The research agenda setting of higher education researchers

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Abstract Research agenda setting is a critical dimension in the creation of knowledge since it represents the starting point of a process that embeds individual researchers’ (and the communities that they identify themselves with) interest for shedding light on topical unknowns, intrinsic and extrinsic factors underpinning that motivation, and the ambition and scope of what a research endeavor can bring. This article aims to better understand the setting of individual research agendas in the field of higher education. It does so by means of a recently developed framework on research agenda setting that uses cluster analysis and linear modeling. The findings identify two main clusters defining individual research agenda setting—cohesive and trailblazing—each with a different set of determining characteristics. Further analysis by cross-validation through means of sub-sampling shows that these clusters are consistent for both new and established researchers, and for frequent and “part-time” contributors to the field of higher education. Implications for the field of higher education research are discussed, including the relevance that each research agendas cluster has for the advancement of knowledge in the field.

Keywords Research agendas · Higher education · Higher education research · Academic research · Cluster analysis · Academics

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Introduction

Academic research is a dynamic process containing several layers of complexity (Latour and Woolgar 2013). As a concept, academic research is not easily definable, which accounts for the many dimensions associated with it (Brew et al. 2016). These dimensions encompass issues related to the sense of belonging and identity, including which research communities individual academic researchers serve, contribute to, and receive value and normative input from (Fyfe 2015). These communities provide guidance for the research engagement of individual researchers, but increasingly overlap (while sometimes competing) within frameworks that foster co-existing, competing, or cooperative logics framed by multidimensional dichotomies such as international versus national research communities, interdisciplinary, multidisciplinary, and disciplinary priorities, and quality or quantity, among others (Lauto and Sengoku, 2015). In addition to these, a multitude of institutional overlaps and interdependencies arise, which range from research communities to national research and higher education systems, universities, faculties, departments, and research centers, each of which may impact the academic research developed by individual academics (Henkel 2015). Environmental pressures such as competitive research funding, the drive to “publish or perish,” and the increasing tensions between teaching and research foci are associated with the introduction of managerialist practices at universities all over the world; all of these have a substantial impact on career progression and academic work itself, which further complexifies the understanding of what academic research is, and what being an academic researcher means (Shattock 2014).

In this framework, Akerlind (2008) has found that the understandings held by individual academics, of what they are as researchers and what their research is, relates to their own research motivations, but also to the processes and outcomes of the research journey, and who it impacts: these factors provide an important conceptual starting point. This understanding of how academics construct the meaning of their academic research is helpful because it centers research choices on the individual academics while at the same time acknowledging the importance of contextual sets of constraints and incentives that help shape individual decisions during the research process (Moss and Kubacki 2007). A substantial body of research has described and analyzed academic research processes in the context of their institutional configuration (Stubb et al. 2014), delineating how these research processes relate to other learning processes such as teaching (Hajdarpasic et al. 2015). The largest body of knowledge thus far constructed concerning academic research relates to research productivity and its determinants. Factors affecting productivity include such demographic characteristics as age and gender, individual ability, and self-efficacy, professional factors such as rank, funding, and network centrality, work-related issues including workload, preference for teaching and research, current and past resources, past activities, and learning experiences (such as earning a PhD abroad), and social aspects such as marital status and number of children (e.g., Kim and Kim 2017; Leisyte 2016; Kwiek 2016; Baccini et al. 2014; Quimbo and Sulabo 2014). In the overall characterization of academic research, what has been somewhat overlooked thus far is the set of factors influencing individual academics as they set their research agendas. The reason for this neglect might relate to the fact that setting agendas often precedes the inputs (resources) needed to start research projects, and may therefore be taken for granted by studies that begin with the input phase. Agendas emerging from ongoing research projects may simply be understood as outcomes of an initial research project that feed the motivation and resources to engage in a new research project, in a known cycle of knowledge production and accumulation (Conceição and Heitor 1999).
This is not to say that academics are unaware of their own research agendas and the place these hold in their research and professional aspirations. At least one study on university-industry collaborations found individual research agendas to be influential in determining the engagement of academics in those types of collaboration (Lee 2000), but such individual research agendas remain nevertheless largely ignored at a formal level. In Lee’s (2000) work, research agendas are presented as somewhat of a common sense or presupposed idea that academics implicitly understand, without really defining what they are or are meant to be. Formal definitions for research agendas are almost non-existent: academics may know what they mean when they talk about their research agenda (after all, they are engaged in research), but coming up with a definition for it has been more challenging. Research agendas can be associated with individual interests or preferences that carry the potential to shape while being shaped by a set of broad dimensions (e.g., environmental, social, and individual characteristics) and narrow dimensions (associated with the challenges of the research undertaking itself and its possible outcomes), which in combination influence the engagement on researching themes or topics of interest at a given time and place (a similar understanding of research agendas is proposed by Leisyte et al. 2008). This process refers to an interaction between the characteristics of the academic and the specificities of the research interest. Just as complex dynamics, identities, and influences affect one’s self-definition as a researcher—following Arkelind’s (2008) argumentation—the construction of research agendas is expected to aggregate dimensions of a dialectic between the academic’s self-identification as a researcher, including attitudes toward research and associated incentives, and specific attributes relating to the specificities (and related challenges) of the research agenda itself. For example, the fact that an academic prefers to work collaboratively can be a dimension brought into the setting of the research agenda as part of the identity of the academic as a researcher, but it may also influence the choices made and actions taken in developing the research agenda. In other words, a research agenda on a particular topic may not be conceived by the individual academic if collaboration is not part of the initial conception. These connections may not be easy to disentangle, even by the academics themselves, in a highly pressurized, constantly changing academic research environment (Brew and Lucas 2009).

This article aims broadly to identify the characteristics of research agenda setting by higher education researchers. The article does not investigate the process of research agenda setting, in that it does not follow the intricacies of the decision-making process followed by individual academics. It also does not identify the topics, issues, or questions chosen (or the methods used to investigate them), but rather identifies factors that shape the decisions defining research agendas (i.e., the choice of themes and topics with different characteristics). Specifically, the question to be asked is whether certain “archetypes” or “doctrines” can be used to group or differentiate academics in their research agenda setting process. The field of higher education is suitable for this exploratory study because it receives contributions from a multitude of researchers from different social science backgrounds including education, sociology, political science, economics, and anthropology among others, making it multidisciplinary while at the same time carrying a broad thematic focus (Tight 2013). The analysis is accomplished by means of cluster analysis, a procedure that aims to identify groups of individuals based on a set of variables—in this case, based on the critical dimensions of the Multi-Dimensional Research Agendas Inventory developed by Horta and Santos (2016). This clustering is followed by a

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1 The definition provided by Ertmer and Glazewski (2014) is a notable exception, albeit only an initial effort; this definition will be shown in the next section of the article.
regression analysis aiming to characterize the importance of various dimensions of the research agenda, followed in turn by a cross-validation of the cluster structure, using two split-sample analyses. Since it is known that the understandings, involvement, and activities of academic researchers are bound to change throughout an academic career (Brew et al. 2016), research agenda setting by both new and established higher education researchers will be analyzed. The same analysis is also performed for academics with different degrees of engagement with the higher education research community (see Harland 2012).

The article is structured as follows. A brief literature on research agendas and the main characteristics of the field of higher education are presented in the next sections. The methodological section is next, followed by the results section. The conclusion sums up and discusses these findings, drawing implications for the advancement of knowledge in the field.

**Research agendas**

While conducting the literature review, a significant number of articles using the term “research agenda” were found, but only Ertmer and Glazewski (2014) attempted a formal definition of the concept. According to them, research agendas can be conceptualized as a combination of strategic problem-solving frameworks and the operationalization of actions to pursue research goals (Ertmer and Glazewski 2014). In this manner, research agendas can be seen as both strategic and tactical. In the literature, research agendas are usually articulated in relation to broad topics representing challenges identified by a research community (or by policymakers) as critical for the advancement of knowledge, for the solution to a societal issue, or both. Although collective agreement concerning common challenges is a stronger influence on individual research agendas in the natural sciences, engineering, and the health sciences, priority setting based on research and policy communities is also present in the social sciences, including in the field of higher education (Middlehurst 2014). As the formulation of individual research agendas in the social sciences is by nature less collective and more focused on application, the individual experiences, backgrounds, and sets of incentives and constraints presented in the immediate institutional environments are expected to have a greater bearing on the choice of research agenda that individual researchers decide to pursue (Spalter-Roth 2007).

Individual choices concerning research agendas shape the advancement of knowledge in each discipline and field of knowledge, but in today’s complex and uncertain world, where academics face careers with increasingly non-linear paths and re-shifting boundaries (Shattock 2014), these choices are also defined by career considerations and sets of organizational incentives and constraints (Kwick and Antonowicz 2015). This suggests that research agendas may not be designed solely for the sake of knowledge advancement itself, but rather are prepared to cope with sets of environmental constraints and incentives that influence the potential of any research agenda including its material and symbolic rewards (this is aligned with the seminal work of Allison and Stewart 1974, criticizing generalizations of the “sacred-spark” hypothesis). In any case, individual research agendas shape knowledge and the evolution of fields and disciplines, and even granted the influence of collective agendas and the organizational environment, the choice for one research agenda over the other remains a personal choice (as convincingly argued by Polanyi 2015). Yet, understanding this choice and the determinants affecting it is critical to interpreting the factors leading
researchers to opt for specific research agendas and to devise policies that can support choices favoring the advancement of knowledge.

Based on the literature mentioned thus far, complemented by the literature on science and technology studies and on the sociology of science, a recent evaluation framework has characterized individual research agendas in terms of eight critical dimensions, divided into 12 sub-dimensions (see Horta and Santos 2016). This framework provides a conceptual and methodological instrument to characterize the research agenda setting of researchers in the field of higher education (Table 1).

The first dimension is scientific ambition, a researcher’s desire to attain prestige and recognition by participating and contributing to the endeavors of a relevant research community, with whom he or she identifies (Latour and Woolgar 2013; Bourdieu 1999). This dimension is sub-divided into prestige—representing the desire for recognition—and the drive to publish, associated to the need to produce codified knowledge that can be easily disseminated and attain maximum visibility (an aspect in tune with the “publish or perish” trend in modern academia; Dobele and Rundle-Theile 2015). The second dimension in the framework is convergence, which represents a preference for disciplinary approaches. This dimension is sub-divided into the concepts of mastery, representing expertise in a specific field, and stability, representing the investment in time and learning made into that field. This stands in opposition to the dimension of divergence, which indicates a willingness to expand beyond a single disciplinary approach. This dimension is sub-divided into branching out, representing the desire to expand into other fields of knowledge, and multidisciplinarity, or the propensity to work in multidisciplinary projects. Both convergence and divergence are well established in the literature as potential strategies for both career and knowledge advancement (see Martimianakis and Muzzin 2015; Rzhetsky et al. 2015; Schut et al. 2014).

Discovery and conservative are also competing dimensions, the former representing the preference for emerging fields carrying the potential for important discoveries and associated with more risk-taking; the latter indicates the preference to research well-established topics, which are considered to be safer (and thus indicating a more risk-adverse stance). The dimension tolerance for low funding represents how much the availability of funding conditions an individual’s choice of research agenda, at a time when even academics who can undertake research without need of funding are pressed by national and institutional pressures to do so (Ion and Ceacero 2017). The seventh dimension, collaboration, is considered to be an increasingly important factor in knowledge creation (Wang 2016) and reflects the researcher’s

| Table 1 Dimensions and sub-dimensions of the Multi-Dimensional Research Agendas Inventory |
|-----------------------------------------------|-----------------------------------------------|
| Scientific ambition                           | Prestige                                      |
|                                               | Drive to publish                              |
| Convergence                                   | Mastery                                       |
|                                               | Stability                                     |
| Divergence                                    | Branching out                                 |
|                                               | Multidisciplinarity                            |
| Discovery                                     | Discovery                                     |
| Conservative                                  | Conservative                                  |
| Tolerance for low funding                     | Tolerance for low funding                     |
| Collaboration                                 | Willingness to collaborate                    |
|                                               | Invited to collaborate                        |
| Mentor influence                              | Mentor influence                              |


preference to set up research agendas that are collaborative in nature. This dimension is subdivided into willingness to collaborate, indicating the propensity to collaborate with peers, and invited to collaborate, which measures the collaborative opportunities made available by others to the researcher. The final dimension in this framework is mentor influence, which reflects the degree to which an individual’s agenda is influenced by his or her PhD mentor, an influence that is expected to decrease over time after the completion of the PhD (Platow 2012). However, this tendency is not universal, and individuals can either drift away from their mentors early on, or pursue career-long partnerships with them. Mentor influence imbeds the transition of an academic to become an independent researcher, while testing the extent to which PhD mentors influence the research agendas set by their former students long after the conclusion of the PhD.

The field of higher education

Higher education is described as a field (rather than a discipline) that has gained visibility in recent decades due mostly to two major worldwide trends: (1) the massification of tertiary education worldwide, as several countries have engaged in a rapid transition from elite higher education systems to mass higher education systems, while other countries have attained nearly universal higher education, which has brought new challenges including those related to internationalization, inequality, skill mismatches, and diversification (Mok 2016); (2) the relevance of formal and organized learning, i.e., teaching and research, in sustaining competitiveness in the context of globalized, competitive, and uncertain knowledge economies where intangibles overcome tangibles, and processes of innovation are transforming the role of higher education institutions in society, requiring analysis to better understand knowledge processes and institutions (e.g., Lo and Tang 2017). In gaining more visibility, higher education research has continued to be closely linked to policymaking and institutional practice (Kehm 2015), and generations of higher education researchers remain keenly aware of higher education-related policy issues (Ashwin et al. 2016). The relative frequency of higher education reforms and changes to higher education systems means that higher education research is still defined by contributors as informing policymaking and practice and thus influencing the transformation of higher education systems (Altbach et al. 2006). This aspect has led scholars such as Malcolm Tight (2004) to interpret higher education research as a field of study and practice, which due to its object-focused rationale often calls for a multidisciplinary approach (see also Altbach et al. 2006).

Higher education research can be understood as an academic field with relatively blurred boundaries, bringing together researchers that identify themselves with a community and work within it on a multitude of higher education-related topics and issues (Kuzhabekova et al. 2015; Chen and Hu 2012; Altbach et al. 2006). Higher education researchers have also been recognized as adopting different stances regarding policy issues (Ashwin et al. 2016), and the participation of contributors with various roles in the field tends to blur the distinctions between research and practice, which create tensions between practically oriented problem solving and scientific reasoning (as discussed by Harland 2012).

This situation leads to two trends. On the one hand, it allows for some theoretical leeway, where theories are deployed because of their empirical applicability without challenging the conceptualization of the research object (Bligh and Flood 2017). This presents an opportunity for researchers with disparate interests in a variety of topics, methodologies, and levels of
analysis to participate in the community based on common interest in higher education themes (Harland 2012; Tight 2008). Relative to this, Tight (2004) argues that higher education research is characterized by overlapping communities of practice, while MacFarlane (2012) describes it as an archipelago of theories, methods, and themes that prevents the field from becoming more coherent. Recent research identifies two main communities in the field of higher education—teaching and learning-oriented and policy-oriented—and emphasizes the relative compartmentalization between them (Kim et al. 2017; Horta and Jung 2014); however, other aspects of compartmentalization are noted in the literature as well (see Tight 2014).

On the other hand, this dynamic leads the field to be host to “part-timers”, researchers making one-time contributions (e.g., those who only publish a single article in higher education literature); these interventions may relate to their professional practice or are made by researchers from other disciplines who happen to come across data sources or methods relevant to higher education (Harland 2012; Clegg 2012). These part-time researchers do not see themselves necessarily as located within the field of higher education studies (Healey and Jenkins 2003) but contribute to the community alongside the regular contributors that are considered critical to the development of the field (Clegg 2012). The characteristics of the field itself entail that research agendas in the field of higher education research may be set with more nuance (and bring in a wider range of factors) than if only researchers were examined having a background in, say, the discipline of education. Another important dimension is the generational change in higher education research, which reflects the same pressures as do other fields of knowledge. Today’s new researchers must cope with different pressures when entering an academic career than those established researchers faced: they need to publish more (and more internationally), collaborate more (and more internationally), and raise more research funding to assure career progression and become established in national and global scholarly communities (Jiang et al. 2017). The introduction of tenure-track structures in many academic systems, combined with the lack of stable academic positions, is raising the stakes for the younger generation of higher education researchers, who may face different pressures and conditions than their predecessors, but could also modify their attitudes toward research itself (van der Weijden et al. 2016). Newer higher education researchers may perceive the relationship between the research they conduct and policy less from the standpoint of membership in a higher education community and more from an individual perspective (Ashwin et al. 2016). These career challenges associated with evolving higher education systems undergoing rapid change are likely to influence differently the setting-up of research agendas by different generations of higher education researchers.

Method

Participants

Data for this study was gathered using an online survey deployed between May and November of 2015. Invitations to participate were sent to all corresponding authors of articles who published in higher education journals indexed in Scopus, between 2004 and 2014. The identification of the corresponding authors was done through a Boolean search in the Scopus
dataset, which identified the journals in the field using the keywords “higher education” or “tertiary education” in the journal’s title. The resulting articles and equal number of corresponding authors represent the list of the 15 most influential higher education journals as proposed by Tight (2012), adding 23 other journals—some of them recent— in which higher education researchers publish their findings. This allows a representative sample of higher education journals, and follows the same process used in the literature to analyze higher education research communities (see Kim et al. 2017; Tight 2014; Horta and Jung 2014). The online survey contained socio-demographic questions and the Multi-Dimensional Research Agendas Inventory (MDRAI), an instrument with 35 Likert-style items to evaluate research strategies, priorities, influences, and goals along 8 dimensions and 12 sub-dimensions, which were validated by means of a confirmatory factor analysis set out in the article that presents the MDRAI inventory (see Horta and Santos 2016). A total of 1348 higher education researchers agreed to participate in this survey, but 416 responses were excluded when the respondents left the survey without completing the MDRAI block. This led to a final sample size of 923 participants, of which 495 (53.6%) were females and the other 428 (46.4%) males. The age of participants ranged from 24 to 84 years (M = 50.97, SD = 11.17). A quarter of the participants were affiliated with the US institutions (230; 24.9%), followed in frequency by Australia (140; 15.2%) and the UK (126; 13.7%). This is proportionally aligned with the worldwide population of higher education researchers publishing in the international literature, which is still concentrated in native English-speaking countries (Kuzhabekova et al. 2015). Higher education researchers affiliated to institutions in 65 other countries accounted for the remaining 427 (46.2%) participants.

Variables

The variables used analytically in this article represent the sub-dimensions in the MDRAI, explained in the section “Research agendas,” above (see also Table 1). This was a conscious, methodological choice made to obtain greater detail in the clustering process and subsequent analysis. These sub-dimensions are the following: prestige, which indicates the researcher motivation to acquire the recognition of peers; drive to publish, which relates to the motivation to publish research; mastery, representing the researcher’s perceived mastery in a specific field; stability, which indicates the level of investment in a single field; branching out, associated to setting-up research agendas that are likely to expand to other fields of knowledge; multidisciplinarity, which reflects the researcher’s preference to engage in topics requiring multidisciplinary approaches; discovery, representing a preference for emerging fields and risk-taking behavior; conservative, suggesting a preference to research safer and well-established topics; tolerance for low funding, which measures to what extent the availability of funding influences the choice of research topics; willingness to collaborate, representing the researcher’s willingness to start collaborative research projects; invited to collaborate, representing the incidence of research agendas started by invitations to collaborate; and mentor influence, which indicates the level of influence of the PhD mentor in designing research agendas.

2 The script of the Boolean search on Scopus was the following: “(SRCTITLE (“higher education”) OR SRCTITLE (“tertiary education”)) AND DOCTYPE (ar) AND PUBYEAR >2003 AND PUBYEAR <2015” —the search reported 40 higher education-related journals, but 2 were excluded, the Chronicle of Higher Education due to characteristics that set its articles apart from other journals (see Horta 2017) and the journal Art Design Communication In Higher Education, which only published two articles during the reference period.
Procedure

The first stage of the analysis employs cluster analysis to identify specific profiles and create a typology of research agendas. In the literature, cluster analysis has been used in a variety of contexts, including the study of behavioral patterns (e.g., Chou 2008), science and technology indicators (e.g., Almeida et al. 2009), and profiles of the careers of researchers (Santos and Horta 2015). In the analysis undertaken for this article, a TwoStep clustering algorithm is used, which offers several advantages over traditional clustering procedures. It allows for the use of both categorical and continuous variables, which is not possible with traditional clustering methods (Norusis 2012), it is compatible with very large datasets (Zhang et al. 1996), and it is capable of statistically determining the optimal number of clusters (see Chiu et al. 2001 for a detailed description of this procedure). The clustering procedure used log-likelihood estimation, given that the reported Euclidean distance performed poorly in this context (see Santos and Horta 2015). The model fit was evaluated by means of the average silhouette measure of cohesion and separation ranging from −1 to 1. The cutoff point of 0.2 (and above) was considered for determining whether or not the model has good fit (Kaufman and Rousseeuw 2009).

The second stage of the analysis makes use of a regression, using input variables to gain additional insights regarding both the relative predictive power of each sub-dimension and their relation to the sub-dimensions that defined the clusters identified in the previous stage. This analysis concludes with a cross-validation that replicates the clustering procedure in sub-samples defined based on “real-life” grouping variables.

Strengths and weaknesses of using perception data

This study relies on self-reported data. Questionnaires represent one of the most practical cost-effective methods to obtain large amounts of data, and produce relatively robust evidence when adequate validation exercises are implemented. However, respondent bias remains an issue, especially regarding socially desirable responses (McDonald 2008), which represents an inherent limitation of this method. Response bias under the form of social desirability, for instance, typically manifests as a skewing of the responses toward what is perceived as desirable (Phillips and Clancy 1972). The instrument used for this analysis was previously validated and found to have normal distribution for all of the used predictors, with low values of skewness and kurtosis (Horta and Santos 2016), suggesting that there is little or no response bias. Moreover, the fact that the analysis is based on perception data means that it refers to respondents’ interpretation of a phenomenon, which is inevitably informed by their previous beliefs and experiences, as well as their effort to provide meaning to their experience (Lindsay and Norman 1977). The way individuals interpret a phenomenon aligns not with reality as it is, but rather with a reality as they construct it. While this is potentially limiting from a methodological point of view, this limitation is mitigated according to a literature that describes self-perceptions as powerful influences defining human action (i.e., what is real is what one perceives it to be) which are highly correlated with actual behavior (Pickens 2005). Self-perceptions are found to be compelling influencers of behavior and action in higher education settings. Studies show how student perceptions of themselves (self-esteem) and of their skills guide their academic choices and their employment focus (e.g., Tavares and Cardoso 2013), while for academics, how they
perceive changing institutions and environmental factors alters and shapes their behaviors and their research productivity (e.g., Kwiek 2015).

Results

First stage analysis—clustering

The clustering procedure yielded two clusters comprising of 605 participants (cluster 1) and 318 participants (cluster 2). The model fit, as evaluated by the silhouette measure of cohesion and separation, was 0.3, indicating a good fit. Tables 2 and 3 and Fig. 1 describe the characteristics of these clusters based on the input variables. Based on the characteristics of the identified clusters, cluster 1 was labeled as “cohesive agendas” and cluster 2 as “trailblazing agendas.” The most evident differences between the clusters rest in the sub-dimensions of convergence and divergence, although other differences can be observed, as described below.

The cohesive agenda cluster accounts for two thirds of the sampled higher education researchers, and represents researchers whose agenda setting leans toward safer research endeavors. This is evidenced by their comparatively lower scores on the discovery dimension and higher scores on the conservative sub-dimension, indicating a preference for more established fields. Their research agenda setting process is somewhat tolerant to low funding, but less so than that of researchers leaning toward trailblazing agendas. Researchers learning toward cohesive agenda setting also consider their research agenda setting to be more influenced by PhD mentors, while scoring slightly lower on both prestige and drive to publish than their more trailblazing agenda-oriented peers. More substantial differences are observed concerning mastery and stability, which are considerably higher for cohesive agenda-oriented researchers, indicating a preference to specialize and take roots in a single field of inquiry. Accordingly, cohesive agenda-oriented researchers score comparatively lower on branching out, multidisciplinarity, and both collaboration sub-dimensions, indicating less willingness to collaborate with peers and—probably as a consequence—fewer opportunities to partake in cooperative ventures started by others.

The competing cluster of the trailblazing agenda-oriented researchers represent one third of the sampled researchers and highlight a different set of characteristics. They are more driven toward discovery and less toward conservative research agendas. They report a higher tolerance for low funding than cohesive agenda-oriented researchers, which can be explained by the fact that they are more willing to attempt exploratory research that does not demand too many resources, but they may also be constrained by research agencies, which tend to prefer to fund established fields (Carayol and Thi 2005). The influence of the PhD mentor is relatively lower for the agenda setting of these researchers, which may indicate more independence but could also entail that after graduation they quickly shift the focus of their research agendas beyond the research interests of their PhD mentor. On prestige and drive to publish, they score comparatively higher than the cohesive agenda-oriented researchers. A lower score on both

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For analytical purposes, standardized factor scores were calculated for the latent factors representing the dimensions under analysis (DiStefano et al. 2009) using full information maximum likelihood (FIML) estimation for purposes of data imputation (Enders and Bandalos 2001). However, when descriptive statistics are reported, the simple mean for individual items comprising that factor is used instead, making it easier to read since these values are easier to be interpreted than Z-scores.
mastery and stability indicates that these researchers have less interest in focusing on a single field and prefer broad and multidisciplinary agendas, which is also evidenced by much higher scores than the cohesive agenda-oriented researchers in the branching out and

Table 2  Quantitative descriptive statistics for the extracted clusters

| Variable                      | 1- “cohesive” | 2- “trailblazing” |
|-------------------------------|---------------|-------------------|
|                               | Mean | Std. dev. | Mean | Std. dev. |
| Discovery                     | 4.19 | 0.88      | 5.05 | 1.22      |
| Conservative                  | 3.36 | 0.90      | 2.32 | 0.92      |
| Tolerance for low funding     | 4.34 | 1.14      | 5.02 | 1.40      |
| Mentor influence              | 2.82 | 1.23      | 2.29 | 1.32      |
| Prestige                      | 4.80 | 1.06      | 5.06 | 1.25      |
| Drive to publish              | 5.11 | 1.11      | 5.46 | 1.30      |
| Mastery                       | 3.88 | 0.97      | 2.67 | 0.96      |
| Stability                     | 3.85 | 0.86      | 2.79 | 0.90      |
| Branching out                 | 4.34 | 0.94      | 5.50 | 0.90      |
| Multidisciplinarity           | 4.74 | 1.07      | 6.08 | 0.95      |
| Will to collaborate           | 5.22 | 0.94      | 5.91 | 0.89      |
| Invited to collaborate        | 4.79 | 1.09      | 5.55 | 1.04      |
| Age                           | 50.56| 11.37     | 51.74| 10.84     |

Table 3  Qualitative descriptive statistics for the extracted clusters

| Variable            | 1- “cohesive” | 2- “trailblazing” |
|---------------------|---------------|-------------------|
|                     | N         | Column (%) | N     | Column (%) |
| Gender              |           |             |       |            |
| Male                | 328       | 54.1       | 169   | 53.0       |
| Female              | 277       | 45.9       | 149   | 47.0       |
| Country             |           |             |       |            |
| Other               | 87        | 14.4       | 41    | 12.6       |
| Australia           | 88        | 14.6       | 52    | 16.4       |
| Canada              | 26        | 4.1        | 13    | 4.1        |
| Finland             | 13        | 2.2        | 7     | 2.2        |
| France              | 4         | 0.7        | 5     | 1.6        |
| Germany             | 8         | 1.3        | 7     | 2.2        |
| Hong Kong           | 7         | 1.2        | 6     | 1.9        |
| Ireland             | 5         | 0.8        | 5     | 1.6        |
| Israel              | 5         | 0.8        | 1     | 0.3        |
| Italy               | 7         | 1.2        | 3     | 0.9        |
| Malaysia            | 9         | 1.5        | 2     | 0.6        |
| Netherlands         | 22        | 3.6        | 2     | 0.6        |
| New Zealand         | 20        | 3.3        | 13    | 4.1        |
| Norway              | 11        | 1.8        | 3     | 0.9        |
| Portugal            | 16        | 2.6        | 4     | 1.3        |
| South Africa        | 22        | 3.6        | 4     | 1.3        |
| Spain               | 18        | 3.0        | 5     | 1.6        |
| Sweden              | 13        | 2.2        | 4     | 1.3        |
| Taiwan              | 6         | 1.0        | 3     | 0.9        |
| United Kingdom      | 78        | 12.9       | 48    | 15.1       |
| United States       | 140       | 23.2       | 90    | 28.4       |

N  605  318
multidisciplinarity sub-dimensions. Researchers following a trailblazing research agenda setting approach also report a higher preference for collaborative agendas and are given more opportunities for collaboration.

The descriptive statistics for the clusters according to age, gender, and country do not show important differences. The mean age of researchers leaning toward cohesive research agendas is 51, while for those leaning toward trailblazing research agendas is 52. The balance between males and females in both research agenda clusters is similar (54% males to 46% females in the cohesive agendas and 53% males to 47% females in the trailblazing agendas). The same holds true for differences between countries, with more researchers leaning toward cohesive agendas in all countries.\(^4\)

Second stage analysis—linear modeling

The first analysis identifies two main trends in the setting of research agendas by higher education researchers, but cluster analysis as a technique provides limited information on the predictive capabilities of the determining variables. Therefore, a follow-up analysis was conducted using a multivariate general linear model, a commonly used procedure (see Parker et al. 2013). This analysis considers dependent variables, the sub-dimensions mastery and stability (constituting the convergence dimension), and branching out and multidisciplinarity (constituting the divergence dimension). These sub-dimensions are used because they are the primary differentiators of the clustering structure. The independent variables used were the remaining sub-dimensions in the clustering analysis. The results are summarized in Table 4.

These results show differences between trailblazing and cohesive agenda setting. Discovery—associated with risk-taking, and a research preference for emerging fields carrying the

\(^4\) with the possible exception of France, but the very small number of observations for that country do not permit even a tentative conclusion.
potential for disruptive discoveries—manifests itself as a statistically significant positive predictor of multidisciplinarity and branching out, while having no effect on stability and mastery. From a conceptual standpoint, this is expected, since researchers performing cutting-edge research are likely to require knowledge from several existing fields (Martimianakis and Muzzin 2015; Schut et al. 2014). Inversely, conservative is a statistically strong positive predictor of both stability and mastery, and a negative predictor of multidisciplinarity and branching out. Researchers pursuing conservative research agendas are more likely to specialize to the point where they are reluctant to engage in other fields. There is a key difference between discovery and conservative dimensions, however. Whereas discovery has a positive effect on divergence without any significant effect on convergence, conservative has a positive effect on convergence while simultaneously having a negative effect on divergence. An interpretation for this is that trailblazing agenda-oriented researchers have lesser incentives and thus are neutral to the prospect of doing, for example, replication research, while cohesive agenda-oriented researchers actively avoid riskier endeavors. This may be an expression of the cumulative advantage effect (Allison and Stewart 1974), as researchers who are “ahead of the curve” have lesser incentives to engage in uncertain ventures. This has been shown to occur even in cutting-edge fields such as biomedicine, where researchers become more conservative as the overall risk of the field increases (Rzhetsky et al. 2015). This is co-substantiated by the tolerance for low funding variable, which is a negative predictor for both stability and mastery, meaning that the greater a researcher’s tolerance to risk is, regarding research funding, the less likely it is that this researcher will engage in cohesive agenda setting. In this regard, it is also important to note that cohesive research agendas are more linked to disciplines, which research funding agencies prefer to fund (vis-à-vis multidisciplinary and interdisciplinary approaches),

### Table 4: Determinant effects on sub-dimensions of divergence and convergence

| Variables                  | Stability | Mastery | Multidisciplinarity | Branching out |
|----------------------------|-----------|---------|---------------------|---------------|
| Discovery                  | −0.016    | −0.006  | 0.268***            | 0.191***      |
|                            | (0.026)   | (0.029) | (0.042)             | (0.032)       |
| Conservative               | 0.347***  | 0.404***| −0.164***           | −0.192***     |
|                            | (0.026)   | (0.029) | (0.042)             | (0.033)       |
| Tolerance for low funding  | −0.046**  | −0.057**| −0.006              | 0.010         |
|                            | (0.021)   | (0.024) | (0.035)             | (0.027)       |
| Mentor influence           | 0.019     | 0.025   | 0.052               | 0.100***      |
|                            | (0.023)   | (0.026) | (0.037)             | (0.029)       |
| Prestige                   | 0.137***  | 0.170***| −0.021              | −0.009        |
|                            | (0.021)   | (0.024) | (0.035)             | (0.027)       |
| Drive to publish           | 0.013     | 0.016   | 0.060               | 0.067**       |
|                            | (0.026)   | (0.029) | (0.042)             | (0.032)       |
| Will to collaborate        | −0.121*** | −0.135***| 0.260***            | 0.166***      |
|                            | (0.035)   | (0.041) | (0.058)             | (0.045)       |
| Invited to collaborate     | −0.004    | −0.012  | 0.043               | 0.053         |
|                            | (0.034)   | (0.038) | (0.055)             | (0.218)       |
| F(8, 911) ***             | 60.190    | 63.162  | 31.011              | 35.916        |
| Adjusted R-squared         | 0.339     | 0.350   | 0.207               | 0.233         |
| Observations               | 923       | 923     | 923                 | 923           |

A general linear model with fixed factors (coded as dummies) and covariates are shown. Standard errors are in parenthesis

*p < 0.1; **p < 0.05; ***p < 0.01
therefore making it likely that more research funding would be available for researchers opting for cohesive research agendas (Carayol and Thi 2005). Tolerance for low funding has no effect on the divergence dimensions, meaning that it has the potential to draw researchers away from the cohesive agenda, while not necessarily pulling them toward adopting trailblazing agendas.

The influence of PhD mentors only has a positive impact on branching out, underlining the key role that mentors can have in encouraging their former students to expand their research agendas into other fields of inquiry. Prestige is a strong and positive predictor of stability and mastery, which are characteristics mostly associated with cohesive research agenda setting. This finding is aligned with literature suggesting that pursuing multiple research foci can be understood by research communities as a lack of thematic focus and engagement in the interests of that particular community, and thus detrimental to researchers desiring to accumulate prestige which, as a positional good, demands significant amount of time, focus, and effort (Bourdieu 1999). Drive to publish, however, has a positive effect on branching out, since entering and expanding into different fields of knowledge requires a tangible “presence” there that implies a greater need to publish to be visible but also allows a broadening of publication venues. The collaboration sub-dimension is a significant predictor of all sub-dimensions, whereas a higher willingness to collaborate leads to less convergence and more divergence. This resonates with the literature stating that multidisciplinary ventures require higher levels of collaboration than disciplinary and specialized research foci (Leahey 2016). This implies that those engaging more in trailblazing research agendas are likely to publish more publications in collaboration than those leaning toward cohesive research agenda setting. No statistically significant differences were found for the invited to collaborate variable.

Third stage analysis—split-sample cross-validation

The literature review suggested potential differences between new and established cohorts of higher education researchers (Jiang et al. 2017; Ashwine et al. 2016), and between part-timers (one-time contributors to the field) and researchers making frequent contributions (Harland 2012; Clegg 2012; Healey and Jenkins 2003). Therefore, a clustering procedure was conducted independently for each of the four groups. The first cross-validation was conducted with the sample divided between new and established researchers. Since differentiation between new and established researchers is not clear-cut, the analysis followed Bazeley’s (2003) suggestion of using relative youth as an indicator of whether a researcher is early or late in his or her career (Bazeley 2003). Therefore, researchers under 40 years old were labeled as new researchers. A related analysis comparing pre-tenured and tenured researchers would also have been of interest, to provide an assessment of new and established researchers complementary to the age-based criterion, but no appropriate data was available to perform it.

In each group, as in the main analysis, only the cohesive and trailblazing research agenda clusters emerged, each showing a fit of 0.3 on the silhouette measure. Figures 2 and 3 juxtapose the two clusters’ profiles on both groups. This shows that except for minor differences (such as the influence of PhD mentors being less for the established researchers leaning toward trailblazing research agendas than it is for established researchers leaning toward cohesive research agendas), new researchers, established researchers, part-time, and frequent contributors to the higher education research community all show a similar structuring of their research agendas, leaning toward either trailblazing or cohesive research agendas. This analysis sustains the robustness of the main analysis and implies that contributors to higher education research at different stages in their academic career, or contributing to higher
education research at differing frequency, maintain the same dynamics concerning the setting-up of research agendas.

**Fig. 2** Comparative variable means for each cluster, for new and established researchers in the field of higher education

**Fig. 3** Comparative of variable means for each cluster, on part-time and frequent higher education researchers
Conclusion

The setting of research agendas by higher education researchers is characterized by multidimensional features that can be categorized into two main clusters: cohesive and trailblazing. Cohesive research agendas pay particular attention to the development of expertise in a field, suggesting that the results of the proposed research will converge with existing knowledge in said field. Implicitly, researchers using such research agendas will need to make long-term investments in terms of time and effort to increase their knowledge of a specific subject and reach topical specialization. Thus, cohesive research agendas convey a sense of stability and are considered low risk. These agendas tend to be predominantly disciplinary in nature and demand a lesser degree of collaboration, which may be due to the substantial influence of the PhD mentor on research agenda setting (particularly for new researchers), related to the topics or general field of inquiry of the PhD. Trailblazing research agendas, on the other hand, are characterized by a willingness to expand research into other fields of knowledge, to conduct multidisciplinary research, and to engage with and be engaged by others in collaborative projects from the start. This research agenda cluster is associated with risk-taking, since it implies a greater likelihood of leaving one’s comfort zone and, potentially, having to deal with a lack of adequate research funding (the propensity to do research with no funding is higher for those researchers opting for this research agenda).

Both research agenda clusters are strongly associated with peer recognition, although the strategies used to attain this recognition vary according to the defining characteristics of each research agenda cluster. Researchers who use cohesive research agendas tend to want their peers to recognize their mastery of knowledge in a specific field of inquiry, while researchers who use trailblazing research agendas tend to have a greater drive to publish or establish a “presence” through concrete research outputs on the many research topics that they study. These distinct strategies to attain prestige presented in the two research agenda types are closely associated with issues of contextualization and legitimacy that disciplinary, multidisciplinary, and interdisciplinary researchers face in modern academia (Carayol and Thi 2005).

However, it should not be assumed that the two research agenda types necessarily involve mutually exclusive approaches; indeed, research agendas are subject to interplay across the continuum of dimensions that characterize them (see also Knuuttila 2013). Nevertheless, analysis of the research agendas of new higher education researchers, established higher education researchers, part-time or full-time independent researchers, and part-time and frequent contributors to the field suggests that researchers in different situations in their career, with varied opportunities to contribute to the field, exhibit remarkably similar clustering in the setting of their agendas. This may indicate that some pressures, including those derived from academic capitalism, may be undermining expected differences in research agenda setting and underlining isomorphic pressures to conform and survive, particularly among younger generations of researchers (see Cantwell and Taylor 2015).

The pressures resulting from a changing academic culture notwithstanding, the implications of this study on the field of higher education could be far reaching, particularly if one considers that two thirds of researchers lean toward cohesive research agendas while one third tend toward trailblazing agendas. As one analyzes the dimensions characterizing research agendas as well as the clusters that form around them, the distinctions and dichotomies between their various features seem to echo Kuhn’s (1970) claim that researchers adhere to, or seek to legitimize and protect, particular paradigms, embedding in them discipline-specific values, identities, and lines of thinking and acting. Meanwhile, often within the same research
community, other groups of researchers work to create “small revolutions” that lead to paradigmatic shifts. Speaking in general terms, the former can be associated with cohesive agendas, while the latter can be associated with trailblazing agendas.

These distinctions produce different roles for researchers within the field of higher education. The role of the stabilizer is performed by researchers who implement cohesive agendas, or engage in what Kuhn (1970) terms “normal science.” Stabilizers (i.e., researchers who prefer cohesive research agendas) provide the core fundamentals of a field’s identity: shared ideals, habitus, consensus, values, norms, and a sense of belonging. All of these elements are critical if a field is to become established, differentiate itself from other fields, and achieve stability and maturity. Those researchers leaning toward cohesive research agendas can contribute to the sustainability higher education research by preserving the genealogies of a given field, conserving historically discursive constructs, and giving coherence and organization to otherwise isolated and uncontextualized heterogeneous statements and findings (Messer-Davidow et al. 1993; Foucault 1972). This ensures that knowledge paradigms, as defined by Kuhn (1970), can be subjected to further advancement, articulated within other paradigms, or even revolutionized into new paradigms, which enrich a field’s knowledge base by allowing it to grow in complexity, relevance, and applicability. However, those researchers leaning toward cohesive research agendas may not be proactive in finding disrupting novelties and are thus unlikely to produce innovative research. In contrast, researchers who implement trailblazing research agendas are prone to innovation as they seek to disrupt normal science, effectively aligning their research projects with the growing call for more multidisciplinary research agendas that address the complex challenges that higher education systems are facing at present and will be facing in the near future (see Tierney 2014).

According to Bourdieu’s field theory perspective, the interplay between higher education researchers who implement trailblazing and cohesive agendas reflects the interplay between agency and structure along with their accompanying relations of power (Kogan 2005). This interplay highlights how these relationships may shape intellectual progress within a field as well as its cognitive, social, and power relations to other fields (Bourdieu 1969). Following this line of argumentation to its natural conclusion, the development of higher education as a field of knowledge requires a greater balance of cohesive and trailblazing research agendas within research communities. This must be done in a way that ensures novelty and change in a field without overly relying on trailblazing agendas, as fields of knowledge are social systems (Latour and Woolgar 2013) that necessitate minimum levels of stability and organization as well as a strong identity to be sustained as recognized fields of knowledge.

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