = 2.5). Overall, however, differences between HEI types are relatively small. The social media orientation of leaders at UTE and RU is very similar.

To explore which factors influence the social media orientation of university leaders (RQ3), we conducted two multiple linear regression analyses using structural information about the HEIs as well as survey-based measures. We found that, on the one hand, structural characteristics (Table 3) are weak predictors of social media orientation ($F = 3.214$, $p = .042$, adjusted $R^2 = .02$). Both the size of the organization (indicated by the number of students) and the total revenues of an HEI explain little variance (together: nearly 2 %). Leaders at larger HEIs and with comparatively lower total budgets tend to have a higher social media orientation.

Table 3 Multiple Linear Regression Analysis of Social Media Orientation: Structural Characteristics (n = 252, all HEI Types)

Independent variables	β	p
Number of students	.330	.013*
Total revenue	–.262	.049*
Adjusted R^2	.017	

Note: *p ≤ .05, **p ≤ .01, ***p ≤ .001, β = standardized regression coefficient. Missing values were handled through listwise deletion.

On the other hand, using survey measurements resulted in good regression models (Table 4) for UAS ($F = 4.139$, $p = .001$, adjusted $R^2 = .28$) and UTE ($F = 3.189$, $p = .006$, adjusted $R^2 = .50$) but not for RU ($F = .980$, $p = .505$, adjusted $R^2 = –.01$, $n = 49$). Regarding the latter, no predictor was significant. Regarding UAS leaders, the objectives of performing well in rankings ($\beta = .245$, $p = .003$) and attracting more students ($\beta = .219$, $p = .010$) were strong predictors of social media orientation. Other nearly significant predictors are the importance of corporations ($\beta = .182$, $p = .054$), as well as students and prospective students as HEI stakeholders ($\beta = .190$, $p = .055$). For UTE leadership, observing HEIs abroad stood out as a predictor of social media orientation ($\beta = .593$, $p = .006$), in addition to the objective of achieving knowledge transfer and impact in society ($\beta = –.339$, $p = .015$). The latter, however, is a negative predictor. In the case of UTE, the objective of knowledge transfer is associated with a weaker social media orientation.

Table 4 Multiple Linear Regression Analyses of Social Media Orientation: Survey Data on the Organization in its Environment, Compared Across HEI Types

	Model 1: UAS (n = 146)		Model 2: UTE (n = 40)	
Independent variables	β	p	β	p
HEI objectives				
Good image and public reputation	.073	.384	–.105	.495
Recruitment of more students	.219	.010**	–.103	.475
Acquisition of research funds	–.090	.276	.211	.172
Knowledge transfer and social impact	–.044	.615	–.339	.015*
Good performance in rankings	.245	.003**	.126	.506
HEI stakeholders				
Own employees	.039	.678	–.011	.950
(Prospective) Students	.190	.055	.033	.855
Alumni	.016	.871	.218	.294
Swiss population	.087	.350	–.063	.791
Political actors	–.117	.192	.147	.533
Corporations	.182	.054	.086	.681
News media	.063	.517	.101	.767
Perceived competitors				
Swiss HEIs of the same type	.017	.857	–.115	.513
Swiss HEIs in general	.060	.516	.306	.124
HEIs abroad	.091	.395	–.056	.762
Observation of other HEIs				
Swiss HEIs of the same type	.105	.317	.003	.989
Swiss HEIs in general	–.079	.440	–.113	.598
HEIs abroad	.110	.351	.593	.006**
Adjusted R^2	.280		.503	

Note: *p ≤ .05, **p ≤ .01, ***p ≤ .001, β = standardized regression coefficient, UAS = universities of applied sciences, UTE = universities of teacher education. Missing values were handled through listwise deletion.

6 Discussion and Conclusion

Building on the literature on the mediatization of organizations in general (e. g., Donges 2008) and HEIs in particular (e. g., Marcinkowski et al. 2013), this study conceptualized the social media orientation of organizational leaders and used survey data to test it for the Swiss higher education sector. Our study reveals that

social media have made their way into university management and communication (Table 1, addressing RQ1). University leaders generally value the use of social media, particularly for dialogic communication, and use social media to monitor how others talk about their organization. Only to a lesser degree do university leaders think that gaining many likes and shares is important for their organization. This shows that university leaders, in the words of van Dijck and Poell (2013), value connectedness over popularity. This is also interesting in light of assessments by communication practitioners in communication departments at Swiss HEIs, who value connectedness and popularity equally and see popularity metrics such as likes and shares as important benchmarks for HEI communication (Fürst et al. 2022b). If Swiss university leaders aim to give priority to the dialogic potential of social media, they would therefore need to set clearer communication goals and allocate resources for communication accordingly.

The lowest agreement among university leaders was found for the question about the influence of social media topics on their managerial work. However, in light of people's tendency to assume that others are more influenced by media than themselves (Davison 1983; Andsager and White 2007), the medium level of agreement with this item was still higher than expected.

The analysis also showed, however, that social media are still seen as less important than news media by university leaders (Table 2, addressing RQ1). News media coverage is strongly used to monitor external perceptions of the organization. University leaders consider it important that their organization attracts much news media attention, and they acknowledge that news media have a rather large influence on their own work. Local, regional, and national news media are seen as important university stakeholders. Leaders of RU show the strongest news media orientation while having a lower social media orientation than UAS and UTE. This aligns with the media coverage of HEIs, with RU being considerably more visible in the news than UAS and UTE (Fürst et al. 2021). Due to the (often substantial) amount of media attention that RU attract, their leaders might consider it less important to stand out on other communication channels, such as social media.

Overall, the social media orientation of Swiss university leaders is at a moderate level, with some differences between HEI types (Table 1, addressing RQ2). RU leaders show the lowest level of social media orientation, closely followed by UTE leaders. UAS leadership reveals a significantly stronger social media orientation, with the strongest agreement across all items. This fits well with a recent social media analysis of the official accounts of Swiss HEIs (Sörensen et al. 2023), which showed that UAS are most active on Facebook and Instagram, with only Twitter being dominated by RU.

Regarding the factors driving social media orientations of university leaders, we found that structural characteristics of HEIs explain little. Both the size and the budget of an organization have a low effect on the social media orientation of its

leaders (Table 3, addressing RQ3). In contrast, HEI objectives, stakeholders, perceived competitors, and the observation of other HEIs – factors derived from the literature on NPM and measured with survey data – proved influential (Table 4, addressing RQ3). The social media orientation of UAS leaders is strongly influenced by the objectives of performing well in rankings and recruiting more students. This influence of rankings (which, in the case of UAS, are often based on students' assessments), student relationship management, and student marketing speaks to the developments and characteristics of UAS in Switzerland. Founded in the 1990s and 2000s, Swiss UAS have experienced tremendous growth in student enrollments over the past 20 years (Lepori 2008; Truniger 2017; Leder 2022, 12). Because their funding is based largely on student numbers, they feel a stronger pressure to attract students than RU do (Lepori et al. 2014; Baumann 2022). In addition, the orientation toward corporations as HEI stakeholders has an almost significant effect on the social media orientation of UAS leaders, which is in accordance with their links to business and industry (Kiener 2013; Lepori et al. 2014; Truniger 2017). Overall, these findings are aligned with studies showing that social media in particular allow for connections between HEIs, students, and businesses (Metag and Schäfer 2019; Vogler 2020a).

Regarding the leadership of UTE, the strongest effect was found for leaders' observations of HEIs in other countries. This might reflect UTE's efforts to find their position within the Swiss higher education system (Altrichter 2015). Founded in the 2000s with a focus on a "very specific segment of tertiary education" (Lepori et al. 2014, 203), UTE feel "urged to legitimate their status as higher education institutions and use internationalization efforts for this purpose" (Leutwyler et al. 2017, 70), such as participation "in many international research networks and projects" (Leutwyler et al. 2017, 72). The analysis also shows that the social media orientation of UTE leaders is negatively influenced by the objective of achieving knowledge transfer and impact in society, meaning that a stronger strive for knowledge transfer is associated with a weaker social media orientation. This is likely connected to "the specific function teacher education institutions fulfil for a field of practice and for a segment of the labour market" (Altrichter 2015, 25). As teacher education is at the core of their knowledge transfer and societal impact, UTE might see less need to invest resources in their public communication (Fürst et al. 2022a, 527) and to communicate on social media (Sörensen et al., 2023).

Regarding RU, the independent variables included in the regression analyses did not significantly contribute to explaining the (lower) social media orientation of this HEI type. However, Swiss RU have the longest history within the higher education system. Many Swiss RU are regularly at the top of international rankings, have good reputations, and gain high visibility in news media due to their research strength (Vogler 2020a, 434; Fürst et al. 2021). This could explain why RU leaders attach a somewhat lower importance to social media. Moreover, as mentioned

above, RU typically perceive a lower competition for students than UAS do and, therefore, likely perceive a lesser need to invest resources in connecting with parents and prospective students via social media.

The strength of this study – its focus on Switzerland as an under-researched yet specific case – is also a partial limitation: The results cannot easily be generalized beyond Switzerland. Although the Swiss higher education system has undergone transformations similar to those in many other Western countries, it is also a particular case due to the rather young history of its UAS and UTE and very well-resourced HEIs in general (Braun 1999; Fumasoli and Lepori 2011; Altrichter 2015; Truniger 2017; Swiss Academies of Arts and Sciences 2021).

The comparison of HEI types was rendered somewhat difficult by differing response numbers; however, these numbers reflected actual differences between the HEI types regarding the size of leadership. Studies in other countries, as well as cross-country comparisons, could expand our findings regarding similarities and differences between HEI types, which would enrich the scarce body of knowledge regarding HEI leaders' social media orientation. Moreover, the concept developed here could be used in research beyond higher education, for instance, regarding the social media orientation of leaders in the corporate sector or of non-governmental organizations.

Another limitation of this study lies in its standardized research design. With its inclusion of all Swiss HEIs and its focus on social media orientation in general, it is beyond the scope of this quantitative online survey to shed light on specific organizational processes or the role of (and differences between) specific social media platforms. Future studies could apply a qualitative research design to learn more about the conditions and processes by which social media gain particular importance, the ways in which the managerial work of university leaders is influenced by social media, and whether university leaders are satisfied with their organizations' use of social media. It would also be important to differentiate between individual social media platforms. In the Swiss case, for instance, Twitter, Facebook, and Instagram are crucial social media platforms, but their importance differs across different HEI types (Sörensen et al. 2023).

Future studies should alleviate these limitations to further improve our understanding of the role of social media for universities. This paper is a step in this direction. It applied the existing scholarship on the mediatization of science and moved it beyond the previous focus on news media by developing a concept of leaders' social media orientation, thereby adding to the growing body of research on digitalization in higher education.

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