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Can you do all in one professional label? Complementarity, substitution, and independence effects in academic life

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Abstract
The diffusion of evaluation systems based on research excellence has been confronting scholars with the dilemma of how to combine the different activities and roles characterizing the academic profession. Besides research, other types of knowledge transfer and academic citizenship, i.e., the service activities and roles carried out on behalf of the university within and outside organizational boundaries, are in fact cornerstones of universities' functioning that allow for their thriving and need to be valued. This study investigates the complementarity, substitution, and independence effects between the various types of knowledge transfer and academic citizenship in a sample of 752 Italian academics working in business schools. We collected data combining different sources including CVs, publication records, and national datasets. Multivariate path analysis was employed to measure covariances between knowledge transfer and academic citizenship. We contribute to the debate on academic citizenship by showing that public and discipline-based service are complementary to knowledge transfer activities, while institutional service is independent from knowledge transfer. Remarkably, journal papers are research outcomes complementary to most academic activities, and the same holds true for dissemination at workshops and conferences. Running counter dominant rhetoric, this study testifies to the likelihood of faculty being "all-round" professionals. We disclose that activities and roles are influenced by academics' previous pathways and research grants and discuss the need to value academic citizenship in performance measurement systems.

Keywords Academic citizenship · Service · Knowledge transfer · Research performance · Business schools · Higher education

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Introduction

Academics have been traditionally faced with the necessity to perform and combine different activities and responsibilities, ranging from teaching to scientific publishing, from sitting on committees to public engagement. If the decisions about activities and roles used to reside in the individual autonomy ascribed to this profession (Degn, 2018; Knights & Clarke, 2014), the growing emphasis posed on the pursuit of research excellence has prompted a lively debate about the interplay between the different expectations that faculty simultaneously experience (Bak & Kim, 2015; Tagliaventi et al., 2020). In particular, whether research finalized to scientific publishing on one hand, and other types of knowledge transfer, such as teaching, patenting, and spin-off creation, on the other, are complementary, substitutable, or independent of each other has been debated (Crespi et al., 2011; Landry et al., 2010; Salter et al., 2017). Scarce attention has been paid to academic citizenship, though, intended as the service activities and roles indispensable for university functioning that faculty undertake within and outside the university boundaries, such as participation in academic committees, involvement in the scientific community, and membership of public and nonprofit organizations' boards (Aguinis et al., 2014; Lawrence et al., 2012; Macfarlane, 2011; Tagliaventi et al., 2019). Specifically, the relationship between knowledge transfer and academic citizenship has been overlooked so far (Macfarlane, 2011; Thompson et al., 2005; Vogelgesang et al., 2010). Our paper addresses this gap by investigating whether different types of academic citizenship and different types of knowledge transfer are linked to each other by complementarity and substitution ties or are independent of each other, and what may affect them, with the aim of revamping the relevance of academic citizenship.

We analyzed the CVs of 752 academics affiliated with Italian business schools, alongside their publication records and information on home institutions. Academic citizenship and knowledge transfer activities turn out to be largely complementary, with the exception of consulting services. In a view of knowledge production as a "triple helix" linking universities, private companies, and government (Plewa et al., 2015), external firms with which to collaborate mark a difference from research councils and nonprofit organizations. It is noteworthy that journal articles and dissemination at workshops and conferences emerge as academic outcomes able to bring together the different tenets of academic life, whereas books are independent of other academic achievements. It is also remarkable that path dependency acts as a meaningful driver of both academic citizenship and knowledge transfer: in spite of the overt pressure to favor research, individuals stick to their previous courses of action and refrain from experimenting with different activities. Additionally, research grants appear to be an effective means to foster both academic citizenship and knowledge transfer.

Unlike extant speculation on academic citizenship, which has evoked the gradual "hollowing out" or "unbundling" of the academic profession due to the attention for research (Macfarlane, 2011; Whitchurch, 2012), our study testifies to the possibility for faculty to remain "all-round" professionals able to contribute to societal development through a variety of tasks and roles. This awareness paves the way for inviting policy makers to revise the actual performance evaluation systems, based primarily on research outcomes, so as to explicitly take into account academic citizenship and sustain emergent complementarities.

The interplay between knowledge transfer and academic citizenship in contemporary universities

Can you do all of these things in one professional label? We're asked to teach students, engage with students, have assessment strategies, feedback strategies, supervise MScs, PhDs, mentor people, mentor other members of staff, research, write research bids, write research papers, present at conferences, publish in high quality journals, administration and all aspects of pastoral care. I mean it's just never-ending but is it realistic? (Knights & Clarke, 2014, p. 342)

This question posed by a lecturer resonates with the daily experience of several academics across the world. Juggling the different requirements explicitly or implicitly posed upon academics has been described with meaningful expressions, such as the "infidelities" (Empson, 2013) that faculty feel when they take time away from research or the "Frankenstein monster" of conflicting agendas that underlie workdays in universities (Martin, 2011). Although multi-tasking has always been part of academic life (Bak & Kim, 2015), something has significantly changed since, back in 1998, Plater wrote:

> Faculty who earn tenure must demonstrate their abilities in research, teaching and service. Activities in all three areas are required, but one of these must be excellent and none of them can be obviously unsatisfactory. (p. 689)

The above statement tells us how the academic profession used to be: individuals had to engage in research, teaching, and service without neglecting any of them, but choosing which one to prioritize, in line with the autonomy and freedom that has traditionally characterized faculty (Butler et al., 2015; Degn, 2018). What has marked a change is the increasing relevance of research worldwide. Research excellence has in fact become the backbone of university functioning and professorial recruitment. 'Excellence is a buzzword of twenty-first century higher education policy' (Pietilä, 2014**,** p. 304) and:

> It is a truism to say that whereas efficiency was the keyword of the 1980s; quality the keystone of the 1990s; 'excellence' is the milestone of the beginning of the twenty first century. Excellence in higher education emerges, in most writings, as something that should be cultivated, a desirable goal that should be pursued by institutions of higher learning (Wangenge-Ouma & Langa, 2010, p. 750)

Focus on research is in line with the New Public Management approach adopted in public policy. In this perspective, transparency and accountability must become the core attributes of universities as public institutions (Capano, 2011; Fussy, 2018; Lewis, 2014). The need for reinforcing these social values is rooted, on one hand, in the intention to improve the competencies of academics and administrative staff in order to sustain economic development and, on the other, in the necessity to allocate fewer resources because of the revision of the Welfare State's financial assets (Capano, 2011). Reinforcement of transparency and accountability relies on the implementation of output-oriented management practices (Overman et al., 2016; Teelken, 2015) or performance-based funding (Frølich, 2011) in which explicit outcome indicators are appraised and rewarded.

A "before" and "after" in the logics governing universities have been legitimized by dedicated reforms in countries like Italy and The Netherlands aimed at enhancing transparency and accountability (Capano, 2018). "The golden age of the professorate has ended," as Pifer and Baker (2013, p. 127) noticed, and academics are currently rewarded primarily for their publication achievements (Pettigrew & Starkey, 2016).

According to Landry et al. (2010), research is one of a "portfolio" of knowledge transfer activities through which faculty reproduce and share knowledge with a variety of partners within and beyond the higher education system. This interpretation of knowledge transfer, which we embrace in this paper, as "the set of activities and processes through which universities accomplish their third-mission objectives, although the scope of the definition can be more or less broad" (Rossi & Rosli, 2015, pp. 1970–71) widens its traditional understanding. The "portfolio" of knowledge transfer activities that faculty can embark upon comprise scientific publishing on one hand, which accounts for research excellence, but also teaching, development of patents and licenses, launch of spin-off, university-industry collaboration, and informal exchanges (Landry et al., 2010). Knowledge transfer thus complies with a multi-stakeholdership view of academia according to which scholars are expected to convey "value for money" to a variety of subjects other than the scientific community, such as students first and foremost, but also governmental institutions, companies, and society at large (Ramos-Vielba & Fernandez-Esquinas, 2012; Aguinis et al., 2014).

A common concern, however, addresses the relationship between research excellence and the other "portfolio" activities (e.g., Mägi & Beerkens, 2016; Salter et al., 2017). Different stances on this issue can be found in the literature: A substitution effect, i.e., engagement in the pursuit of a dimension of performance interferes with the attainment of another, or, contrariwise, a complementarity effect, i.e., a fruitful co-occurrence, or even independence, i.e., no significant interplay, have been claimed between research and the other knowledge transfer activities (Crespi et al., 2011; Salter et al., 2017). Substitution implies that, due to resource constraints, commitment to a course of action impinges on commitment to different alternatives (Kelly & Grant, 2012). Conversely, complementarity builds on economies of scope: different activities share some resources and skills that allow for their coordination and joint attainment (Landry et al., 2010). Finally, activities are independent when they are separate and do not exert any mutual influence on each other (Meyer, 2006).

Regarding the nexus between scientific publishing and teaching, according to the Conventional Wisdom model, research and teaching can be complementary activities in that the former conveys input for the latter and vice versa (Hattie & Marsh, 1996; Mägi & Beerkens, 2016). On the contrary, the Scarcity Model contends that research and teaching be substitutes for each other, as research focuses on the investigation of specific topics, while teaching is rather a skill to be learnt and applied (Wiley et al., 2016).

The interplay between expected tasks gets also more complicated if one takes into account the other types of knowledge transfer beyond teaching (Aguinis et al., 2014; Landry et al., 2010; Salter et al., 2017). According to some studies, there is a positive correlation between scientific publishing and university-industry collaboration, as they can reinforce each other driving academic efforts towards achievements that are beneficial to both universities and society (e.g., Abramo et al., 2011; Plewa et al., 2015). From a different standpoint, Davies (2013) maintained that a trade-off between different types of knowledge transfer be likely, since any distraction from the "publish or perish" mindset would jeopardize scholarly success. A yet mixed intertwining, with both positive and negative influence, was argued by Moosmayer (2011) and by Sà et al. (2011). The relationship between scientific publishing and university-industry collaboration has been claimed to vary across disciplines. Commercialization of research outcomes like patenting, licensing, and spin-off creation may be frequent in the Science, Technology, Engineering, and Mathematics (STEM) field, while in Social Sciences and Humanities (SSH), relational and collaborative modes, such as consultancy, contract research, and joint research, prevail (Olmos-Peñuela et al., 2014). Collaborative

knowledge transfer can in fact mobilize resources for research that are otherwise hard to access in these domains (Perkman & Walsh, 2008).

In particular, consulting has received considerable attention. Complementarity or substitution effects have been traced back to the type of consulting services carried out, specifically to their research orientation (Perkman et al., 2011). While research-driven consultancy can be complementary to scientific publishing, opportunity-driven consultancy can encroach upon research accomplishments (Perkman & Walsh, 2008). Rentocchini et al. (2014) posited that consultancy be negatively related to scientific productivity in STEM in general, but not in Medical Sciences and SSH. In these fields, a substitution effect between research and consulting has been shown for high levels of consulting, whereas complementarity can be found at low or moderate levels (Crespi et al., 2011).

Academic citizenship, which refers to the activities and roles that allow for the ordinary running and thriving of universities, has mostly remained out of the picture in this lively debate (Holland, 2016; Lawrence et al., 2012; Tagliaventi et al., 2019). Macfarlane (2007) proposed a taxonomy of academic citizenship based on a "service pyramid": at the bottom level lies student service (e.g., acting as a student counselor, coaching students for job interviews), followed by collegial service (e.g., mentoring colleagues, contributing to "open days"), institutional service (e.g., being the director of a degree program or a member of the university Senate), discipline-based or professional service (e.g., organizing an academic conference, acting as a peer reviewer or journal editor), and public service, which represents the top layer (e.g., sitting on boards of or advising public and charitable organizations).

In addition to the straightforward evidence that citizenship is essential for any organizations, the scant attention devoted to academic citizenship necessitates to be contrasted since, by refraining from these roles and activities, faculty delegate decisions that impact on their institution to a limited number of individuals, who repeatedly sit on boards, councils, committees, and Senates, in charge of defining the university identity and mission, thereby prompting their marginalization alongside the reproduction of dominant coalitions (Gosling et al., 2009; Thompson et al., 2005). Eventually, engagement in academic citizenship as an expression of collegiality can counterbalance the exacerbated individualism that evaluation systems based on individual performance have been sustaining (Moosmayer, 2011; Knights & Clarke, 2014).

This paper aims to further our understanding of the intertwining between academic activities and roles by investigating whether substitution, complementarity, or independence effects unfold between scientific publishing, other types of knowledge transfer, and academic citizenship, as well as what factors influence these relationships.

Data and methods

We specifically examine whether academic citizenship, research, and other knowledge transfer activities are complementary, substitutes, or independent of each other in business schools. Business schools are an interesting setting since they have been traditionally characterized by a tension between scientific performance and other activities and roles (Butler et al., 2015; Hodgkinson & Starkey, 2011), up to the point that Salter et al. (2017) deem them as an "extreme case." If in these settings faculty in fact used to be selected because of their ability to have an impact on society due to their applied orientation, the rising pressure to better research performance has over time unbalanced them on the

research side, jeopardizing other knowledge transfer effort (Salter et al., 2017; Thomas & Wilson, 2011). Consequently, the relationship between the rigor expected of scientific publishing and the relevance of commercial knowledge transfer is now controversial in business schools (Butler et al., 2015). Furthermore, a multiplicity of disciplines—e.g., marketing, organizational behavior, strategy, accounting, and finance—converge into business schools, thus enabling to gain an extensive perspective (Salter et al., 2017). All the said disciplines share the feature that knowledge transfer through consulting services and dissemination at meetings and conferences prevails (Crespi et al., 2011). Relatedly, given the paucity of large-scale research grants in this field, consulting is becoming a compelling source of funding, highlighting the issue of substitutability, complementarity, or independence among knowledge transfer activities (Salter et al., 2017).

We specifically investigated the Italian higher education system, as it has been subject to a growing pressure towards research excellence, fostered by the so-called Gelmini Reform issued in 2010 (Capano, 2018). Before the Gelmini Reform, Italian academia had been blamed for being "riddled with dead wood, a legacy of too little competition for academic posts or research grants. And universities are not penalized if they choose to hire staff on the basis of personal contacts instead of talent" ('Assessment Time', 2010, p. 1001). In line with New Public Management values, the aim of the Reform was to promote excellence by linking public funding to the quantity and quality of publications through a far-reaching reorganization of the higher education system.[1] Following the British Research Evaluation Framework example, National Evaluation Exercises ("Valutazione della Qualità della Ricerca") are regularly run to assess public universities' research and assign funding (Rebora & Turri, 2013). In parallel, a National Qualification Exam ("Abilitazione Scientifica Nazionale") based first on the achievement of given scientific performance targets, and then on CV appraisal, was implemented to acknowledge eligibility to associate and full professorship. Specifically, three scientific performance targets are set for each discipline and each rank. Candidates must show to have attained at least two out of three targets. It is only after target achievement has been verified that applicants' CVs are taken into account by a national committee, and, if deemed adequate, candidates get qualified and can later apply at local openings.

To collect information about academic citizenship and knowledge transfer activities, we combined different sources. We replicated the consolidated practice of using academics' CVs as source of information about professional achievements (Kaltenbrunner & de Rijcke, 2019; Macfarlane, 2020), including academic citizenship, consulting services, research grants, and research awards, in a rich and longitudinal format. We started with gathering CVs from the National Qualification Exam website. Candidates to associate and full professorship and to membership of national committees are in fact required to upload their CVs in a standardized format on a dedicated website of the Ministry of Education, University, and Research. To complement this collection with the CVs of academics who did not participate in the procedure, we looked up the websites of universities and research groups, research projects, conferences, and professional associations. In order to gain as

[1] More than 10 years after the Reform implementation, its effectiveness is being questioned. Concerning research performance, the Reform has been argued to spark output maximization instead of impact maximization, i.e., an increase in number rather than in quality of publications (Civera et al., 2020). A negative influence on academic careers has been claimed, too, which can be summed up by the 3Ls (less staff, later careers, lower salaries: Civera et al., 2021) and which has led to diminished attractiveness of Italian academic positions and growing brain drain (Cattaneo et al., 2018).

much consistency and homogeneity as possible, we selected only CVs with a structure coherent with the National Qualification Exam format.

Overall, we were able to collect 752 full CVs, all updated at least to January 2014. The final sample was composed of 46.1% academics in business administration and accounting studies, 28.7% in management, 17.2% in finance, and 8.0% in organizational behavior. 39.8% of the scholars in the sample were female. In terms of academics' rank, 43.3% were assistant professors, 27.8% associate professors, and 28.9% full professors. Chi-square tests revealed that the composition of our sample did not differ significantly from business schools' Italian academics who participated in both rounds of evaluation ($N = 1{,}428$) in terms of discipline, gender, and academic rank.

To have a comprehensive picture of research, we resorted to the Scopus database (Agarwal et al., 2016) and retrieved the number of papers published on Scopus-indexed journals, the total number of citations received by these papers at the end of December 2017, and the number of international co-authors (Tagliaventi & Carli, 2021). Furthermore, we collected publication data of the academics in the sample from national datasets created for 2004–2010 Research Evaluation Exercise ("Valutazione della Qualità della Ricerca") and for the yearly evaluation of departmental research ("Scheda Unica Annuale per la Ricerca Dipartimentale': Crespi et al., 2011; Goglio & Parigi, 2016). This additional source of data reports on papers, books, book chapters, and participation to conferences, which are argued to be significant publication outlets in SSH (Austin, 2002; Bonaccorsi et al., 2017). Eventually, the two datasets provided information about universities and departments' rankings.

Measures

To measure the different facets of academic citizenship, we used an original operationalization developed by Tagliaventi and Carli (2021). When considering knowledge transfer, we adopted the taxonomy proposed by Landry et al. (2010). Patenting and spin-off creation by scholars in business schools are very limited (Bennerworth & Jongbloed, 2010): none of the scholars in our sample declared any patent or spin-off participation; hence, we did not consider these knowledge transfer activities in our analysis.[2] We included a variable to parse out participation in conferences and workshops as a proxy for informal exchanges (Crespi et al., 2011). Concerning scientific publishing, we appraised it using a set of multiple variables: the number of publications listed in Scopus, the number of journal articles, the number of books, the number of book chapters, and impact of publications on the scientific community (research influence: e.g., Agarwal et al., 2016). This multifaceted approach has the benefit of balancing quality, quantity, and impact of scientific publishing (Bonaccorsi et al., 2017; Ruocco & Daraio, 2013). With regard to teaching, Italian academics' teaching load is set by law[3] for each academic rank and only rarely is modified, with the consequence that information on teaching is often not detailed in CVs.

Table 1 details all the measures used in our study, their definition, the relevant references used to operationalize them, and data source. The variables measuring academic

[2] As a further control, we triangulated our data with the Research Evaluation Exercise report provided by ANVUR (2013). Among the 512 spin-offs accredited and controlled by Italian universities from 2004 to 2010, only 12 were related to scholars in business and management. In the same period, academics in business schools submitted only 1 of the 312 patents filed by Italian universities.

[3] Assistant professors are expected to teach 90 h per year, while associate and full professors 120 h per year.

Table 1 Variable list, operationalization, and data source

Variables	Measures	References	Source
Institutional service	Count variable: number of activities and roles in university boards and committees	Macfarlane (2007); Thompson et al. (2009); Vogelgesang et al. (2010)	CVs
Public service	Count variable: number of activities and roles in public bodies and nonprofit organizations	Macfarlane (2007); Thompson et al. (2009); Vogelgesang et al. (2010)	CVs
Discipline-based service	Count variable: number of journals for which an academic acts as peer reviewer, participates in the editorial board and of membership of scientific conference boards and committees	Macfarlane (2007); Thompson et al. (2009); Vogelgesang et al. (2010)	CVs
Research productivity (Scopus papers)	Count variable: number of scientific contributions reported in Scopus	Authors (2020)	Scopus
Research productivity (journal articles)	Count variable: number of journal articles published	Austin (2002); Bonaccorsi et al. (2017)	National Agency for the Evaluation of the University and of Research System (ANVUR)
Research productivity (books)	Count variable: number of books published	Austin (2002); Bonaccorsi et al. (2017)	ANVUR
Research productivity (book chapters)	Count variable: number of book chapters published	Austin (2002); Bonaccorsi et al. (2017)	ANVUR

Table 1 (continued)

Variables	Measures	References	Source
Research influence	Count variable: number of citations an author received by December 2017 for all the publications published in Scopus-indexed journals. This number is standardized by the number of years since the publication date, as earlier articles are likely to be cited more than late articles. For instance, an author who published an article in 2011, which received 18 citations by 2017, 2 articles in 2012, which received 15 citations by 2017, and 3 articles in 2013, which received 8 citations by 2017, gets a citation score equal to (18/6) + (15/5) + (8/4) = 8 for the 2011–2013 period	Authors (2020)	Scopus
Consulting services	Binary variable: 1 if the academic gets research funding from industrial partners, 0 otherwise	Gulbrandsen and Smeby (2005)	CVs
Participation in conferences and workshops	Count variable: number of conference and workshop papers and proceedings published	Crespi et al. (2011); Landry et al. (2010)	ANVUR
Research awards	Binary variable: 1 if the scholar received a scientific award in the 2004–2010 time span, including best-paper, best dissertation, and other awards from scientific associations, 0 otherwise	Lutter and Schröder (2016)	CVs
Research grants	Count variable: number of national and international research grants managed as principal investigator or co-investigator in the 2004–2010 time span	Schmidt and Graversen (2017)	CVs

Table 1 (continued)

Variables	Measures	References	Source
International collaborations	Categorical variable: 0 for no international co-authors, 1 for one international co-author, 2 for more than one international co-author, based on the publications reported in Scopus published in the 2004–2010 time span	Cañibano et al. (2020)	Scopus
Visiting scholarships	Binary variable: 1 if the individual spent a period of time working abroad as a visiting scholar in the 2004–2010 time span, 0 otherwise	Jonkers and Cruz-Castro (2013)	CVs
Gender	Binary variable: 1 for males, 0 for females	Bevan and Learmonth (2013)	ANVUR
Research discipline	Categorical variable for each discipline	Crespi et al. (2011)	ANVUR
Academic rank	Categorical variable to account for academic rank: assistant, associate, and full professor	Salter et al. (2017)	ANVUR
Department research orientation	Continuous variable: score obtained by the individual's department in the 2004–2010 Research Quality Assessment (VQR)	Hottenrott and Lawson (2017)	ANVUR
University research orientation	Continuous variable: score obtained by the individual's university in the 2004–2010 Research Quality Assessment (VQR)	Salter et al. (2017)	ANVUR
Department heterogeneity	Count variable: number of disciplines represented in the individual's department	Somech and Drach-Zahavy (2013); Stewart (2006)	ANVUR

Research productivity (journal articles, books, and book chapters) in the period 2004–2010 is drawn from the national Research Evaluation Exercise, which set a maximum of three contributions per academic

citizenship and knowledge transfer activities, namely, *institutional service*, *public service*, *discipline-based service*, *research productivity (divided into Scopus papers*, *journal articles*, *books*, *book chapters*), *research influence*, *consulting services*, and *participation in conferences and workshops*, were calculated in two different time spans: the former covers the period considered by the Research Evaluation Exercise preceding the Gelmini Reform (2004–2010), when scholars were not yet exposed to the research-oriented assessment system, and the latter covers the subsequent Research Evaluation Exercise time span (2011–2013), when scholars were subject to the new appraisal modalities. In the paper, we use the term "Past" to refer to the 2004–2010 period.

Count variables are typically used in literature about research productivity (e.g., Bonaccorsi et al., 2017; Daraio & Moed, 2011), whereas the variable about citations was weighted to counterbalance the difference in the age of papers published between 2004 and 2013. Following the model of Kautonen et al. (2015), we conducted a robustness check on the variable by also running the analyses described in the next paragraph using the unweighted variable for citations, without reaching any significant difference in the results.

We controlled for the effects of several control variables that have been regarded as influential on knowledge transfer and academic citizenship. The interplay between knowledge transfer and academic citizenship can in fact be traced back to individual and contextual factors (Schmidt & Graversen, 2018; Vogelgesang et al., 2010). At an individual level, engagement in knowledge transfer and academic citizenship has been related to previous accomplishments (e.g., Tagliaventi et al., 2019), research awards (e.g., Lutter & Schröder, 2016), grants obtained by research councils (e.g., Schmidt & Graversen, 2018), international collaborations (e.g., Cañibano et al., 2020), visiting scholarships (e.g., Jonkers & Cruz-Castro, 2013), discipline (Moosmayer, 2011; Crespi et al., 2011), gender (e.g., Anzivino et al., 2020), and academic rank (e.g., Salter et al., 2017). Taking context features into account, university size (e.g., Abramo et al., 2011), university and department orientation to research (Salter et al., 2017), and department heterogeneity (Somech & Drach-Zahavy, 2013; Stewart, 2006) have been shown to be influential.

Table 2 presents the descriptive statistics of the count and continuous variables and the proportions of categorical and binary variables.

Finally, we assessed the relationship between the independent variables to exclude multi-collinearity problems: the correlation matrix did not show any values higher than 0.569 and the highest variance inflation factor is under the suggested threshold of 5 (Hair et al., 2010).

Methods

We adopted a correlation approach to investigate complementarity, substitution, and independence effects among dependent variables (Amara et al., 2008; Arora & Gambardella, 1990; Landry et al., 2010). This method measures covariances among a set of dependent variables, while also considering the effects of a set of other variables on them, in our case considered as controls. By doing so, measures of covariance between variables are not affected by the effect of the control variables. Whereas the computation of a set of separate models would discard the possibility of measuring complementarity and substitution, this comprehensive model based on interrelated equations controls for the existence of mutual covariances between the equations' disturbances (Amara et al., 2008).

Table 2 Descriptive statistics (mean, standard deviation, minimum, and maximum of the continuous variables and proportions of the binary variables)

Variables	Mean	SD	Min	Max
Institutional service	2.434	3.401	0	24
Public service	1.203	2.521	0	19
Discipline-based service	1.682	3.253	0	28
Research productivity (Scopus)	2.106	3.176	0	28
Research productivity (journal articles)	4.110	6.605	0	119
Research productivity (books)	1.227	1.381	0	11
Research productivity (book chapters)	3.598	3.959	0	44
Research influence	3.638	7.956	0	60
Participation in conferences and workshops	2.273	3.461	0	49
Past institutional service	4.227	5.461	0	47
Past public service	1.842	3.704	0	35
Past discipline-based service	1.844	4.473	0	43
Past research productivity (Scopus)	1.914	4.037	0	45
Past research productivity (journal articles)	1.233	1.013	0	3
Past research productivity (books)	0.638	0.769	0	3
Past research productivity (book chapters)	0.642	0.817	0	3
Past research influence	3.724	12.881	0	189
Past participation in conferences and workshops	0.086	0.317	0	2
Research grants	1.197	3.828	0	85
Department research orientation	0.234	0.147	0	1
University research orientation	0.308	0.104	0	1
Number of research fields in the department	7.011	2.677	1	12
Binary and categorical variables				
Consulting services	13.8% (Yes)	86.2% (No)		
Past consulting services	9.9% (Yes)	90.1% (No)		
Visiting scholarship	27.4% (Yes)	72.6% (No)		
Research awards	19.6% (Yes)	80.4% (No)		
International collaborations				
None	79.65%			
One	9.04%			
More than one	11.30%			
University size				
Small university	11%			
Medium university	26.6%			
Large university	62.4%			
Academic rank				
Assistant professor	43.3%			
Associate professor	27.8%			
Full professor	28.9%			
Research discipline				
Accounting	46%			
Management	28.6%			
Finance	17.2%			
Organizational behavior	8.2%			
Gender	39.8% (females)	60.2% (males)		

Number of observations = 752

Following Landry and colleagues (2010), we built two path models using Mplus (Muthén & Muthén, 2015). The first path model[4] jointly estimated ten regression models on a common set of explanatory variables and measured covariances between the error-terms of the equations. Our dependent variables were *institutional service*, *public service*, *discipline-based service*, *research productivity* (*Scopus papers*, *journal articles*, *books*, *book chapters*), *research influence*, *consulting services*, and *participation in conferences and workshops* in the 2011–2013 time period. The sign and significance of covariance of the equations' disturbances indicated the presence of complementarity (significant positive covariance), substitution (significant negative covariance), and independence (non-significant value of the covariance) effects between dependent variables (Amara et al., 2008; Arora & Gambardella, 1990). We tested the presence of an inverted U-shaped effect of past discipline-based service on the dependent variables introducing a quadratic term, as the debate on this topic has questioned a linear relationship. Engagement with the scientific community may help scholars develop research capabilities up to a certain point, beyond which it could turn out to be detrimental to their own research accomplishments (e.g., Lawrence et al., 2012; Vogelgesang et al., 2010).

The second stage of the analysis focused on the assessment of the goodness of fit. This check was not possible in the first model because, being it saturated (i.e., the model includes all the possible paths between independent and dependent variables), it had a null chi-square value (Hair et al., 2010). Therefore, to assess fit, we ran the same model, but fixing insignificant regression coefficients (i.e., those with $p > 0.05$, two-tailed) equal to 0 (Landry et al., 2010). The χ^2 statistics of the unsaturated path model was 203.571, with an insignificant p-value (0.593). Thus, we cannot reject the null hypothesis of fit between the implied and observed covariance matrices, which is a good indication of model fit. We subsequently appraised whether this second model with free error-terms covariances better accounted for the relationships emerging from our data (Schreiber et al., 2006) than a model with all the covariances between the equations' error-terms fixed equal to zero. This latter unsaturated path model presented a significant difference ($p < 0.001$; 45 degrees of freedom) in the χ^2 statistic (1140.81) calculated according to the specific procedure for the adopted estimator. This implies that the use of separate regression models is not appropriate to estimate the determinants of academic citizenship and knowledge transfer.

Findings

Tables 3, 4 and 5 report the unsaturated path model which preserves all the significance values of the saturated path model. The covariances between error-terms reported in Table 6 show complex patterns of interactions between dependent variables.

There were several positive significant covariances. Institutional, public, and discipline-based service had positive covariances, suggesting complementarity among them. Research productivity (Scopus papers) and research influence were strongly complementary, with a covariance of 0.725. These two activities were complementary also with research productivity (journal articles), two forms of academic citizenship—public and discipline-based service—and with participation in conferences and workshops. This latter activity came out as

[4] The use of a multivariate path model with free error-terms covariances offers superior performances compared to multiple separate models (Landry et al., 2010), because it grants the possibility to assess interdependence between dependent variables through the analysis of the covariance of the equations' disturbances.

Table 3 Unsaturated multivariate path model (part 1/3)

Independent variables	Academic citizenship					
	Institutional service		Public service		Discipline-based service	
	(β)	Sig	(β)	Sig	(β)	Sig
Intercept	0.316	0.101	−0.540*	0.007	0.271	0.207
Threshold						
Past institutional service	0.637***	0.000	0.064*	0.038		
Past public service			0.645***	0.000		
Past discipline-based service	0.281***	0.000			0.764***	0.000
Past discipline-based service (squared)	−0.255*	0.006			−0.151*	0.012
Past research productivity (Scopus)						
Past research productivity (journal articles)	−0.122**	0.002				
Past research productivity (books)			0.078*	0.039		
Past research productivity (book chapters)	−0.078*	0.024			−0.086*	0.028
Past research influence						
Past consulting services			−0.109***	0.000		
Past participation in conferences and workshops						
Research awards			0.094**	0.001	0.085**	0.001
Research grants	0.081*	0.005	0.147***	0.000	0.099***	0.000
International collaborations (ref. None)						
One						
More than one						
Visiting scholarships						
University size (ref. Small university)						
Medium university						
Large university						
Department research orientation						
University research orientation	−0.080*	0.043				
Number of research fields in the department			0.074*	0.028		
Research field (ref. Accounting)						
Management	0.279***	0.000	0.129***	0.000	0.169***	0.000
Finance	0.143***	0.000	0.094*	0.006	0.102**	0.001
Organizational behavior	0.137***	0.000	0.067*	0.016		
Gender (Male = 1)						
Academic rank (ref. Full professor)						
Assistant professor						
Associate professor	0.080*	0.019				
R-square	0.530		0.478		0.542	

*** (**, *) indicate a significance level of 0.1% (0.5%, 5%)

complementary to all the others, with the sole exceptions of research productivity in terms of books and of consulting services, which in turn were negatively related to research influence, thus highlighting the only two substitution effects. Productivity in terms of journal articles is complementary to all other activities but for consulting services. Consulting services were

Table 4 Unsaturated multivariate path model (part 2/3)

Independent variables	Knowledge transfer							
	Research productivity (Scopus)		Productivity (journal articles)		Productivity (books)		Productivity (book chapters)	
	(β)	Sig	(β)	Sig	(β)	Sig	(β)	Sig
Intercept	0.306	0.232	1.258***	0.000	1.097***	0.000	1.490***	0.000
Threshold								
Past institutional service								
Past public service								
Past discipline-based service								
Past discipline-based service (squared)								
Past research productivity (Scopus)	0.532***	0.000						
Past research productivity (journal articles)								
Past research productivity (books)								
Past research productivity (book chapters)								
Past research influence					−0.168*	0.022		
Past consulting services					−0.095*	0.013		
Past participation in conferences and workshops	0.080*	0.011						
Research awards	0.064*	0.040	0.090*	0.041				
Research grants	0.106**	0.004	0.173***	0.000	0.114*	0.016	0.139***	0.000
International collaborations (ref. None)								
One								
More than one								
Visiting scholarships	0.076*	0.018						
University size (ref. Small university)								

Table 4 (continued)

Independent variables	Knowledge transfer							
	Research productivity (Scopus)		Productivity (journal articles)		Productivity (books)		Productivity (book chapters)	
	(β)	Sig	(β)	Sig	(β)	Sig	(β)	Sig
Medium university								
Large university								
Department research orientation								
University research orientation	0.084*	0.042						
Number of research fields in the department								
Research field (ref. Accounting)								
Management	−0.088*	0.023						
Finance					−0.154***	0.000		
Organizational behavior							0.137**	0.001
Gender (male = 1)	−0.064*	0.047						
Academic rank (ref. Full professor)								
Assistant professor								
Associate professor								
R-square	0.378		0.042		0.066		0.043	

*** (**, *) indicate a significance level of 0.1% (0.5%, 5%)

Table 5 Unsaturated multivariate path model (part 3/3)

Independent variables	Knowledge transfer					
	Research influence		Consulting services		Participation in conferences and workshops	
	(β)	Sig	(β)	Sig	(β)	Sig
Intercept	0.186	0.463			0.804**	0.002
Threshold			2.061**	0.001		
Past institutional service						
Past public service						
Past discipline-based service						
Past discipline-based service (squared)						
Past research productivity (Scopus)	0.175**	0.001				
Past research productivity (journal articles)						
Past research productivity (books)						
Past research productivity (book chapters)						
Past research influence	0.400***	0.000				
Past consulting services			0.375***	0.000		
Past participation in conferences and workshops	0.066*	0.018				
Research awards						
Research grants	0.114**	0.001	0.353***	0.000	0.142***	0.000
International collaborations (ref. None)						
One						
More than one						
Visiting scholarships	0.084*	0.007				
University size (ref. Small university)						
Medium university						
Large university						
Department research orientation					−0.200***	0.000
University research orientation	0.096*	0.022				
Number of research fields in the department					0.093*	0.020
Research field (ref. Accounting)						
Management			−0.252*	0.031	0.189***	0.000
Finance					−0.167***	0.000
Organizational behavior			−0.246*	0.019	0.203***	0.000
Gender (male = 1)						
Academic rank (ref. Full professor)						
Assistant professor			0.238*	0.043		
Associate professor						
R-square	0.409		0.428		0.196	

N = 752; $\chi 2 = 203.571$; degrees of freedom = 209; *p*-value = 0.593

*** (**, *) indicate a significance level of 0.1% (0.5%, 5%)

Table 6 Covariances among the dependent variables

	Institutional service		Public service		Discipline-based service		Research productivity (Scopus)		Productivity (journal articles)		Productivity (books)		Productivity (book chapters)		Research influence		Consulting services		Dissemination	
Cov	ε_1	Sig	ε_2	Sig	ε_3	Sig	ε_4	Sig	ε_5	Sig	ε_6	Sig	ε_7	Sig	ε_8	Sig	ε_9	Sig	ε_{10}	Sig
ε_1																				
ε_2	0.126***	0.000																		
ε_3	0.064*	0.035	0.144***	0.000																
ε_4			0.068*	0.032	0.148***	0.000														
ε_5	0.107**	0.001	0.088*	0.005	0.142***	0.000	0.403***	0.000												
ε_6									0.203***	0.000										
ε_7	0.097*	0.006	0.066*	0.042	0.107***	0.000	0.155 ***	0.000	0.211***	0.000	0.289***	0.000								
ε_8			0.096**	0.001	0.198***	0.000	0.725***	0.000	0.344***	0.000										
ε_9															−0.146*	0.019				
ε_{10}	0.102**	0.001	0.100**	0.001	0.110***	0.000	0.146***	0.000	0.226***	0.000			0.082*	0.008	0.155***	0.000	−0.193**	0.003		

*** (**, *) indicate a significance level of 0.1% (0.5%, 5%)

independent from all types of academic citizenship, while institutional service was independent from research productivity (Scopus papers and books) and research influence but was positively related to research productivity measured by articles and book chapters.

Considering control variables' effects reported in Table 3, previous courses of action turned out to be meaningful, with the exclusion of the variables of research productivity related to journal articles, books, and book chapters: the effect sizes were particularly high compared with the effects of other variables, showing how academics stuck to former appointments notwithstanding research emphasis. Additionally, having obtained a research award had a positive impact on academic citizenship related to public and discipline-based service.

We found that academics who had received a grant attained higher research productivity (Scopus papers, journal articles, books, and book chapters) and influence. Interestingly, past research grants enhanced also all types of academic citizenship, as well as the likelihood of undertaking consulting services and participating in conferences and workshops. Visiting scholarships had a positive influence on both research productivity (Scopus) and influence. Our analysis did not find strong significant differences for gender, except for research productivity, in line with studies claiming a negative bias for women (e.g., Lariviere et al., 2013; Gaiaschi & Musumeci, 2020). Eventually, associate professors were more dedicated to institutional service than full professors, while assistant professors were more dedicated to consulting services. Findings show differences across disciplines, with scholars in management, finance, and organizational behavior being more devoted to all the types of academic citizenship than their colleagues in business administration and accounting studies, with the sole exclusion of organizational behavior scholars for discipline-based service. This latter group was more productive than the others in terms of Scopus outputs and book chapters, though. Academics in management and organizational behavior were less involved in consulting services and keener on attending conferences than the reference group of business administration and accounting studies scholars, while academic in finance were less likely to write books and go to conferences and workshops. We also found inverted U-shaped effects of past discipline-based service on institutional service and on discipline-based service.

Regarding contextual characteristics, consistently with extant literature, university research orientation had a positive effect on research productivity (Scopus papers) and influence. Additionally, being part of a department devoted to research reduced the likelihood of participating in conferences and workshops. Finally, being in a multidisciplinary department increased public service and participation in conferences and workshops.

Discussion

This paper explores complementarity, substitution, or independence between various knowledge transfer activities and academic citizenship roles and activities, as well as their antecedents. The emergent patterns are represented in Table 7.

Our analyses conducted on a sample of academics affiliated with Italian business schools disclose complementarities among the three types of academic citizenship that we have delved into (institutional, public, and discipline-based service) and among different types of research productivity. In particular, discipline-based service is linked to research productivity gauged through articles in Scopus-indexed and journals and book chapters, as well as to research influence, testifying to the fact that research performance is intertwined with involvement in the scientific community. Along the above line of reasoning, books and chapters are independent of involvement in the scientific community, thereby standing

Table 7 Complementarity, substitution, and independence among academic citizenship and knowledge transfer

	Institutional service	Public service	Discipline-based service	Research productivity (Scopus)	Productivity (journal articles)	Productivity (books)	Productivity (book chapters)	Research influence	Consulting services	Dissemination
Institutional service										
Public service	+									
Discipline based service	+	+								
Research productivity (Scopus)	Ø	+	+							
Productivity (journal articles)	+	+	+	+						
Productivity (books)	Ø	Ø	Ø	Ø	+					
Productivity (book chapters)	+	+	+	+	+	+				
Research influence	Ø	+	+	+	+	Ø	Ø			
Consulting services	Ø	Ø	Ø	Ø	Ø	Ø	Ø	-		
Dissemination	+	+	+	+	+	Ø	+	+	-	

+: complementarity effect between activities

Ø: independence effect between activities

-: substitution effect between activities

in marked contrast to other publication outcomes. Public service comes out as complementary to Scopus and journal articles, book chapters, and research influence, too: this finding stresses the positive influence that academia and the wider society can exert on each other. Taking on public roles and being an influential researcher are goals that can be pursued simultaneously, which reinforces the interpretation of universities as actively embedded in society, and not a world apart (Nørgård & Bengtsen, 2016).

Regarding scientific publishing, Scopus papers, journal articles, and chapters in books emerge as complementary to each other, with Scopus and journal papers also being complementary to research influence, whereas books and chapters in books are independent of research influence. This finding enriches our understanding of publication patterns in SSH: a stark difference from STEM has already been highlighted in this domain, with SSH scholars engaging more in the production of books and chapters than in influence-oriented outlets like indexed journals (Austin, 2002; Bonaccorsi et al., 2017). As a matter of fact, any practice with articles in journals, regardless of these latter being indexed or not, is bound to be impactful. A different kind of expertise seems to pertain to books and chapters in books, though, when research influence is taken into account. Writing books and chapters is independent of influence exerted in the scientific community through citations: this knowledge transfer activity does not seem to reach out to other scholars through international, renowned channels but is likely to be shared within a restricted local audience only.

Remarkably, journal articles and dissemination turn out to be versatile products able to play a pivotal role in academic life. Journal articles are in fact complementary to other knowledge transfer activities but books, as well as to the three types of academic citizenship, while they are independent of consultancy. Likewise, dissemination is complementary to most activities examined, while it is independent of research productivity (books) and is a substitute for consulting services. Literature has discussed whether star scientists are willing to undertake also tasks that are not directly conducive to research excellence, as is the case with collaborative knowledge transfer (Perkmann et al., 2011; Olmos-Peñuela et al., 2014) or academic citizenship (Macfarlane, 2007; Tagliaventi et al., 2020). Journal papers and dissemination emerge as valuable outcomes of faculty engagement that are likely to bring to convergence the different tasks and expectations undergirding the academic profession, as far as both knowledge transfer and academic transfer are concerned.

It is noteworthy that the only substitution effects shown by our analysis regard the relations between consulting services and research influence, on one hand, and between consulting services and dissemination, on the other. Additionally, consulting services appear to be independent of all knowledge transfer modalities as well as of academic citizenship in the context under study. Consulting services, therefore, seem to follow a pathway of their own in the academic profession that is hard to match with the other tasks that faculty perform. This evidence runs counter to studies that have claimed a positive relation between consulting and scientific publishing in SSH (Rentocchini et al., 2014). In particular, moving beyond measures of scientific productivity, this study discloses that consultancy and research influence can be substitutes for each other. When faculty embark upon collaborative knowledge transfer with industry partners, their research is scarcely impactful in the scientific community. Similarly, consulting is linked to dissemination at workshops and conferences by a substitution effect. Consulting is therefore a stand-alone kind of knowledge transfer that is hard to combine with other academic duties in Italian business schools.

On top of that, institutional service and scientific publishing on Scopus-indexed journals and on books are independent of each other, while complementarity connects institutional service with journal articles and chapters: serving on internal committees and

boards is therefore beneficial to research-related activities traditionally characterizing SSH (Bonaccorsi et al., 2017), but does not foster high-quality outcomes.

Consequently, we claim that, with the notable exception of consulting services, our findings corroborate the likelihood of being "all-round" academics who take charge of a variety of knowledge transfer and academic citizenship activities that former studies have instead questioned (e.g., Macfarlane, 2011; Thompson et al., 2005). According to these authors, the emphasis on research performance has stressed the difficulty to accomplish all the duties that are expected of faculty members. Along this line of reasoning, a previous study on Italian academics, carried out on a limited number of disciplines and fewer scholars, tapped into their belongingness to different clusters based on research and service performance (Tagliaventi et al., 2020). Interestingly, while a small group of "All-round" academics emerged from the analysis, most faculty either exceled in a single type of activity, be it academic citizenship or research, and the largest cluster were scarcely engaged in any activities at all. Conversely, prevailing complementarity ties arising from our analysis convey an encouraging message: with reference to the opening quote, academics do not need to see the heterogeneous facets of academic life as competing with each other, but as a challenge bearing chances of success, with some effort, namely publishing journal papers and engaging in dissemination, being core to complementarity, while other, such as consulting, prompting substitution and independence.

Regarding control variables, path dependency appears to be a relevant explanation, but for conference attendance. In coping with the call for prioritizing research, therefore academics stick to their past activities and roles. If a change in behaviors is expected, individuals' self-efficacy, i.e., the belief that they can accomplish new tasks successfully, needs to be reinforced (Bandura, 1993). In higher education, excellence in research cannot be simply asked, but it has to be embraced by academics as a realistic achievement. To this end, departments should help faculty develop a positive perception by offering them resources and competencies, such as collaborations with distinguished scholars, visiting scholarships, and intense coaching.

On top of that, the relationship between discipline-based and institutional service turned out to be invertedly U-shaped, suggesting that some competition may occur between these two types of academic citizenship only beyond a certain degree of activities. A similar pattern applied to the relationship between past and subsequent discipline-based service, which supports claims that involvement in the core activities of the scientific community as reviewers and editors, thus contributing to others' research, may be valuable, but may be perceived as subtracting time from one's own research, and therefore dismissed, if it is too intensive (e.g., Vogelgesang et al., 2010).

We also note that, except for past consulting services, the other individual control variables did not show any negative effect on academic citizenship. This finding therefore does not support the belief that investing effort in research jeopardizes academic citizenship commitments, corroborating instead the view of complementarity between tenets of the academic profession.

Implications for policy

The emergent complementarities among most activities and responsibilities expected of academics call for a revision of performance appraisal and related rewards in higher education. Comprehending that academic citizenship and knowledge transfer are complementary courses of action should prompt the design of incentives to undertake tasks and assume

roles other than research (e.g., Aguinis et al., 2014; Lawrence et al., 2012; Macfarlane, 2011). Prominence of research and an intensifying attention for impact on society have overshadowed acknowledgement of service. Academics who assume roles and perform activities critical for the university functioning—women especially—can even be disfavored in tenure track processes compared to peers focusing on research and abstaining from organizational activities (Bevan and Learmonth, 2012). A comprehensive evaluation system that values academic citizenship alongside knowledge transfer would reinforce the actual complementarities between distinctive constituents of academic life.

The evidence that effort in consulting services encroaches upon engagement in other types of knowledge transfer, while being independent of academic citizenship, could also benefit from a more comprehensive approach to performance appraisal. Faced with multidimensional performance assessment that rewards a variety of activities and responsibilities, academics would be motivated to look for synergies between consulting, on one hand, and other types of knowledge transfer and academic citizenship on the other.

A key role in leveraging the benefits of complementarities between academic citizenship and knowledge transfer can be played by research grants. Although we already know that funding by national and international research councils can positively influence research outcomes (e.g., Schmidt & Graversen, 2018), this study highlights that availability of research grants can mobilize effort towards all the roles and activities that we have dealt with. Although further research funding is economically demanding for countries, it appears an effective way to foster "all-round" professorate. Time is ripe for rethinking the premises of faculty evaluation systems by formally rewarding a set of activities and roles that academics already recognize as characterizing their profession.

Finally, the complementarity-enhancing role played by journal articles alongside the independence of books from other types of knowledge transfer as well as from academic citizenship spark reflection on the criteria adopted to decide on career progressions in Italian higher education. The National Qualification Exam introduced by the research-oriented Gelmini reform in 2010 requires that candidates to upper positions in SSH be appraised based also on the number of books published. Books are given the same prominence as journal papers, whereas this study unravels that they have a quite different impact on knowledge transfer and academic citizenship. Whether the criteria set for academic progression are still significant in light of emergent findings calls for some lively discussion in the scientific community.

Limitations and hints for future research

This study has some limitations that pave the way for further research. First, it targets Italian academics in business schools: while the sample includes more than a half (52.67%) of the academics involved in the two rounds of evaluation under study in the considered disciplines, it would be interesting to investigate how academics in different schools (e.g., medicine, engineering, etc.) and in different countries handle the heterogeneous duties linked to their profession. We are in fact already aware that differences across disciplines, as well as context peculiarities, matter (e.g., Moosmayer, 2011). Expanding on different settings and disciplines can inform our understanding of the relationship between academic citizenship and a wider set of knowledge transfer activities, such as spin-offs, patents, and teaching.

Second, our study is based on the analysis of CVs and databases. Information concerning individual characteristics and attitudes, such as personality, job satisfaction, and organizational commitment, could shed light on the willingness to undertake academic citizenship and knowledge transfer and be considered unobserved variables. We therefore invite further inquiry into the factors fostering or hindering complementarities among basics of academic life following specific approaches to define proxies (e.g., Stanca, 2006).

In conclusion, this paper aims to revitalize the debate on the interplay of roles and tasks in higher education. The very mix of activities and responsibilities that underlie the academic profession calls for a deep rethinking of university management, so that pursuing research excellence is no longer a catchphrase trivializing any other engagements but emergent complementarities are instead encouraged and valued.

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Declarations

Conflict of interest The authors declare no competing interests.

References

Abramo, G., D'Angelo, C. A., & Di Costa, F. (2011). University-industry research collaboration: A model to assess university capability. *Higher Education, 62*(2), 163–181.

Agarwal, A., Durairajanayagam, D., Tatagari, S., Esteves, S. C., Harlev, A., Henkel, R., ... & Majzoub, A. (2016). Bibliometrics: Tracking research impact by selecting the appropriate metrics. *Asian journal of andrology*, *18*(2), 296

Aguinis, H., Shapiro, D. L., Antonacopoulou, E. P., & Cummings, T. G. (2014). Scholarly impact: A pluralist conceptualization. *Academy of Management Learning & Education, 13*(4), 623–639.

Amara, N., Landry, R., & Traoré, N. (2008). Managing the protection of innovations in knowledge-intensive business services. *Research Policy, 37*(9), 1530–1547.

Anzivino, M., Ceravolo, F. A., & Rostan, M. (2020). The two dimensions of Italian academics' public engagement. *Higher Education*, 1–19.

Arora, A., & Gambardella, A. (1990). Complementarity and external linkages: The strategies of the large firms in biotechnology. *The journal of industrial economics*, 361–379.

Assessment time. (2010). Nature, 468(7327), 1001–1002. https://doi.org/10.1038/4681001b

Austin, A. E. (2002). Preparing the next generation of faculty: Graduate school as socialization to the academic career. *The Journal of Higher Education, 73*(1), 94–122.

Bak, H.-J., & Kim, D. H. (2015). Too much emphasis on research? An empirical examination of the relationship between research and teaching in multitasking environments. *Research in Higher Education, 56*(8), 843–860.

Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational Psychologist, 28*(2), 117–148.

Benneworth, P., & Jongbloed, B. W. (2010). Who matters to universities? A stakeholder perspective on humanities, arts and social sciences valorisation. *Higher Education, 59*(5), 567–588.

Bevan, V., & Learmonth, M. (2013). 'I wouldn't say it's sexism, except that… It's all these little subtle things': Healthcare scientists' accounts of gender in healthcare science laboratories. *Social Studies of Science, 43*(1), 136–158.
Bonaccorsi, A., Daraio, C., Fantoni, S., Folli, V., Leonetti, M., & Ruocco, G. (2017). Do social sciences and humanities behave like life and hard sciences? *Scientometrics, 112*(1), 607–653.
Butler, N., Delaney, H., & Spoelstra, S. (2015). Problematizing 'relevance' in the business school: The case of leadership studies. *British Journal of Management, 26*(4), 731–744.
Cañibano, C., D'Este, P., Otamendi, F. J., & Woolley, R. (2020). Scientific careers and the mobility of European researchers: An analysis of international mobility by career stage. *Higher Education*, 1–19.
Capano, G. (2011). Government continues to do its job. A comparative study of governance shifts in the higher education sector. *Public Administration*, *89*(4), 1622–1642.
Capano, G. (2018). Policy design spaces in reforming governance in higher education: The dynamics in Italy and the Netherlands. *Higher Education, 75*(4), 675–694.
Cattaneo, M., Malighetti, P., & Paleari, S. (2018). The Italian brain drain: Cream and milk. *Higher Education, 77*(4), 603–622.
Civera, A., Lehmann, E. E., Paleari, S., & Stockinger, S. A. (2020). Higher education policy: Why hope for quality when rewarding quantity? *Research Policy, 49*(8), 104083.
Civera, A., Meoli, M., & Paleari, S. (2021). When austerity means inequality: The case of the Italian university compensation system in the period 2010–2020. *Studies in Higher Education, 46*(5), 926–937.
Crespi, G., D'Este, P., Fontana, R., & Geuna, A. (2011). The impact of academic patenting on university research and its transfer. *Research Policy, 40*(1), 55–68.
Daraio, C., & Moed, H. F. (2011). Is Italian science declining? *Research Policy, 40*(10), 1380–1392.
Davies, S. R. (2013). Research staff and public engagement: A UK study. *Higher Education, 66*(6), 725–739.
Davies, M. (2015). Academic freedom: A lawyer's perspective. *Higher Education, 70*(6), 987–1002.
Degn, L. (2018). Academic sensemaking and behavioural responses–exploring how academics perceive and respond to identity threats in times of turmoil. *Studies in Higher Education, 43*(2), 305–321.
Empson, L. (2013). My affair with the "other" identity journeys across the research–Practice divide. *Journal of Management Inquiry, 22*(2), 229–248.
Frølich, N. (2011). Multi-layered accountability. *Performance-Based Funding of Universities. Public Administration, 89*(3), 840–859.
Fussy, D. S. (2018). Policy directions for promoting university research in Tanzania. *Studies in Higher Education, 43*(9), 1573–1585.
Gaiaschi, C., & Musumeci, R. (2020). Just a matter of time? Women's career advancement in neo-liberal academia An analysis of recruitment trends in Italian Universities. *Social sciences, 9*(9), 163.
Ghasemi, A., & Zahediasl, S. (2012). Normality tests for statistical analysis: A guide for non-statisticians. *International Journal of Endocrinology and Metabolism, 10*(2), 486.
Goglio, V., & Parigi, P. (2016). An institutional mechanism to reduce internal competition? A hypothesis about the diffusion of satellite universities in Italy. *Studies in Higher Education, 41*(8), 1495–1513.
Gosling, J., Bolden, R., & Petrov, G. (2009). Distributed leadership in higher education: What does it accomplish? *Leadership, 5*(3), 299–310.
Gulbrandsen, M., & Smeby, J. C. (2005). Industry funding and university professors' research performance. *Research Policy, 34*(6), 932–950.
Hair, J. F., Black, W. C., Babin, B. J., et al. (2010). *Multivariate data analysis* (7th ed.). Prentice Hall.
Hamann, J. (2016). The visible hand of research performance assessment. *Higher Education, 72*(6), 761–779.
Hattie, J., & Marsh, H. W. (1996). The relationship between research and teaching: A meta-analysis. *Review of educational research, 66*(4), 507–542.
Hodgkinson, G. P., & Starkey, K. (2011). Not simply returning to the same answer over and over again: Reframing relevance. *British Journal of Management, 22*(3), 355–369.
Holland, B. A. (2016). Factors and strategies that influence faculty involvement in public service. *Journal of Higher Education Outreach and Engagement, 20*(1), 63–71.
Kaltenbrunner, W., & de Rijcke, S. (2019). Filling in the gaps: The interpretation of curricula vitae in peer review. *Social Studies of Science, 49*(6), 863–883.
Kautonen, T., Van Gelderen, M., & Fink, M. (2015). Robustness of the theory of planned behavior in predicting entrepreneurial intentions and actions. *Entrepreneurship Theory and Practice, 39*(3), 655–674.
Kelly, K., & Grant, L. (2012). Penalties and premiums: The impact of gender, marriage, and parenthood on faculty salaries in science, engineering and mathematics (SEM) and non-SEM fields. *Social Studies of Science, 42*(6), 869–896.
Knights, D., & Clarke, C. A. (2014). It's a bittersweet symphony, this life: Fragile academic selves and insecure identities at work. *Organization Studies, 35*(3), 335–357.

Jonkers, K., & Cruz-Castro, L. (2013). Research upon return: The effect of international mobility on scientific ties, production and impact. *Research Policy, 42*(8), 1366–1377.
Landry, R., Saïhi, M., Amara, N., & Ouimet, M. (2010). Evidence on how academics manage their portfolio of knowledge transfer activities. *Research Policy, 39*(10), 1387–1403.
Larivière, V., Ni, C., Gingras, Y., Cronin, B., & Sugimoto, C. R. (2013). Bibliometrics: Global gender disparities in science. *Nature, 504*(7479), 211–213.
Lawrence, J., Ott, M., & Bell, A. (2012). Faculty organizational commitment and citizenship. *Research in Higher Education, 53*(3), 325–352.
Lewis, K. (2014). Constructions of professional identity in a dynamic higher education sector. *Perspectives: Policy and Practice in Higher Education*, *18*(2), 43–50.
Lincoln, A. E., Pincus, S., Koster, J. B., & Leboy, P. S. (2012). The Matilda effect in science: Awards and prizes in the US, 1990s and 2000s. *Social Studies of Science, 42*(2), 307–320.
Lutter, M., & Schröder, M. (2016). Who becomes a tenured professor, and why? Panel data evidence from German sociology, 1980–2013. *Research Policy, 45*(5), 999–1013.
Macfarlane, B. (2007). Defining and rewarding academic citizenship: The implications for university promotions policy. *Journal of Higher Education Policy and Management, 29*(3), 261–273.
Macfarlane, B. (2011). The morphing of academic practice: Unbundling and the rise of the para-academic. *Higher Education Quarterly, 65*(1), 59–73.
Macfarlane, B. (2020). The CV as a symbol of the changing nature of academic life: Performativity, prestige and self-presentation. *Studies in Higher Education, 45*(4), 796–807.
Mägi, E., & Beerkens, M. (2016). Linking research and teaching: Are research-active staff members different teachers?. *Higher Education, 72*(2), 241–258.
Martin, B. R. (2011). The research excellence framework and the 'impact agenda': Are we creating a Frankenstein monster? *Research Evaluation, 20*(3), 247–254.
McLellan, T. (2020). Impact, theory of change, and the horizons of scientific practice. *Social Studies of Science*.
Meyer, M. (2006). Are patenting scientists the better scholars?: An exploratory comparison of inventor-authors with their non-inventing peers in nano-science and technology. *Research Policy, 35*(10), 1646–1662.
Moosmayer, D. C. (2011). Professors as value agents: A typology of management academics' value structures. *Higher Education, 62*(1), 49–67.
Muthén, L. K. & Muthén, B. O. (2015). *The comprehensive modelling program for applied researchers: User's guide, 5*. Los Angeles: Muthén & Muthén.
Nørgård, R. T., & Bengtsen, S. S. E. (2016). Academic citizenship beyond the campus: A call for the placeful university. *Higher Education Research & Development, 35*(1), 4–16.
Olmos-Peñuela, J., Castro-Martínez, E., & d'Este, P. (2014). Knowledge transfer activities in social sciences and humanities: Explaining the interactions of research groups with non-academic agents. *Research Policy, 43*(4), 696–706.
Overman, S., Akkerman, A., & Torenvlied, R. (2016). Targets for honesty: How performance indicators shape integrity in Dutch higher education. *Public Administration, 94*(4), 1140–1154.
Perkmann, M., & Walsh, K. (2008). Engaging the scholar: Three types of academic consulting and their impact on universities and industry. *Research Policy, 37*(10), 1884–1891.
Perkmann, M., King, Z., & Pavelin, S. (2011). Engaging excellence? Effects of faculty quality on university engagement with industry. *Research Policy, 40*(4), 539–552.
Pettigrew, A., & Starkey, K. (2016). From the guest editors: The legitimacy and impact of business schools—key issues and a research agenda. *Academy of Management Learning & Education, 15*(4), 649–664.
Pifer, M. & Baker, V. (2013) Identity as a theoretical construct in research about academic careers. In J. Huisman J and M. Tight M (Eds.), *International Perspectives on Higher Education Research* (pp. 115–132). Bingley: Emerald Group Publishing Limited.
Pietilä, M. (2014). The many faces of research profiling: Academic leaders' conceptions of research steering. *Higher Education, 67*(3), 303–316.
Plater, W. (1998). Using tenure: Citizenship within the new academic workforce. *American Behavioral Scientist, 41*(5), 680–715.
Plewa, C., Galán-Muros, V., & Davey, T. (2015). Engaging business in curriculum design and delivery: a higher education institution perspective. *Higher Education, 70*(1), 35–53.
Ramos-Vielba, I., & Fernández-Esquinas, M. (2012). Beneath the tip of the iceberg: Exploring the multiple forms of university–industry linkages. *Higher Education, 64*(2), 237–265.
Rebora, G., & Turri, M. (2013). The UK and Italian research assessment exercises face to face. *Research Policy, 42*(9), 1657–1666.

Rentocchini, F., D'Este, P., Manjarrés-Henríquez, L., & Grimaldi, R. (2014). The relationship between academic consulting and research performance: Evidence from five Spanish universities. *International Journal of Industrial Organization, 32*, 70–83.
Rossi, F., & Rosli, A. (2015). Indicators of university–industry knowledge transfer performance and their implications for universities: Evidence from the United Kingdom. *Studies in Higher Education, 40*(10), 1970–1991.
Ruocco, G., & Daraio, C. (2013). An empirical approach to compare the performance of heterogeneous academic fields. *Scientometrics, 97*(3), 601–625.
Sá, C. M., Li, S. X., & Faubert, B. (2011). Faculties of education and institutional strategies for knowledge mobilization: An exploratory study. *Higher Education, 61*(5), 501–512.
Salter, A., Salandra, R., & Walker, J. (2017). Exploring preferences for impact versus publications among UK business and management academics. *Research Policy, 46*(10), 1769–1782.
Schmidt, E. K., & Graversen, E. K. (2018). Persistent factors facilitating excellence in research environments. *Higher Education, 75*(2), 341–363.
Schreiber, J. B., Nora, A., Stage, F. K., Barlow, E. A., & King, J. (2006). Reporting structural equation modeling and confirmatory factor analysis results: A review. *The Journal of Educational Research, 99*(6), 323–338.
Somech, A., & Drach-Zahavy, A. (2013). Translating team creativity to innovation implementation: The role of team composition and climate for innovation. *Journal of Management, 39*(3), 684–708.
Spence, C. (2019). 'Judgement' versus 'metrics' in higher education management. *Higher Education, 77*(5), 761–775.
Stanca, L. (2006). The effects of attendance on academic performance: Panel data evidence for introductory microeconomics. *The Journal of Economic Education, 37*(3), 251–266.
Stewart, G. L. (2006). A meta-analytic review of relationships between team design features and team performance. *Journal of Management, 32*(1), 29–55.
Tagliaventi, M. R., & Carli, G. (2021). The effect of service on research performance: A study on Italian academics in management. *Higher Education Policy, 34*(4), 812–840.
Tagliaventi, M. R., Carli, G., & Giacomini, D. (2019). Academic citizenship. Global Encyclopedia of Public Administration, Public Policy, and Governance, 1–7.
Tagliaventi, M. R., Carli, G., & Cutolo, D. (2020). Excellent researcher or good public servant? The interplay between research and academic citizenship. *Higher Education, 79*(6), 1057–1078.
Teelken, C. (2015). Hybridity, coping mechanisms, and academic performance management: Comparing three countries. *Public Administration, 93*(2), 307–323.
Thomas, H., & Wilson, A. D. (2011). 'Physics envy', cognitive legitimacy or practical relevance: Dilemmas in the evolution of management research in the UK. *British Journal of Management, 22*(3), 443–456.
Thompson, P., Constantineau, P., & Fallis, G. (2005). Academic citizenship An academic colleagues working paper. *Journal of Academic Ethics, 3*(2–4), 127–142.
Vogelgesang, L. J., Denson, N., & Jayakumar, U. M. (2010). What determines faculty-engaged scholarship? *The Review of Higher Education, 33*(4), 437–472.
Wangenge-Ouma, G., & Langa, P. V. (2010). Universities and the mobilization of claims of excellence for competitive advantage. *Higher Education, 59*(6), 749–764.
Whitchurch, C. (2012). Expanding the parameters of academia. *Higher Education, 64*(1), 99–117.
Wiley, C., Wallingford, V., Monllor-Tormos, M., & Konyu-Fogel, G. (2016). Faculty promotion in business schools: What counts and what should count? *Journal of Higher Education Theory and Practice, 16*(4), 105–126.