


Research

Information ecosystems in early academic career building: how do researchers in the social sciences and humanities learn the tricks of the trade?

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Abstract

Early career investigators (ECIs) in the Social Sciences and Humanities need to receive adequate information so that they will be empowered to progress in their academic career and deal with the various evaluation processes that constitute an essential part of their professional development. This article relies on an informational-ecosystemic approach originally developed in the context of resilience studies and crisis communication and uses it as a theoretical framework to analyse and understand the “early academic career building information ecosystems” (EACBIEs), into which ECIs professionally develop. The characteristics of these ecosystems are then refined through the analysis of interviews conducted with ECIs from all around Europe in the framework of the European Network for Research Evaluation in Social Sciences and Humanities (ENRESSH), European Cooperation in Science and Technology (COST) Action. The analysis reveals the remarkable heterogeneity of the information ecosystems into which early career researchers have to build their career in Europe, articulating a diversity of formal, non-formal and informal learning environments, and several related information channels, as well as showing a geographical spread that covers institutional, national and international levels. Furthermore, although the diverse information channels at hand and geographical levels at which they operate appear in some cases to be complementary, and even mutually reinforcing, they can also, in other cases, be dysfunctional, fragmented and unfair to some extent.

Keywords Information ecosystems · Academic careers · Social sciences and humanities · Research evaluation · Early career investigators

1 Introduction

To build a career within academia, early career researchers in the Social Sciences and Humanities (SSH) need, as well as any other young professionals, to receive adequate information so that they will be empowered to progress in their career. While this argument may sound obvious, it appeared from the interviews the authors of this article have conducted with early career investigators (ECIs) from all around Europe in the framework of the European Network for Research

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Evaluation in Social Sciences and Humanities (ENRESSH), European Cooperation in Science and Technology (COST) Action, the duration of which was 2016–2020, that—although making relevant professional choices in the current academic world is more challenging than ever—often scholars consider that they are not that well informed about the professional requirements of an academic career. While research has recently been conducted in regard to ECIs' perception of non-academic career opportunities (see for ex. [31])—a topic that we did not directly work on in ENRESSH—, there is still an empirical and theoretical gap in our knowledge, in regard to how ECIs get informed about academic careers.

Therefore, this paper has two aims. First, we will argue that the informational-ecosystemic approach originally developed by Susman-Peña et al. [55] in the context of resilience studies and crisis communication provides an adequate theoretical framework for the analysis and understanding of the “early academic career building information ecosystems” (EACBIEs) in which career related information is produced and circulates. Second, we will analyse the interviews conducted with ECIs in the context of the COST ENRESSH Action, using the different dimensions of the modelling of Susman-Peña et al. [55]. This will allow us to deepen and refine further the characteristics of the EACBIEs of European universities, emphasising their specificities, notably in relation to the role played therein by the various evaluation processes that constitute an essential part of ECIs' professional development.

It should be noted that while we adopt an international European perspective, some of the characteristics of the EACBIEs we study here are strongly context dependent. The landscape of higher education at international level is indeed quite diverse, as research evaluation also is. In particular, doctoral training paths in Europe vary a lot in terms of contracts, conditions and policy contexts [36], as well as between disciplines [30]. For example, completing one's PhD is considered as a needed step to continue further an already started academic career in some national systems (like in Bosnia and Herzegovina), or only as a first step towards a potential career in academia in other systems (like in Belgium). Furthermore, each European country has its very own research assessment and—often complex—research evaluation systems [48].

2 Informational-ecosystemic approach to early academic career building

The informational-ecosystemic approach developed by Susman-Peña et al. [55] focuses on the role of information in empowering communities to understand and adapt to different types of change, notably those disruptive ones that engage behavioral adaptations. We argue that the eight dimensions thereof—Information needs, Information landscape; Production and movement; Dynamic of access; Use of information; Impact of information; Social trust and Influencers—could be fruitfully applied to EACBIEs for a number of reasons.

2.1 Universities as information ecosystems

Firstly, universities can be conceptualised as information ecosystems in which ECIs relate to a diversity of resources. Indeed, if the concept of ecosystem on which the notion of information ecosystem is built has been originally developed in the field of ecology—in which it refers to a community of living organisms that interact as a system with the non-living components of their environment [61]—, it has been metaphorically used in the context of “information ecology” for describing and analysing information systems, in mutual relationships with their environment [18, 54]. In this perspective, information ecology consists in “the study of the relationship of environmental information (at least physical, biological, social, and cultural environments) to all that comprises collective and individual processes of knowing and decision making (ideology, values, expectations, beliefs, symbolism)” [54].

While Davenport and Prusak [12] dedicated a book to the topic of the organization dimensions of information ecology, Miller is the first, to our knowledge, to have studied universities as “information environments” and “knowledge ecosystems” [42]. According to her, ECIs relate to formal, non-formal and informal resources (texts, humans, tools, cultures and environments), most often in the context of social relationships, to create experiential, personal, technical, disciplinary and interdisciplinary knowledge. More recently Miller et al. [43] have presented a ‘knowledge ecosystem’ model of “how early career academics experience using information to learn while building their social networks for developmental purposes”. Their model proposes a conceptualisation of how to empower ECIs through agency (individual and relational) and facilitation of personalised informal learning (design of physical and virtual systems and environments) in programmes, courses, events, community, home and social media. Willson [62] showed the Systemic Managerial Constraints (SMC) that influence ECIs' information behaviour, inducing uncertainty and precarity in higher education. To respond to SMC,

EICs share information with their peers and use information to exercise their personal agency. It should be noted that the ecosystemic perspective, integrating theories originally developed for business environments, has also been used as a theoretical and exploratory framework by Baruch [3] for exploring the contrast between stable and dynamic labour markets in academia.

2.2 Universities as complex informational environments

Second, the informational-ecosystemic approach is very comprehensive, information ecosystems being conceived therein as “complex organizations of dynamic social relationships through which information moves and transforms in flows” [55]. It takes into account different elements that seem also relevant for academic environments such as the diversity of information flows, including at human-to-human level and informal ones, the information needs of communities; the context, production, sharing, or impact of information; the use of information or social factors such as trust and power dynamics.

Notably, universities constitute complex informational ecosystems that articulate formal, non-formal and informal learning channels. Building on Coombs et al. [10] and Dib [14] definitions of formal, non-formal and informal types of education, we define formal learning environment as those that are systematically organized, and structured in a regulated way, in regard to their objectives, contents and methodologies, like in particular the formal activities that constitute PhD training and usually involve some form of master—apprentice relations, and usually happen within universities, as well as the explicit prescriptions at institutional or national level, etc. Non-formal learning environments are those that happen outside such a kind of established formal system, under a less rigid form, but still have identifiable learning objectives, like the formalized processes of peer reviewing and peer learning that are linked to publications, conferences or grant funding. Informal learning environments are those that are freed of any obligation and control of the performed activities, and supplement formal and non-formal learning environments through the provision of attitudes, values, skills and knowledge from the daily professional experience.

2.3 Universities as unstable professional environments

Third, while the situation of a European university is in no way comparable to a natural disorder, the many changes that the University knows currently—including some very disruptive ones—make it quite an unstable, if not disordered, institution to begin a career within [59]. EICs are notably torn between the traditional and the entrepreneurial models of university [27] and exposed to new forms of quantitative evaluation towards which they show ambivalence, resistance as well as strategic behavioural adaptations [26]. Scholarly communication practices in particular, which have become a central element in research evaluation processes, have known substantial transformations in the last decades too. In this regard, Open Science mandates and policies have been considered by EICs with some caution, because of the reputational concerns linked to the notion of “predatory publishing” [45] or, more recently, facing the growing diversity, complexity and intricacy of Open Access mandates and business models [47]. Furthermore, building an academic career is a complex and sometimes even convoluted journey, particularly for young female academics [4, 44]. The need for EICs to be resilient has been studied at the disciplinary level (see, Wyllie et al. [63], i.a., who studied the resilience of EICs in nursery) or at the national level (like Bourdages [5] study on the resilience of doctoral students in Quebec).

3 Academic socialization, early career development and research evaluation

The analysis and understanding of the information ecosystems into which academics in the SSH build their early career also benefit from a substantial body of research that relates to professional socialization within academia, academic career development and research evaluation.

3.1 Professional socialization of EICs

Social relationships underlie academic knowledge ecosystems [42]. According to [35], EICs’ socialization refers to a process of integration, through formal as well as informal interactions, and learning of values, skills, attitudes, norms and knowledge that allow individuals to participate to a group in an effective way. A further specificity of academic

professional socialization is that ECIs are socialized not only to the environment of the graduate school but to the professional role as well [1], and that disciplines play a specific role in students' socialization [24].

As studied first in a functionalist perspective by Merton, the values and norms of science of Universalism, Communitarianism, Disinterestedness and Organized Skepticism [41] imply that career building in academia is based on merits and rewards being distributed according to individual performance [53], not taking any other social category into account. This vision is obvious in Dubar's argument that there is a specific mode of academic professional socialization—the "physicist model"—that rewards mastery of formalized knowledge and disciplinary methodologies [15, 52].

On the other hand, other authors have argued that specific interests and power games are as important in academia as in other socio-professional environments, social actors struggling for the definition of what constitutes the most valued forms of capital, and for the control thereof [6, 7]. In this perspective, evaluations, rather than being only objective and meritocratic, assessing the quality of the epistemic contents produced by the scientist, are rather political endeavours involving negotiations between multiple actors [57]. It has also been shown that funding is not based on quality alone but that a Matthew effect rewards the already richly funded researchers and hinder entry or continuous funding for others [38, 40], while network centrality plays a significant role in the distribution of European research funding [17].

Several studies on ECIs' socialization have focused on the role of PhD directors (i.a. [23, 60]). According to Bragg, faculty members are "primary socializing agents" who "transmit their attitudes, values, and behavioral norms both formally—through the structures they establish and through the courses they teach—and informally—through individual advising and supervising of study and through social activities" [8]. Devos et al. found that even if support from peers plays a positive role, supervisors' support is deemed to be central in the process [13]. According to Gardner though, faculty members do not perceive the important role they play in their students' socialization and attribute their socialization mostly to external agents and experiences [23].

Other studies relate to the ECIs' views on their own socialization [1, 22]. Some argue that doctoral students agency—expressed towards advisors, faculty and peers—is central in their socialization [51], or demonstrate that PhD candidates can challenge the socialization process [25]. ECIs' interactions with peers—in particular with more veteran PhD candidates—also play a major role in graduate school [22], and cohort structures provide even part-time PhD students with "emotional and professional support [that is] important for students' success beyond the university department" [60].

3.2 Academic career development

In their review article of the literature available on academic career development, Zacher et al. [64] underline that research in the field tends to focus on gender inequality, but not so much on intersectionality (see for example [11, 21, 39]). Regarding mentoring practices (also happening through social media), all the empirical studies mentioned by Zacher et al. [64]—which are mostly in the health science—attest a positive effect on career success, for the "protégés" but also for their mentors (see for example [19, 34]). Several studies are highlighted that investigate the effectiveness of career development programs and interventions, beyond mentoring, in terms of research, teaching, and/or administration (see for example [9, 58]). The review of the literature by Zacher et al. [64] also underlines that academic career development has been typically conceptualized until now as something that has been implemented to support early career investigators rather than those that are in a more advanced stage of their career.

3.3 ECIs and research evaluation

Research evaluation constitutes an element of paramount importance in the career development of any ECI, since only positive assessment allows one to go further in the academic career. As such, research evaluation conditions to some extent the development and further building of any academic career. Current dominant assessment processes are based on quantitative assessment of performance as well as on accountability and market oriented rationales, in the framework of new public management (NPM). NPM has come from Anglo-Saxon countries where it first fostered a movement of rationalization of academic careers that had already started in the early 1980s [16].

A significant body of research has been dedicated to the bibliometrics as a tool for quantitative research evaluation [37], notably in comparison to qualitative peer review [56]. Parallel to scholarly research on research evaluation, responsible research assessment (RRA) has become a major science policy topic in the last decade, at national and European

research area level [50], leading to declarations such as DORA, the Declaration on Research Assessment that was developed during the 2012 Annual Meeting of the American Society for Cell Biology in San Francisco and which criticizes the use of Journals Impact Factor in the assessment of individual researchers, the 2015 Leyden Manifesto that pursued the same purpose [32], or the more recent European Coalition for advancing research assessment (COARA) that has been endorsed by the European Research Area in 2022. All these initiatives plea for the development of better quantitative indicators, and/or better usage thereof that complements the use of qualitative evaluation and peer review so that the diversity of research outputs can be better recognized and valorized.

Literature shows that marketization of academic careers and new modalities of research evaluation, together with precarious academic employment—through increase in temporary contracts and part time jobs as well as predominance of individualistic careerist strategies [49]—, have contributed to the diversification of researchers' professional identity orientations [59]. Those range from an engagement in the traditional collegial nature of the academic endeavour to a more entrepreneurial attitude, with implications on ECIs' core commitment, career risk, career support, and stance towards the university. Furthermore, ECIs constitute a particularly sensitive group to outside pressures [28]. ECIs feel mainly pressured to publish for career-related reasons, given their uncertain professional future. The relevance of publishing is not restricted to a more prolific career in terms of research production and productivity but also includes greater visibility of the research produced, scientific autonomy, and international collaboration [33]. According to a international survey conducted in seven countries in the science and the social science, ECIs' perception is that publishing in prestigious—high Impact Factor—journals is essential for advancing and securing their careers, and indexation in Scopus or Web of Science is deemed as an important criterium for selecting a journal [46]. It has been shown though that PhD students in the SSH are generally less aware than those in the natural and life sciences of the need to publish in top journals and to co-author with senior researchers [29]

4 Methodology

In order to deepen and refine the characteristics of European EACBIEs, we have analysed according to the informational-ecosystemic approach of Susman-Peña et al. [55] 56 semi-structured interviews conducted with ECIs (PhD+ 8 years) from 14 countries around Europe (Belgium, Bosnia and Herzegovina, Croatia, Cyprus, Finland, Latvia, Lithuania, Malta, Montenegro, Poland, Portugal, Serbia, Slovakia, Slovenia). The interviews were conducted by the members of the Special Interest Group (SIG) that aimed at focusing on Early Career Researchers' career issues in the field of SSHs and was created within the ENRESSH COST Action. All interviewees came from a social sciences and humanities background and represented a diverse range of disciplinary fields: Geography, History, Psychology, Economics, Communication, Sociology, Physical Education, Law, Political Sciences, Educology, Philosophy, Business, Gender Studies, Hungarian Studies, Social & Health Policy, Agroecconomics, Literature, Linguistics, Ethnology, Management, Civil Engineering, Folklore Studies. Four interviews were conducted in each country during 2017–2018 by the SIG members in their respective national languages, tape recorded and afterwards translated into English. The interviewees were found using the snowball method, through the interviewers' personal contacts, and conducted in accordance with relevant guidelines and regulations, as in force in the country of each interviewee at the time of interviewing. All experimental protocols were approved by the relevant committees within the interviewers' institutions, and informed consent was obtained from all interviewees.

The interviewing process lasted from forty-five minutes to one and a half hour. 27 interviewees were male ECIs, 29 interviewees were female young researchers. The interview grid was developed by the SIG members, aiming to collect ECIs' narratives about their early careers, focusing on "moments of evaluation" that played a role in their career development, like for example doctoral exams, post-doc recruitment, academic job application processes or publication endeavours. Each interview quote is coded with the interview number, country initials, gender and discipline (for example, 45RS-F, Law reads as 45 Republic of Serbia, female interviewee with a PhD degree in Law).

A systematic method of qualitative content analysis—of the thematic type [2]—was used to analyse the material. Twelve relevant categories emerged from the first floating reading of the interviews into which the thematic content of each interview has been allocated in a second step, i.e. PhD decision, PhD completion, PhD achievement, PhD supervision, career planning, career achievement, publication strategy, peer review, evaluation in academia, research activity, national system of science, grant funding. For the purpose of this particular article, the characteristics of each of the eight ECIEs dimensions, as well as ECIs' perceptions thereof, have been induced from the analysis of the material within each of these categories, by two different coders.

5 Analysis and interpretation of the results

In this section we will analyse and interpret the data from the interviews by relating them to each of the abovementioned eight dimensions of the informational-ecosystemic approach developed by Susman-Peña et al. [55].

5.1 Information needs (I)

The first dimension of the informational-ecosystemic approach is concerned with “information needs across different segments of the population, and how they change over time. The degree that information needs are known to information producers and consumers” [55].

In our transposition of the framework to academia, ECI currently starting their professional career constitute a particular “segment” of the academic population, which may have different needs than the previous generation of researchers, and be confronted with new quantitative approaches to research evaluation.

Experiences with the process of publication after the gap I made in science, were much more stressful. In 10 years since I have returned to science, things have changed radically so I have experienced a complete shock. All these networks have been established, such as "Thomson Reuters", etc., and new guidelines had to be taken into account. Impact factor has become much more important. Because of all this, it is difficult to be published in a journal that is well indexed (54SI-F, Civil Engineering).

This segment may be further differentiated according to the different stages of the early academic career (including the PhD period), the different countries and different institutions (universities vs research institutes) they work in as well as the different disciplines they represent. All these dimensions may be important in determining and shaping information needs of ECIs.

Today I know that long-term investments pay off better than the short-term de-focusing in order to gain some points. I didn't have such full clarity as a PhD student, the time perspective was different as well. I mean the moment when you understood something was important or not so important came rather late. The verification moment came with finishing the PhD and having to get a job (38PL-F, Philosophy).

Furthermore, the interviews reveal that information needs of ECIs are of two main types. As consumers of scientific knowledge, they need access to scholarly information, under the form of bibliographic databases and subscription to relevant journals. Access to this kind of information appears to be very variable among respondents (see below, dimension IV).

As producers of research, ECIs' needs range from general know-how in the profession to publishing processes, especially the publication of the first academic article, to insufficient knowledge about evaluation processes and recruitment opportunities, which are often deemed as lacking transparency. PhD candidates also require a lot of advice regarding the content matters of their PhD work.

As I mentioned, I will make academic recruitment more transparent, based on firm objective criteria and make sure that students are several years ahead informed what is expected from them if they choose to pursue academic career (17HR-F, Psychology).

According to a significant number of respondents, those needs that are linked to the production of knowledge are not always met. One of the especially acute informational needs in this regard was concerned with the publication processes, strategies, venues and decisions. Several interviewees talked about the lack of information from their national institutions or supervisors and peers concerning training for publications, guidelines on where to publish and rankings of journals, how to select the right journals, which publications are considered to be quality publications.

I ask colleagues, where they publish, how to know and how to select the publication channel. Nobody has ever tried to explain that to me. I don't know whether somebody has to explain that or whether we have to figure it out ourselves, but even in the requirements for the position, perhaps you noticed, there is no explanation, simply publications, but there are no explanations as to in which journals, in which databases, how many points are allocated for them. Nothing is explained. And how do I find out? Maybe if I find some information on my own it could be wrong. How reliable is it? I don't know, but to my mind, there is a huge gap here (21LT-F, Literary studies).

Such information need concerns particularly the content and form of their publications, especially their first article.

It was difficult to write my first article because I was not familiar with the genre of an article. Now there is a course on academic writing, a supervisor gives you guidelines how to shape a BA or MA thesis, but with an article there are a lot of questions and much depends on your supervisor. Therefore, the first article was not easy (23LT-M, Linguistics and Literature).

Some underline the lack of professional guidance and information about academic career development at their institution. Others emphasize insufficient PhD training, or the lack of training in academic writing, scientific English and teaching practices.

Nobody gave us knowledge about how to write scientific articles or how to apply for a project, which covers most of our work. Due to this fact all the colleagues of my generation had similar experiences and were forced to get acknowledged with this process on the principle "learning by doing". Everyone tries to do his or her best (55SI-M, Geography).

Some ECIs also feel they need more information, knowledge and skills for the integration into research networks, project work and work in research teams as frequently they have never had a chance to participate in them. Interviewees also mentioned the unfulfilled need of getting information on how to get funding for the projects, on the available funding programs both in the national and international context, the lack of administrative support to settle the matters of PhD funding.

The programs funding office needs to engage early career researchers to existing research projects. As I realized, it is easier to publish articles if a researcher is involved with a research program. So they need to give the opportunity to ECRs to engage in the program. I notice that researchers involved in European projects are able to publish articles easier than other researchers. It is more difficult to collect data, publish articles on our own. A research funding will support this effort. When a researcher is collaborating with others it is a good way to publish articles in journals (9CY-F, Education).

In other cases though, interviewees acknowledged that their informational needs were duly recognized and that they received clear guidelines on the recruitment procedures and information on the difficulties on the post PhD academic career. Several respondents were happy with the training that was provided either by their home institutions or other institutions (sometimes international) concerning specific know how on the application for specific programs and grants, the selection of an adequate publication venue, the English language proofreading of the publications done by a professional, or organizational and legislative help of the project management service of the university to write grants.

There were attempts to bridge the informational gap on specific matters made by individuals or groups of colleagues or by special administrative groups at the institutions.

In our faculty now there is a special administrative group formed which takes up the major part of work in writing project proposals. You ask them, do your content input, and they take over and do it for you, so it is a major help (22LT-F, Sociology).

As we can see, there are numerous and very diverse information needs that early career researchers have and getting the right information is crucial—but obviously not easy—in a very competitive academic labour market [9]. Furthermore, getting the right information is perceived as a must for building a career, intrinsic merits not being deemed as sufficient [57].

5.2 Information landscape (II)

The second dimension of the information ecosystems is "the physical and institutional infrastructures that support information production and flow ... [as well as] intermediary organizations", considered in their "capacity to verify, filter, sort and disseminate information" [55]. Various aspects of the existing information landscape can play an important role in the accessibility, dissemination and transmitting of information for early career investigators. As Susman-Peña et al. note [55] "different groups access information through different means, understanding the information landscape ensures that information is matched with the most appropriate and resonant way to communicate it for impact".

In our adaptation of the informational ecosystemic model, we see the information landscape consisting of institutional infrastructures and individual providers. Institutional infrastructures would include ministries, research councils, universities as well as their specific departments such as faculties, centers, agencies for data and information analytics, editorial boards of research journals, etc. The individual actors usually come from institutional infrastructures but they

act on individual level as information providers. Here such individuals as deans of faculties and heads of departments, supervisors, peers, editors of the journals and peer reviewers act as information disseminators.

On the one hand, information landscapes appear to depend on the size and characteristics of the countries and their higher education system. For example, in small countries which have few universities information regarding recruitment can be transferred in more specific ways than in big countries.

Personal networking is a decisive factor for employment in Universities in Cyprus. There are very few Universities in Cyprus. There are many candidates with high academic qualifications and therefore the recruitment process and decision making depend on personal networking. For instance, if there is one open faculty position and fifteen candidates then personal networking is more important than the candidates' academic qualifications (10CY-F, Business).

The extent to which quantitative performance indicators—used to steer higher education systems in the framework of New Public Management [20]—have been integrated to research assessment at national level also impacts the information landscape. The academic recruitment system and its history shape the information landscape as well, particularly in regard to the degree of openness to international competition. Indeed, in some countries, recruitment happens by default at an international scale, while others are viewed as still dominated by practices of local recruitment and inbreeding.

On the other hand, the information landscape that relates to the building of academic careers is characterised by its integration within a broader, international informational landscape, accompanied by a sometimes conflicting hierarchy in the provision of information at national level. Some ECIs, especially from Eastern and Central Europe, mention the significant role of international landscape actors in their process of acquisition of the know-how and relevant information. Participation in conferences, research visits and stays abroad often act as an eye opener and a source of inspiration to young scholars, especially in the beginning stages of their academic career.

During my studies I lacked the feedback at my home institution due to the fact that nobody else was interested in my research field, however I have really good experience with feedback at different international conferences, workshops and my research stay. The feedback I received really helped me to continue in my research, revealed connections I did not see before and improved my doctoral thesis (50SK-F, Political Sciences).

The international perspective could become very important in information exchange not only from the general institutional perspective, but also from the individual perspective, with individual international actors contributing important information, skills, know-how and knowledge to the professional development of the early career investigators. Many of them understood this impact quite early in their careers and paid a lot of attention in developing international networks and cooperation, or suggest this for the future young scholars.

The advice I would be giving to the nowadays PhDs in my institution is to be open and to make contacts with the experts from another countries, because, that is how they work will be more qualitative (1BA-F, Geography).

An interesting related aspect which came up occasionally in the interviews with early career scholars from Eastern and Central Europe was the comparison between the national and international actors, with the ones from the “west” considered as exhibiting better judgement or behaviour patterns than the ones in the national context.

And when later on I and my colleagues won one project, the reviews were very different. I was under the impression that either it was a young person or a person from abroad who wrote the evaluation, because the tone was very different, the positive sides as well as the areas of improvement were noted. So it was already a respectful approach (22LT-F, Sociology).

5.3 Production and movement (III)

This dimension relates to “the variety of types of information available (e.g. government services, community news)”, “the producers of information and the owners of the means of production and dissemination” as well as “the variety of types of content available, and to whom”: “Strengthening information flows is not just about building new tools or technologies; it is also about redundancy and coordination. Healthy information ecosystems are characterized by a diversity of sources capable of providing the same message.” [55]

ECBIEs are characterized by a huge diversity of information channels, occurring both in formal, non-formal and informal learning environments that convey relevant information of various types to ECIs. Since formal information channels are sometimes perceived as insufficient and not fulfilling ECIs' information needs, respondents also engage

in less formal processes to obtain information. Furthermore, perceptual knowledge—which is gained by observing or by doing rather than through formal channels of information—plays an important role.

Formal policy prescriptions—about performance indicators to be used in evaluation, lists of qualifying journals or the rewards linked to certain types of publication—, whenever they exist, are deemed as being sufficiently transparent by some interviewees.

We have performance tables issued annually at faculty level. In them my performance is acceptable, which gives me reason to continue with the same trend and not to change my strategies very much. The table itself is created relatively transparently with clear criteria and is provided to employees in the full-data form. So everyone sees everyone else's yearly performance. Sometimes I have to find a balance between the required numbers of outputs, i.e. quantitative indicators on one side and meaningful research on the other. But it has not caused me serious problems yet (52SK-M, Philosophy).

In several national and institutional systems, providers of information analytics and quantitative indicators of research performance have taken a growing importance.

It is a well-known fact that we all strive to accumulate as many points as possible because this is related to our promotion, the election into a specific title or in order to meet the criteria for a project manager. (54SI-F, Civil Engineering).

In other cases, interviewees are not provided with clear information about the evaluation criteria for research endeavours, or indicators of journals prestige are perceived as lacking consistency or stability.

But I don't have a very exact understanding of how it's [my work] evaluated in the end, besides the amount of publications and where they were published (13FI-F, Adult education).

You never know how the Polish journals will look in two years. Just because you get 14 points now, which is my wishful thinking, it doesn't mean that it won't be only 2 points in the future, although I doubt it. But you never be sure how well the evaluation will go, it all depends on the way the algorithms are prepared (39PL-M, Communication).

Furthermore, in the hierarchical national structures, relevant information may also become blurred because, for example, institutions do not implement particular procedures according to the regulations of hierarchically higher institutions, such as ministries or councils.

So in the beginning and even now I do feel the dissonance between the ministerial policy and the institutional policy. I mean, the Ministry gives clear guidelines and clearly evaluates various publication manners, whereas the institutions—because of certain weakness of its leaders or the lack of leaders in such institutions as well as wanting to by-pass evaluation procedures—make the procedures foggy and some people get lost in it. What do I mean by that? Our Department is a great example. For a number of years we had a summary points ranking list, without counting the publications. Here the quantity mattered, even I felt the pressure of not wanting to be pushed down to the bottom of this ranking, which was quite distracting. Today I know that it was meaningless when you take into the account the whole year, every year. I know that the perspective is long-term and only after a certain period of time will you be appraised (38PL-F, Philosophy).

PhD directors are another type of formal providers of information [13]. Respondents' attitude towards them is ambivalent. In some cases the relation between candidate and director is considered as fruitful, PhD directors sharing networks, giving epistemic advice on thesis content, and informing about the specificities of the evaluation system. In many other cases, directors were deemed by respondents as not delivering relevant information, for a diversity of reasons: lack of interest in the epistemic content of the thesis, lack of care for it.

Supervisor was present for how long it took, and asked me to do almost everything (from the selection of topics and on), and so I kept trying to learn, progress. He helped me with finding literature, advice and guidance (31ME-M, Physical education).

And, with regard to that, we feel a little lost and we feel like we are abandoned and we did not feel a lot of support from the directors. This results in a feeling of loneliness on the side of the doctoral student, and probably also a discomfort of the promoter in relation to all that (8BE-M, Social Psychology).

If you take a look at an Anglo-Saxon academy, for instance, they have a lot of standards and books for supervisors on how to deal with a PhD student, how to deal with a student, how to give feedback on a draft/chapter/thesis/book—everything.

In general, a lot of energy is put into teaching the art of giving feedback. It's not a natural gift, but something that can be taught. You have to know how to do it. In this regard Polish science is an absolute vacuum. There is this image of a Great Master of Science, who has a book of spells and hocus pocus—a review! Hocus pocus—a reply for the student! And no one has access to this book of spells (38PL-F, Philosophy).

Formal training and professional accompaniment on topics such as (international) publishing, team work or project management are welcome sources of information, whenever they are available at institutional level.

Numerous interviewees emphasized the role of peer reviewers in improving the manuscript and the importance of constructive review of both papers and grant proposals.

And young researcher's problem is that they don't have that much experience, that it grows along the way. So, you have to do a lot of work with the text, to make it publishable. But that, when I started... I see it for example in my first article, that the way it was commented was very instructive and forward-looking, and it was very much the way you'd want young researchers to be treated, to understand on what basis young researchers write these things (13FI-F, Adult Education).

Editors may be helpful too in explaining the explicit—and sometimes also the tacit (see below, dimension VII)—rules of peer review.

So, I think, in order to help researchers, young researchers, researchers at the beginning of the career, there could be in a big help the editors of journals for whom they choose to publish. I know, for example, the cases where the editor works with authors for some time, when the article does not have a good argumentation, structure or whatever. And only then the editor sends a corrected article to a review (53SI-F, Ethnology),

Even calls for scholarships and forms that candidates to an academic job have to fill in may constitute a non-formal source of information and learning about the qualifications required for a certain position.

Beyond these formal and non-formal learning contexts, ECBIEs appear to be characterized by the importance taken by informal channels of communication. At both institutional, national and international level, several respondents mention the importance of networking with higher status academics or the need to build and be engaged into networks of “likeminded peers”. Informal exchanges inside such groups play a particular role for getting the information needed for writing the first article, but also for getting informed about open positions and future career opportunities.

My publishing strategy is that, to people who are already profiled and who achieved cooperation with certain publishing companies and offices, I assume professional cooperation where we go through a whole process of scientific research from beginning to the end, which results in certain co-authorship. This co-authorship to me often may be a door for a paper to get published. This is the most open and the most honest. Does that mean that my work does not have quality? No. I speak of quality papers, of quality research. However, regardless of which quality they are, without that cooperation, I do not think I could win at any competition as only to get them to consider my work, let alone to further get reviewed or published (3BA-M, Psychology).

I succeeded in publishing the article when I started looking for people through my social networks, who could advise me where the article could get accepted (22LT-F, Sociology).

I started working with the Dean of School concerning the preparation and publication of academic papers. I gained more experience and self-confidence by collaborating with my colleagues (9CY-F, Education).

Furthermore, perceptual knowledge plays an important role in ECBIEs. In particular, it proves essential in getting the needed information about strategic publishing. Proceeding by trials and errors, observing (more experienced) peers or studying the career of successful academics, but also becoming member of editorial boards or serving as article peer reviewer constitute valued non-formal ways to learn what to publish (types of data, contents, language, etc.), in which journal or via which book editor—learning how to take bibliometrics into account and publish in high IF journals—, and with which co-authors.

I did not know how important the publications were at the time. I came in touch with other academics so I realized the importance of publications instead of teaching (9CY-F, Education).

More generally, ECIs' perceptual knowledge on how to build a career is reinforced by their involvement in the organisation of conferences, collaborative projects or applications, or through becoming evaluators themselves and/or getting involved in academic committees.

After having ended up acting as an evaluator also by myself, I have started to understand how the system works and the good and bad sides of it (15FI-M).

5.4 Dynamic of access (IV)

This dimension relates to “the environment in which information flows (e.g. political, cultural, time, cost, and other factors)”, the “ease of accessing, finding, using, sharing, and exchanging different types of information”: “Power relationships and other forms of social constraints profoundly shape access to information. Understanding power dynamics is critical to designing for inclusive access.” [55]

The dynamic of access within ECBIEs is characterised firstly by a distinction between two categories of information recipients, insiders and outsiders to the information ecosystems, who occupy a central or a more peripheral position in the access to the relevant information. Furthermore an important number of respondents express complaints about the lack of transparency and fairness that academic information ecosystems sometimes show, as well as about the lack of information in regard to several aspects which are nevertheless crucial for building an academic career.

There is a recurring perception among interviewees that some ECIs are insiders to ECBIEs, with a privileged access to information that is relevant to the building of their career, while others have to remain rather outsiders, at the periphery of the information ecosystems. This distinction operates at geographical, institutional as well as at interpersonal level.

At a geographical level, some respondents consider that non-Western universities do not have the same facilities to get access to the international research scene than the Western ones. Hence some non-Western ECIs may be kept at the periphery of the international publishing activity, for not being familiar with the epistemic contents that are discussed therein, and lose therefore a significant possibility of networking at the international level.

Unlike natural and technical sciences, where communication was always present, and 50 years ago technical and natural sciences were also studied here in Yugoslavia, Serbia the same way as in Germany or the United States, while the field of economics was completely different. And what happened was, since let's say, we were amateurs in the field of economics compared to those who issued these journals, we had a small chance to publish in those journals. I say this because I often read such journals and I find it very difficult to follow because what we learned at the university was not advanced enough (48RS-M, Agroecoeconomics).

Furthermore, numerous interviewees, especially from Eastern and Central Europe, mentioned missing subscriptions to bibliographic databases that are relevant for the discipline, as well as lacking access to relevant journals and literature. Such peripheral position relative to the international publication circles not only deprives those researchers from important scientific resources but also constitutes another obstacle towards their integration in international publication circles, and limits their access to the non-formal information that is linked to the editorial processes thereof (see dimension III).

Some journals to which local universities are subscribed are of quite questionable quality and often there is no subscription to top journals—this means I do not even have a theoretical chance of formulating a proper question (26LV-F, Psycholinguistics).

Another stated reason is the lack of funding, leading in some cases to a quasi-impossibility to attend international conferences abroad, which, as we have seen, also constitute an important non-formal source of information about international careers and evaluation, as well as an opportunity to build and develop interpersonal networks.

At the institutional level, some respondents feel they are outsiders to their own university and hence do not benefit from equal opportunities to get the relevant information. This may be caused by having a peripheral professional status—such as independent researcher PhD candidate, visiting senior lecturer or elementary school teacher—, or having less time to dedicate to research—which is deemed as the most rewarded academic activity—because of heavy teaching duties. This may also be the consequence of living at some physical distance from the institution—like in another town -, and hence from the colleagues.

Because I have been free to do what I feel essential and I have had a nice working community here in Tampere, but formal working community has always been somewhere else. This links also to the theme of evaluation in that sense that I have had very little feedback from my colleagues—because we were not working in the same city (15FI_M, History).

Finally, some interpersonal networks are perceived as constituting almost parallel information ecosystems in regard to which ECIs are either insiders or outsiders. Getting a PhD or a postdoc position has been facilitated in some cases

because either the PhD or postdoc director was already promoter of the Master or doctoral thesis, or if the PhD candidate was already the assistant of the promoter or was pursuing a PhD degree in the same institution.

So, about half a year after completing my doctoral dissertation, I was selected as assistant professor. Until that election, I was a senior teaching assistant and I did not even think about other jobs at all. I signed up for a vacancy for an assistant professor at our faculty and I was immediately admitted. Also, I was the only registered candidate. I suppose there were no more candidates who applied, because it was known that the vacancy was related to my promotion. This is mainly done at other faculties and universities in Bosnia and Herzegovina also. This means that it is very difficult for young researchers outside the faculty or university to find employment (4BA-M, Economics).

Interpersonal networks may also constitute an asset for getting a postdoctoral or another type of open position after PhD. In some cases, a promotion can even be attributed because of having kept “good relations” with significant academics. Grants and publications would sometimes be easier to get once connected with “people in higher position”. Even getting an article published may become easier through contacts with people working in the publishing industry.

Respondents mention that getting a prize, or publishing an article in a well-recognized journal, constitute efficient ways to get into this kind of interpersonal networks.

But I do think that somehow it has to work, because the publishing is linked with having conversations with the other researchers working on the same field, and this produces the networks, and if you like to go somewhere for a few months, that's where you go, where these people are, not somewhere randomly. So if we think that it makes a difference in some selection or evaluation that you've been there, then it's probably been useful (13FI-F, Adult Education).

Hence there may be, in these different types of situations, a kind of Matthew effect at work [40], those already well informed in regard to early career building becoming even better informed, and those already in a peripheral position being further away from the ECBIEs centre.

5.5 Use of information (V)

In Susman-Peña et al.'s [55] model, the dimension of the use of information is interpreted from the perspective as to whether and how the information is used, in other words, “what consumers and audience do with information that is received. How information is processed, disseminated, and applied” [55]. In the context of our study, information is typically used by ECIs to improve the epistemic contents of the thesis or the article, to understand the management of research careers/how evaluation works, to seek for grants and positions in the local, national and international labour market. More specifically, and as is evidenced in many of the quotes from the interviews above, communication channels relate to different evaluation situations (PhD defence, post PhD recruitment, career evaluation, peer review of publication or project). The information that ECIs receive is mostly used to seek for positions in the local, national and international labour market, to improve their publication practices, including the proper understanding of the peer reviewing system and the definition—largely grounded in perceptual knowledge—of what makes a quality publication at institutional, national and international level, both in regard to epistemic contents and choice of journal; to get involved in academic activities and conferences; to seek for available grants and funding; to improve the thesis; to learn about the networks and interpersonal relationships to be built.

5.6 Impact of information (VI)

The dimension of the impact of information involves “relationship between information, knowledge and behavior change” [55]. The general principle of this dimension is that “relevant, compelling, and accessible information has a positive impact on people's lives in terms of their agency and overall well-being” [55]

We can observe from the interviewees' responses that accessible and relevant information has a positive impact on career development of ECIs, while the lack of crucial information on various important aspects of the profession results in a shrinking sense of security [28]. The information, through formal, non-formal and informal channels, on various aspects relevant for academic career helped ECIs to shape and finish their PhD thesis, turn them into books, improve the quality of research articles and generally enhance their understanding about the publishing processes.

It was very useful because my supervisor was very experienced. She knew what it means to write a thesis, to produce a scholarly text and undoubtedly I received a lot of feedback that eventually helped me to shape my thesis (23LT-M M, Linguistics and Literature).

I generally think that reviews are very useful and even though they are sometimes unpleasant to read, I usually try to look at them as pieces of information. In the end, it turns out that, in the cases of methodology or statistics issues, the reviewer's requirements do make sense. I actually learned that in a certain situation one can apply another method and not just the one I did, so yes, I have really learned from the reviews. I might have learned more from the reviews than during the courses at the faculty, for example, Methodology, which was very important for us [...]. If I want an academic career, I have to publish papers, so reviews do encourage me (46RS-F, Psychology).

I have always learned a lot from the comments even when the articles are rejected. I think comments help us to evolve and improve our work and after that initial impact (41PT-F, Communication).

The information received resulted in employment positions offered, grants won, projects submitted.

My [coming] postdoctoral position is clearly due to nothing but the network because it has not been published, there has been no competition, and there is no will to open a competition. It was done between two doors. Not a will to hide, but a willingness not to look for someone, but to have someone they knew. There is a clear perception of being in the right place at the right time, and also having to push to be evaluated < ... >. I am convinced that being in networks, discussing, sharing, whether it is within the University X, or as others have through very strong networks abroad, the strategy n° 1 to have a postdoc is the networks (8BE-M, Social Psychology).

Our interviewees also acknowledged that because of the experience they gained, they gradually developed a different understanding of how things work in academia—in particular the important relational and managerial elements of the career—beyond the need to produce quality epistemic contents, as well as different strategies of how to develop and progress in the career. They also feel stronger and more confident.

At the beginning I considered hard work, research, and analysis to be the only important things, however later I found out that the connection with other researchers outside your country and networks are very important, too (50SK-F, Political Sciences).

There have been some changes, I now realise that you know things like building social networks and building relationships with funders, thinking about how my work can benefit industry and society at large is you know part of my work that I can't afford to overlook as I had during my PhD (34MT-M, Psychology).

I learn and develop during the working process. This is what I advise all early career researchers to do—to use every opportunity to develop, and not to be afraid of difficulties (27LV-F, Management).

Finally, it is interesting to notice that the information and experience that early career investigators receive contributes not only for the academic career, but also for their personal development as human beings.

I appreciate feedback a lot from my peers, from my superiors, from wherever it comes from because it is always an opportunity to grow, to learn and grow, so I might discard it if I don't agree and if I think that there are reasons for people saying something but usually there is something to learn and I try to find that something to learn which will help me become a better academic and a better person hopefully (35MT-M, Occupational Psychology).

5.7 Social trust (VII)

This dimension relates to the “influence of trust networks on the flow and use of information”, “trust building around information”, “trust in information sources, medium, content”, “disruptions in trust tied to information (or the lack of information)” as well as “challenges in building trust around information flows” [55].

A significant number of respondents manifest a lack of trust in recruitment procedures and grant allocation. This goes from the perception of a lack of transparency to a plain feeling of manipulation of the rules. The introduction and use of performance indicators in a particular assessment system does not lead per se to more trust in the related information ecosystem.

Some respondents from Belgium (Flanders), Cyprus, Latvia, Malta and Slovenia perceive their national recruitment system as transparent, and the selection of projects—in Portugal—and PhD candidates—in Serbia—as fair. In those

countries, new public management driven evaluation practices have been recently introduced, using quantitative performance indicators as an attempt to make the process and criteria of evaluation more explicit and transparent.

A bigger number of ECIs express criticism though, considering that the national system in which they try to build their career is lacking transparency and fairness. Respondents from Bosnia-Herzegovina, Croatia and Slovakia deem career evaluation as being procedural and not enough informative, while the toughest critics come from ECIs from Belgium (French speaking Community), Bosnia-Herzegovina, Cyprus, Finland, France, Croatia, Lithuania, Latvia, Malta, Poland, Serbia and Slovakia. Respondents from these countries criticize—or in some cases admit they have benefitted from—the fact that networking, lobbying and even cronyism weigh sometimes more than individual merits.

As such, respondents mention the existence of unwritten rules about which ECIs don't get information by other means than experience and perceptual knowledge. Examples of which include the recognition that positions are open only for specific candidates at the whim of powerful academics, the discovery of the existence of tacit prescriptions in favour of a rotation in recruitment between internal and external candidates or even indirect reports about the role played by “back channels and personal favours” in academic careers. More generally, respondents regret a lack of open competition in the academic labour market and that, even when formal guidelines do exist or when the use of formal performance indicators is prescribed, they can be misused or not followed.

It is not transparent. I see that what is most missing is transparency. When we talk about positions, why there are no open competitions, this is first of all. The same is with evaluation, there should be a possibility for some sort of feedback. There is some of it, maybe it is the learning stage, maybe this evaluation culture is becoming more transparent and will be such in the future. We know nothing [about] what happens with the appeals on evaluation results (22LT-F, Sociology).

Editors have been mentioned by several interviewees as explaining some unwritten, even unspeakable, rules of peer review, like the information that—according to one Croatian respondent—only senior researchers would receive the “best categorization” from reviewers, or that—according to a Slovenian ECI—one member of the editorial board should be credited as a co-author.

Moreover, in a conversation with the editor of one scientific journal I was told that the best categorization of paper goes to “older” authors, while “young” need to know their place in the system. This is in direct contradiction with all the aspects of professionalism in science (19HR-M, History).

At the Faculty of Civil and Geodetic Engineering, we even made a strategy how to get in touch with the editorial board of the Thomson Reuters journal from the Lithuanian technical university in Vilnius. We decided to go to Vilnius and to make some lectures at this university. In this way, we came into contact with the editorial board, which gave us additional conditions for publication; among others, we had to include one of them as the author of our study (54SI-F, Civil Engineering).

In the most extreme—and worrying—cases, recruitments and grant allocation are perceived as fake and pretending, committee members being described as cheating with the criteria so that the predestined candidate—often an internal one or someone who is part of their networks—may be chosen, as reported by ECIs from Belgium (French speaking Community), Finland, France, Malta, Poland and Serbia.

And then, honestly, practically every time, it may seem I am talking like the nasty loser girl, even still now in hindsight, I think the dice were already loaded every time. I say it really without bitterness. Sometimes I hesitated even to apply [for a position] because I knew it was for this guy. I even told them: I do not know if I will apply. So questions about teaching [being asked in evaluation situations], I always felt that it was a bit of a way of deciding among the candidates, but that was never really the issue (6BE-F, Communication).

It is not enough, and the right information [about funding opportunities] is not available either, if there is a call for application, it does not reach everyone. In my opinion, it works somehow like applying for a job: it has been decided in advance who will get in and who won't (47RS-F, Linguistics).

5.8 Influencers (VIII)

This dimension of the information ecosystems relates to “the people, organizations, and institutions that influence how different types of information flow”, the “builders of trust in information”, as well as the “change in influence over time, especially during disruption” [55].

As mentioned above, the lack of formal information resources leads ECIs to find information from non-formal sources, like elder and/or more prestigious peers [22]. In some cases, ECIs find real mentors who, although not being their formal PhD director, act as an information bridge and help them to build a career. This may be particularly the case for those respondents that perceive themselves as outsiders to the information ecosystem, or for ECIs that may lack self-confidence and complementary information and reassurance.

The second conference was in 2015 in Brussels. It was organized by the Missouri Institute of Journalism and a university in Brussels. It was on the theory of communication and media. And this conference showed me that if I ever wanted to do something different to what I had been doing so far, I would have to pay attention to how it is done in the West. That was a crucial moment for me and it changed my way of thinking (39PL-M, Communication).

There was a big conference in New York in February, by the great American historian of dance Lynn Garafola. And so there was a thesis award in this journal, and I asked her if I could apply with the article I had presented at the conference. [...] So it's the same every time, I must have some green lights on. It's about getting the confidence of my peers, so it is really. And then I go for it (5BE-F, History).

6 Conclusion

The informational-ecosystemic approach on which the EACBIE concept is principally built has proved to be a fruitful theoretical framework for analysing the heterogeneity of the information ecosystems into which ECIs have to build their career in Europe, articulating a diversity of formal, non-formal and informal learning environments, and several related information channels, as well as showing a geographical spread that covers institutional, national and international levels.

From the informational-ecosystemic perspective, ECBIEs can be considered as crucial environments for ECIs to navigate their careers. In all the countries investigated, ECBIEs revolve around the communication—by a diversity of actors and in a diversity of situations—of “tricks of the trade” that relate mostly to scholarly publishing, network building and research assessment. Beyond these few commonalities, ECBIEs in Europe appear to be heterogeneous and sometimes fragmented or even unfair and lacking equity. They are significant geographical and institutional differences in how ECIs receive information and the transparency of evaluation processes. Some countries or institutions have more transparent systems, while others are criticized for their lack of openness and fairness.

6.1 Evidence-based recommendations

Many ECIs report a lack of transparency in recruitment and grant allocation processes. They perceive these processes as sometimes being manipulated, with networking and cronyism playing significant roles over individual merit. This results in unwritten rules that ECIs must learn through experience rather than clear guidelines. Although such non-formal and informal learning environments may have their utility, they should not replace the need of more formal sources of transparent information about the requirements of an academic career.

Likewise, international sources of information are useful but should not become an excuse for a lack of trustworthy information available, at institutional level, to all ECIs regardless of their status, institutional position or national and international networking. Furthermore any discrepancies between national and institutional prescriptions regarding the career requirements of ECIs should be avoided. There is thus a clear call for more open and coherent communication of evaluation criteria, as well as accessible feedback mechanisms.

Our findings also emphasize the role of PhD advisors and senior researchers in providing not only epistemic guidance but also information about the relational and managerial aspects of academic careers. Providing explicit and vetted information about the academic career and its requirements at local, national and international level should be considered as an integral part of their professional duties (and they may be assessed in this regard too). In particular, professional guidance should be provided to PhD students in regard to publication strategies and the writing of the first articles, as well as the principles and practicalities of team science and collective practice of research.

6.2 Future developments of the informational-ecosystemic approach

Although borrowed from a model that aimed at analysing information ecosystems in the context of natural disorders, the different, and complementary, dimensions thereof have proved to be relevant for proposing a diagnosis of the information needs of ECIs active in various fields of the SSH, the extent to which such information is provided—and by whom, through which channels—and contributes to the building of their career. Further research may be needed though to confirm the validity of the modelling, by applying the informational-ecosystemic approach to other populations of (early career) researchers.

Furthermore, while using the informational-ecosystemic approach as an analysis tool, a particular difficulty was to attribute segments of interviews to specific dimensions at the exclusion of the others (several times, some segments could have been attributed to more than one dimension). Hence our modelling could be further refined and the different dimensions that we used to analyse the EACBIEs in the SSH disciplines, while keeping their complementarity, provided with more precise definitions that are more directly in line with the realities of academia.

Finally, because our research was based on an international European sample, a better understanding of the impact of national, institutional and disciplinary contexts on the functioning of EACBIEs is needed. Specifically, further analysis could beneficially be conducted at these levels in the future. Whenever relevant, such further studies could be carried out together with those national experts who are in charge of reforming or advancing the rules and processes of research assessment and academic careers in Europe.

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Data availability The data that support the findings of this study come from non-anonymised semi-structured interviews and so are not publicly available, for privacy reasons. The data are, however, available from the authors upon reasonable request.

Declarations

Competing interests The authors declare no competing interests.

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