Paper presented at the ISPIM Conference
Stockholm, Sweden on 17-20 June 2018. The publication is available to ISPIM members at www.ispim.org.

The Promiscuity of Publishing Partners in Innovation Management Research – The formation and impact of publishing collaborations

Pia Hurmelinna-Laukkanen*
University of Oulu, Oulu Business School
P.O. Box 4600, FI-90014 University of Oulu, Finland
E-mail: pia.hurmelinna@oulu.fi *
*Corresponding author

Allen Alexander
University of Exeter Business School in Cornwall,
Penryn Campus, Falmouth, TR10 9FE, United Kingdom
E-mail: A.T.Alexander@exeter.ac.uk

Kyriaki Papageorgiou
ESADE Business & Law School
Av. Pedralbes, 60-62, E-08034, Barcelona, Spain
E-mail: kyriaki.papageorgiou@esade.edu

Urs Daellenbach
Victoria Business School, Victoria University of Wellington, PO Box 600, Wellington 6140, New Zealand.
E- mail: urs.daellenbach@vuw.ac.nz

Abstract: While some empirical evidence indicates clear benefits to co-authorship in terms of speed, volume and diffusion of publishing outcomes, co-authorships have also been shown to be prone to difficulties. There is also limited guidance available on how to initiate new publishing partnerships with higher likelihood of success. Through a review of literatures on co-authorship across numerous disciplines, we are able to identify author attributes that could provide some initial search criteria for evaluating prospective publishing partnerships. However, this same review suggests that the process through which successful co-authorships develop is complex, being influenced by contextual factors and with varying—even contradictory—outcomes associated with individual attributes and their combinations. With a view on the innovation management field, we argue that it is essential to extend previous research to analyze multiple author attributes and success measures simultaneously, encompass both individual and organizational-level variables, as well as understand the specificities of certain research areas and disciplinary traditions.

Keywords: Innovation management research, publishing, collaboration

1 Introduction

Co-authorship can be a powerful way to promote innovative outcomes, increase knowledge dissemination, and secure the quality of the transmitted messages. It "can accelerate the time to market of research papers, enhance the quality of research (Floyd et al., 1994), and, as a consequence, improve the probability of acceptance in academic journals and citations thereafter (Urbancic,1992)" (Tucker et al., 2016). Additionally, results are more likely to be acknowledged by other researchers, and more likely to be disseminated in those researchers' networks (Harsanyi, 1993), especially given the connectivity now provided by online platforms such as ResearchGate and linkedin. Similarly, Li et al. (2013) link co-authorship to citation counts, and Ductor (2015) reports that co-authoring is positively related to research productivity (measured by page count and quality). In certain cases, co-authorship enables the integration of findings from multiple studies, rather than single studies originating from one research group (see Acedo et al., 2006; Sutter and Kocher, 2004). As a result, the conclusions from such research can promote genuinely new insights and achieve exceptional rigor and relevance, which is particularly important with regard innovation processes and reaching innovative outcomes. Such collaborations are more likely to extend the generalizability of findings, which can be developed for a wider audience. Co-authoring also enables teams of mixed-method or mixed-mode researchers to work together (for example, blending quantitative and qualitative work or integrating the works of mode 1 and mode 2 knowledge creators) to create studies that are both intellectually significant and relevant to practitioners (Gibbons et al., 1994). This means that co-authorship yields benefit to both practitioners and academics in terms of generating innovative outputs.

Regardless of the benefits it is not always certain that collaboration in co-authoring and publishing, let alone successful and relevant collaborations, will be achieved (see, e.g., Bidault and Hildebrand, 2014; Lunsford and Ede, 1986). These difficulties can often be overlooked, because research on co-authorships is usually subject to a censoring bias in that only the outputs of publishing partnerships that make it successfully through the conference or journal review processes are included, limiting our understanding of whether similar attributes and capabilities are also present in 'unsuccessful' collaborations. When studied in depth, Bozeman and Youtie (2017:4) highlight that there can be significant transaction costs associated with "setting up, coordinating, and managing collaborations" with these stemming from geographic distance, the communication media employed, the number of collaborators, their familiarity, as well as differences in goals and incentives. It is challenging to find the right co-authors, establish a pattern of working, establish a common context, identify and deploy a common technical language, set up rules supporting procedural justice, and so on. Showing how complex starting a collaboration can be, it may be that extensive co-authoring may lead to a decline in starting up new collaborative works (see Abbasi, 2016).

Contextual factors are not irrelevant either. For example, a study by Santonen and Ritala (2014) among members of the International Society for Professional Innovation Management (ISPIM) suggests that geographical and institutional boundaries determine publication collaboration to quite an extent. Likewise, studies point toward the importance of at least some face-to-face activity (e.g., Bagire and Punnett, 2017). Similarly, connectedness matters. Fafchamps et al. (2006) suggest that "a new collaboration emerges faster if the two authors are more closely connected, either directly or indirectly, through collaborations with others". At the same time, while geographic proximity naturally eases some obstacles to co-authoring, the greater availability of tools for working together across distance (Tucker et al., 2016) and the potentially restrictive effects of "settling for the obvious solution" (e.g. Nathan et al., 1998) or being "held captive" by existing collaborations suggest that it would be very useful to learn more about how to promote greater promiscuity among publishing partners.

When searching for publishing partners, the attributes of potential co-authors[1] that make them, first, knowledgeable contributors and, second, capable of working together effectively become highly important (Cainelli et al., 2015, for example, point towards

[1] The terms publishing partners and co-authors are used here interchangeably. Furthermore, we are using the term to reflect equal partners where there can be any number of them.

complementarities in skills and attitudes, and effort). Identifying the authoring and collaborative attributes of researchers, the combinations of these attributes that are beneficial, and the relevant contextual factors that enable or hinder the publication collaboration to succeed is not a straightforward task, however. Thus, one of the biggest challenges identified is that the evidence-based knowledge, required to create co-authoring guidelines, is largely missing from our academic communities (Tucker et al., 2016). Even in the field of Innovation and Innovation Management research, where the disciplines of collaboration, cooperation and open innovation have been extensively studied, the potential for *publishing* collaborations, and the attributes of researchers have been left relatively un-studied. With incomplete evidence to work from, we assert that individual researchers find it difficult to assess:

- with whom they could collaborate with to combine and disseminate their findings;
- which attributes are the most important to look for in a publishing partner given their particular goals (taking into account the need to match or complement the researcher's own attributes); and
- how the collaborators could organize their work patterns in order to produce the most beneficial results.

Our aim is therefore to explore the characteristics of existing publishing partnerships from the point of view of researcher attributes, identify what makes them attractive in the first place (beyond the intrinsic motivations to collaborate), and what enables the emergence of productive collaborations (some of which can be more long-lived than others). We focus initially on researcher attributes since for many seeking new collaborators, the decision to engage in co-authoring will rest at least in part on evidence inferred from these characteristics. We also aim to identify ways to bring potential publishing partners together, in an environment that allows these attributes to be prominent.

To do this, we will first discuss the existing literature and relevant fields of research covering this topic, before attempting to identify and categorize relevant co-authoring attributes that we suggest can lead to successful collaborative publications. We will then consider how these attributes might create effective and high-performing partnerships. Instead of focusing on motivations of researchers to collaborate on publishing, we will try to understand what enables co-authoring (e.g., how the attributes of researchers might match or complement each other), and what this means for the perceived success and renewal of co-authoring relationships. We will close the study by suggesting how the findings can be used as the basis for empirical research, and as the basis for developing a practical method to facilitate future co-author partnerships.

2 In the search for relevant attributes – Overview of current literature

We started our exploration of identifying publishing co-authors' influential characteristics by examining existing research on the subject. In doing this, we discovered there are visible trends in the literature that provide relevant information on publishing partner attributes, but also some trajectories that may disguise these.

2.1 Research collaboration vs. publishing collaboration

Current literature primarily relates to research collaborations, thereby addressing collaboration on *research* broadly rather than *publishing* collaboration specifically. Bozeman and Youtie (2017) provides one such example, assembling evidence on research collaboration toward a 'science of team science'. In this area, different motivations, strategies, and output measures have been identified, depending on whether the collaboration involves actors from academia, industry, or both. In terms of academic-academic collaboration, Bozeman and Corley (2004) find that the most cited reasons for research collaborations are a) access to expertise, tacit knowledge, equipment or resources; b) enhancing productivity, prestige and visibility; c) for mentoring a student and d) for pleasure or fun. Putting aside structural and institutional factors for the moment, it is generally agreed that most collaborations emerge informally from conversations among colleagues. Consequently, spatial proximity, which increases the likelihood of informal dialogue, is seen as a primary positive factor influencing collaborations.

In terms of research collaborations with industrial partners, the motivations can be different (Bozeman and Youtie, 2017). Managers are most likely interested in practical solutions and applications, unless it is in their personal ambitions to achieve an academic degree, for example. Academics choose to work with industry because they are "gaining public recognition for their work; gaining academic esteem for their work; gaining financial reward; making an academic contribution to their field of study; making an academic contribution to society; learning and feedback on applicability of their research" (Miller et al., 2017). These academics are said to be Entrepreneurial Academics—"academic faculty member[s] who adopt an entrepreneurial outlook through seeking opportunities to support their research and teaching objectives by engaging with commercial partners in a range of collaborative and less formal modes of engagement" (Miller et al, 2017: 12). These motivations do not necessarily translate directly to joint publications, however, even if they can initiate and influence publication activities. However in this context joint research publications are only one type of outputs available to researchers and Entrepreneurial Academics, so the complexity of the context and the variety of modes available for collaboration may become confusing in terms of selection (Alexander and Childe, 2013).

In fact, it is important to acknowledge, as Katz and Martin (1997) note, that research work and publishing—and research collaboration and co-authoring—rarely go hand in hand. For example, not all actors involved in the joint research work are necessarily mentioned as authors in all publications coming out from that research collaboration. In some fields, limiting the number of authors per publication is an established practice to which researchers need to adjust in their co-authoring (Nathan et al., 1998). Relatedly, Murray (2002) indicates that co-publication may only account for a subset of the collaboration and engagement activities that contribute to the development and maintenance of the social capital relevant to innovation. On the other hand, the opposite happens also: those who have not actually contributed to the writing may be named in publications based on their involvement in research. This may be due to their position (e.g. as research group leaders or supervisors) (Katz and Martin, 1997; Endenich and Trapp, 2016) or because their inclusion enhances the likelihood of subsequent publication or obtaining grants (Bozeman and Youtie, 2017). Coined as "author inflation" in recent studies, the growing author lists in scholarly papers have cast a set of critical questions about their use in evaluating individual academic performance (Lozano 2013; Von Bergen and Bressler 2017). Relatedly, joint publications and co-authoring are often discussed as just one indicator of existing collaboration (see, e.g., Perkmann and Walsh, 2007; Katz and Martin, 1997), although others continue to use co-publications to infer the extent of research cooperation, knowledge flows and exchanges (e.g., Calero et al., 2007). This is perhaps as flawed as measuring only patent registration as a way to determine the innovativeness of an organization.

2.2 Studies on co-authoring

Next to and partially intertwined with studies on research collaboration, a body of research takes the viewpoint of co-authoring academic papers. A distinctive feature is that these studies are often categorized according to the type of collaboration (e.g., academic-practitioner) (Bozeman and Youtie, 2017; Miller et al., 2017), specific disciplines (e.g., accounting, finance, innovation, political science, or strategy) (e.g. Endenich and Trapp, 2016; Fisher et al., 1998; Jabbehadari and Walsh, 2017; Samitas and Kampouris, 2017) or in terms of geographic locations (such as Europe; Narin et al., 1991). Many studies seem to build on network analysis (e.g. Cainelli et al., 2015; Koseoglu, 2016; Santonen and Ritala, 2014), and they typically address general patterns (e.g., developments in number of authors/paper, author networks; e.g. Santonen and Ritala, 2014; Sutter and Kocher, 2004) and motivations of co-authoring (e.g. Bagire and Punnett, 2017), or practical issues of organizing these activities (e.g., Posner and Baecker, 1992; Lowry et al., 2004).

Considering the topics studied in this context, the increasing volume of co-authoring is well documented (e.g., Abramo and D'Angelo, 2015; Cainelli et al., 2015), like the motivations (Acedo et al., 2006) and outcomes of co-authorships (e.g., increased focus on specific topics or publication quality) (Laband and Tollison, 2000; Tucker et al., 2016). Furthermore, it is established that co-authorship practices differ across academic fields (Jabbehadari and Walsh 2017; Stewart and Aldrich 2015; Laband and Tollison, 2006).

Generally speaking, faculty members typically find benefit in co-authoring, and it is encouraged by departments (see, e.g., Nathan et al., 1998), even though benefits and productivity appear to vary across individuals (Endenich and Trapp, 2016; Ductor, 2015). There are, however, a range of competing mechanisms that discourage co-authoring. For example in the UK, the Research Excellence Framework assessment of research capacity and quality requires academics to submit a number of their best papers for review by expert panels. Each panel deals with a particular field (the Unit of Assessment - such as "management" or "accounting"), and if an academic is publishing with peers who also are homed in the same department, two authors cannot claim the same paper[2]. This, in effect, discourages co-authoring with immediate peers. Similarly, in cases where schools offer monetary bonuses to their faculty for academic publications, rules for even reward distribution among co-authors from the same school is likely to hinder in-house writing collaborations. Some disciplines also appear to de-value articles with numerous authors through raising questions about individual contributions, with promotion processes frequently reinforcing such traditions.

In practical terms, collaboration on publication is not always easy, and promises and deadlines may fail, therefore calling for careful planning and close co-author relationships (Floyd et al., 1994; Nathan et al., 1998). When working with co-authors, the strength of the relationship and the manner in which authors are able to share ideas is very important (Ede and Lunsford, 1983). Clarity and alignment are required, relatively quickly, to secure effective communications across the chosen channel. In effect, this communication is a form of knowledge transfer. Alexander and Childe (2012) suggest that the effectiveness of collaborations on joint publications is a function of the media richness of the channel selected. Further parallels for the efficacy of communication channels are reported rhetorically, with the analogy of "signal to noise ratio" being used to explain the clarity that knowledge (the signal) is transferred in a communication channel, versus the communication of unwanted or irrelevant information (the noise).

In sum, studies on co-authoring have analyzed a variety of factors from collaborative team characteristics, features of collaboration environment, to collaboration processes, and they have illustrated how these determinants may influence research progress, team functioning, and benefits to individual actors (e.g., Bagire and Punnett, 2017; Bozeman and Youtie, 2016, Lowry et al., 2004). These can become the antecedent and success factors for co-authoring and can, therefore, be used as guidelines for identifying those attributes that are relevant points of evaluation when looking for potential publishing collaborators.

2.3 Partner selection and publishing partner attributes in existing literature

In general, a lot of discussion on collaboration partner attributes and selection criteria address the organizational level, and are located in literature addressing collaborative endeavors, such as R&D collaboration with companies, or innovation partnerships (see, e.g., Feng et al. 2010). There is less literature focusing on these attributes and criteria at the individual level, in the context of publishing and co-authoring. Lunsford and Ede (1986), for example, touch upon this topic as they refer to the difficulties of evaluating co-authors' abilities and input ex ante. In particular, they note that a "complex set of largely unidentified, or perhaps even unrecognized, variables creates general satisfaction or dissatisfaction with both the processes and products of group writing" (Lunsford and Ede, 1986:75). Cainelli et al. (2015), for their part, suggest that "each author faces a 'matching' problem in finding his co-author, and this problem is exacerbated by the fact that one of a co-author's qualities is based on an ex ante evaluation of an unobservable variable (his/her effort)."

Despite these challenges, some progress has been made in terms of uncovering relevant publishing partner attributes, and a few proposals have been elaborated on what kind of attributes could be of importance for establishing well-performing collaborations. Given that research and publishing collaborations are not fully equivalent, attributes associated with valued publishing partnerships need to be considered separately, even if these initially emerge from the existing literature in research collaboration.

Generally speaking, literature on the attributes (or criteria) for partner selection of alliances indicates that certain aspects such as partner's quality, availability, reliability,

[2] Guidelines for recording the credit for publications in REF 2007 and REF 2914 are published here: https://www.ref.ac.uk/2014/about/guidance/. Accessed 10.5.18.

performance, culture, and past experience are important (Feng et al., 2010). Emden et al. (2006) have introduced a process theoretical model for partner selection in collaborative NPD alliances where resource complementarity, technical ability, overlapping knowledge bases, motivation correspondence, goal correspondence, compatible cultures, propensity to adapt, and long-term orientation emerged as relevant issues. While developed for different context and located at different level of analysis, similar attributes could be assumed to be important in co-authoring.

Considering collaborative research and publication activities, the level of analysis varies. For example, Powell et al. (2005) aim attention at the network dynamics and evolution of the field of life sciences, and the growing trends of *intra- and inter-organizational collaboration*. In more general terms, and focusing at *inter-organizational level*, Alexander et al. (2018) identify a range of pervasive problems with knowledge transfer activities—including also joint publications. They suggest these fit into contextual issues, practical issues and micro-social factors. Contextual factors relate to the relative standing of institutions and their organizational knowledge reputation, their inter-organizational partnerships, and the relative priorities placed on activities. For example, whilst research income and project kudos are attractive to the less research active universities, of applied science faculties, the same emphasis to publish may not be evident, particularly in certain high quality but low impact scholarly locations. In practical terms, support functions and funding, for example, are of relevance, and micro-social factors refer to inter-organizational pressures, issues of establishing trust and relational embeddedness between partners, as well as legitimacy with one's peers—related to the research-orientation of the institution (Alexander et al. 2018). These all have the potential to create barriers for collaboration, particularly joint publications.

In terms of studies more directed at *interpersonal collaborations*, disciplinary, interdisciplinary and gender dynamics, work style fit, career stage, trust and experience have been recently highlighted by Bozeman and Youtie's (2017) review of the literature. Earlier, Bozeman and Corley (2004: 601) examined the effect of research partnerships on "the sum of scientific, technical and social knowledge, skills and resources embodied in a particular individual". They identified six types of collaborators with specific attributes that researchers find desirable: (1) 'taskmasters,' based on work ethic and punctuality; (2) 'nationalists,' having the same language and nationality; (3) 'mentors,' dedicated to helping junior researchers or graduate students; 4) 'followers,' with strong academic reputation; 5) 'buddies, based on previous collaboration, friendship or personality; and 6) 'tacticians, with a set of complementary skills. However, Bozeman and Youtie's (2017) findings further suggest that the different individual facets interact in complex ways, making generalizations difficult and barriers to effective research collaborations frequently intractable. Additionally, while some of these facets typically only lead to difficulties in collaboration, others, such as disciplinary diversity on a team, can also at times lead to benefits. Therefore, summarizing the existing knowledge, it seems that a breadth of useful information is available, but due to compartmentalization of studies under individual disciplines and focus in individual attributes' effects on co-authoring instead of (being able to study and) addressing more holistic settings, useful instructions on how to promote co-authoring are missing.

4 Publishing partner attributes in facilitating co-authoring

Building on the above notions, our aim is to take steps towards finding the needed guidelines and frameworks. Despite the above-identified challenges, it can be argued individual level attributes play a role in finding the ways of facilitating co-authoring. They are relevant on their own, but even more so with regard achieving benefits from synergies when publishing partners come together.

4.1 Categorizing author attributes

Based on the insights from existing research, it seems that there are two relevant differentiations that affect publishing partners:

- Organisational-level contextual and practical factors
- Individual-level skills and competences (covering both the substance and the writing).

We argue that categorizations can be useful for analytical purposes, and therefore, the following discussion will be devoted to addressing factors within these categories. While far from exhaustive, the discussion is meant to provide starting points for further steps.

When assessing author attributes, Cainelli et al. (2015: 675) identify three sets of variables that can be considered relevant for productivity. The first of these comprises 'attributional variables' that include "age, gender, academic position, tenure, scientific sub-discipline". These can be considered to address the *competence base and skills* in terms of knowledge of the phenomenon or the context of the study in question, skills in different methods, and practical skills such as the production of logical text or managing efficient ways of working in more general[3]. Similarly, Fafchamps et al. (2006) find that co-authoring success depends on the type of each researcher's ability and experience. Building on the notions of authors such as Burt (2017); Maskell (2000) and Bloor (1985), social capital and social knowledge matter. Providing practical means of evaluating these attributes, Bidault and Hildebrand (2014) suggest that the quality of journals in which the researchers have published earlier reflect their competence and reputation. They further indicate that sole-authored papers could, due to their higher visibility, be of relevance in exhibiting these characteristics. Laband and Tollison (2000: 45) introduce yet another individual attribute that may prove important during the publication process. More specifically, they suggested that "individuals who are better able to deal with seemingly personal rejection and who can move beyond the disappointment of being informed that their ideas are not as relevant as they would like to believe are likely to be more successful contributors to economic science than individuals who have trouble accepting such rejection." While this feature may be next to impossible to evaluate ex ante in a collaboration partnership, it may be useful for authors to acknowledge this in themselves—together with many other individual traits that may, in combination with other researcher's attributes, affect the final outcomes.

On the other hand, it is not just competences in terms of "technical" skills that matter. The second category of important variables identified by Cainelli et al. (2015: 675) is 'relational variables' that refer to "propensity to cooperate and stability of cooperation patterns." This indicates that social skills are also relevant. Co-authors need to be able to communicate (and defend) their own ideas, plan and execute deadlines, and deal with difficult situations, such as negotiating author-order or cutting someone else's contribution (cf. Lunsford and Ede, 1986). In fact, regarding *collaboration capabilities*, experience of co-authorship in general, as demonstrated by previous joint publications, could be used to evaluate potential publishing partners (Bidault and Hildebrand, 2014). For their part, Fafchamps et al. (2006) highlight the importance of a willingness of each author to exert effort, as well as their availability. In fact, the ability to balance between multiple tasks and (self-evaluation capabilities in terms of) committing to an adequate effort level can be notably important. Findings of Fafchamps et al. (2006) further suggest that because collaboration with someone reveals information about their motivation, ability and skills, a referral by a coauthor can be seen as a screening process indicating whether a coauthor is competent and can be trusted to do his/her share. Desirable coauthors, however, are likely to have the tendency to underestimate their work loads, which easily leads to underperformance in any collaboration that is not prioritized. To prepare for this possibility, author attributes such as teaching load, editorial board memberships, reviewer activity, positions in university administration, etc. could be evaluated. Nevertheless, it cannot be forgotten that some of this information can also signal competences, as editorial board memberships can relate to higher co-authoring propensity (Endenich and Trapp, 2016).

The above competences and capabilities may also result from the researcher being a part of specific organization or community, and they may continue to be affected by different contingencies. In terms of *contextual factors*, proximity particularly has been noted to play an important role (see above). The circumstances for co-authoring seem to be favorable when there are enough points of contact, and good communication tools available (e.g., face-to-face meeting(s), interaction aided by different tools for distant work). Proximity (organizational or geographical) can be assessed with authors' affiliation (Bidault and Hildebrand, 2014). The affiliation also may become a useful indicator of other

[3] Individual differences are likely present, consider, e.g., writing a lot and then deleting unnecessary parts vs. planning first and writing only then; preferring to work in advance compared to being pushed by deadlines; taking the lead vs. waiting for others to contribute first, starting from empirical evidence vs. preferring to craft theoretical basis first, etc.

relevant contextual elements. Beyond the individual styles of working referred to above, it may be that different schools have, for example, different emphases with regard teaching vs. research and publication (Alexander et al., 2018), or in terms of rewarding collaborative publishing, which directly affects possibilities and incentives to invest in these activities. Alexander et al. (2018) also talk of the levels of support that is provided (for example in terms of IT facilities for real-time, global connectivity), or access to funding that enables travel to, and time spent with partners. These may become important enabling (or preventing) and incentive factors.

Table 1 below combines our discussion from the earlier parts of this paper, and illustrates some of the relevant attributes along the different dimensions.

Organizational Factors		
Contextual	**Practical**	**Micro-social**
Relative organizational standing	Virtual connectivity resources	Legitimacy with peers for publication
Organizational knowledge reputation	Access to travel funds	Relative standing within the organizations
Organizational relative priorities for collaboration	Time allocated to publications (tempo)	Confidence to develop trusting and relationally embedded partnerships
Individual and Inter-personal Factors		
Technical Knowledge	**Social Knowledge**	**Social Capital**
Relevant qualifications	Emotional intelligence to create partnerships	Network power
Publication track record	Worldly-wise knowledge	Network reach and range
Career Status	Collaboration Experience	Relational Variety
Competence and Reputation	Ability to Sustain Relationships	Relative visibility

Table 1: Suggested categories of attributes for collaboration synthesized from the literature.

4.2 Facilitating matching of authors – attributes acknowledged

The discussion above, and elements in table 1 suggest that analytical categorizations can provide some direction for initiating and approaching co-authoring in new ways. In particular, the awareness of potential synergies, and the possible risks residing in poorly matching attributes in advance may ease finding the best collaborators and avoiding over-investment in 'doomed' collaborations.

Regarding practical ways to initiate publishing collaborations based on the knowledge of author attributes, very few guidelines can be found. Among the few studies that touch upon this issue, the general notions are at the level of suggesting that senior-junior setting, informal contacts and face-to-face interaction, and proximity (with regard different dimensions) are typically present. Cainelli et al. (2015) advocate that complementarities in skills and attitudes, and the level of effort put in the collaboration matter—following Fafchamps et al. (2006: 8) who note that "collaboration is more likely between authors whose abilities are complementary, that is, for whom the overlap in competence is a small component of their total ability". Furthermore, "there is a natural pressure towards individuals wanting to collaborate with others of higher ability" (Fafchamps et al., 2006: 6), for example, as working with prolific scholars can develop a researcher's structural capital (Li et al., 2013). Similarly, Bidault and Hildebrand (2014) have examined the effect of asymmetry—defined as the difference between co-authors regarding research competence, experience, influence, or reputation between co-authors—on the benefits and losses that may accrue to each co-author. Junior authors often lack skills and competence, to which those and experience of seniors are seen to form an important counterpart.

These general notions can be taken as starting point or threshold aspects that one can build on if the target is to facilitate co-authoring in more intentional and structured manner, but they hardly are enough to reach the optimal outcomes. In particular, due to the complex interactions (Bozeman and Youtie, 2004; Endenich and Trapp, 2016) and because one attribute can yield different outcomes, a more holistic view is likely needed.

For example, referrals mentioned by Fafchamps et al. (2010; see above) are not completely reliable, as it depends on how well the attributes of co-authors actually match

whether or not the collaboration works. It may be that each collaborator has had numerous well-working collaborations earlier, possesses all the necessary skills, but they eventually fail to match in terms of styles of working. It is possible that the 'chemistry' between the individuals is not good and they simply cannot work well together. Also other challenges in relying on existing findings on the "typical (successful) publishing collaborations" can be identified. For example, while looking for complementarities seem natural, it is not always the best approach. Junior-senior setting, for example, looks very promising at first glance. As indicated by Cainelli et al (2015), junior authors may have more time to focus on the tasks at hand, and the "higher effort levels of time-constrained high ability author can produce more research while the low ability researcher produces better quality output" (Fafchamps et al., 2006:8). However, looking for a co-author with higher abilities is not without risk: Azoulay et al. (2010) suggest that researchers publishing with outstanding scholars are negatively affected if these outstanding scholars fail later in their careers. In more general, there is a possibility that even the best collaborations wither. Another challenge is that the author attributes are not fixed. Li et al (2013) have explored how social capital might influence co-authorship practices and research impact. Using Information Systems scholars and three dimensions identified in social capital theory (structural, relational, and cognitive capital), these authors found that researchers can develop different strategies to shift positions in their network and influence their citation count. As a final example, while co-authorship is seen to imply "face-to-face interaction, including extensive discussions, exchange of ideas and joint problems solving, and represents a considerable investment for the participants" (Almeida et al., 2011: 1582), the validity of this has rarely been tested, and so the existence of one or more co-publications could occur even when success-producing collaborator attributes identified, e.g., by Bozeman and Corley (2004, see above), are not present.

5 Discussion and conclusions

The review of the extant research suggests that a more sophisticated facilitation of co-authoring likely requires wider-scale approach, where creating platforms for adequately reliable "(self-)profiling" of authors and first-encounter opportunities is needed. Our study finds that there are a number of relevant researcher attributes that can be categorized roughly to those that relate to the capabilities to contribute (expertise with regard substance, methods, and other such aspects), to those that relate to ways of working (motivation, adherence to deadlines, goodwill towards co-authors) and to environmental factors (such as institutional standing, time allocated to publishing and other organizational factors etc.). Evaluating these in a holistic manner seems to be necessary to get past the challenges associated with evaluating the effects of only individual attributes—that may actually give start to quite opposing outcomes.

Combining careful evaluation of author attributes to practical means of bringing them together seems a good way to move forward. In terms of the latter, many studies highlight the need for close relationships, and our findings indicate that the closeness can be built on different factors (e.g., framing of the topic, social interaction, practical arrangements). This resonates with and combines, e.g., the findings of Price (1986), indicating that co-authoring arises from economic rather than intellectual dependence, and of Stokes and Harfley (1989) and Bandodkar and Grover (2016), who consider the role of intellectual and social factors to play an essential role. Building on these notions, one could conclude that creating an environment where social interaction has potential to emerge, but where the researchers also have more structured ways to bring forth their attributes, is beneficial for new co-authorships. This raises an interesting question—are these the conditions that prevail at the best conferences? How could these moments be enhanced or orchestrated during professional meetings?

What we establish is that co-authoring is beneficial and by negotiating the barriers and hurdles in collaborations, joint publication should lead to increased reach, range and generalizable content in publications, particularly if authors have the opportunity to utilize mixed methods and mixed modes of study. Being able to achieve the above noted should improve the quality of research on innovation: publishing collaboration forces the different actors to understand what others are doing. E.g., combining empirical data held by one researcher to theoretical expertise and views of another is not possible without each gaining insight on the basic principles and assumptions that the other holds. Therefore,

collaborating increases the likelihood that different points of views are better incorporated in the findings, and it also affects the personal skills and attributes of the authors contributing—they are learning as they work, assuming they employ reflexive practices and learn from their experiences. Likewise, research is better communicated as joint writing and publication stars from the collaborators making the message understandable among the collaborators. Difficult-to-obtain data can be utilized more fully, as more uses can be found by scrutinizing it from different angles. In designing the publication, shortcomings of the research come visible more easily, and new ideas are likely introduced, which may lead to new relevant research endeavors (e.g., as a response of - quite inevitable - limitations of the data to meet the requirements of all emerging views). While it needs to be acknowledged that co-authoring is resource-intensive and time-consuming activity, and that new collaborations cannot be started all the time, active promotion of publication partnership formation has the potential to break stagnating silos, and complement (and develop into) long-term relationships, that are not restricted by excessive path-dependency.

Our contribution, arising from our research, extends the current knowledge on publishing collaboration and provides a 'schema' from which to develop an extended empirical study. What we know from experience is that early career researchers often struggle to find partners beyond their doctoral supervisors and/or their own institution, and findings on how to create new partnerships with innovation management practitioners as well as academics in the field more widely holds notable potential. The theoretical understanding on publishing partner selection and co-authoring is advanced through the focus on researcher attributes and their demonstration possibilities. In particular, we suggest that is makes sense to move beyond 'to what extent and why researchers collaborate on publishing' to 'what allows them to publish together (successfully)'.

On a very practical level, the benefit will accrue, first and foremost, to researchers trying to find ways to disseminate and test their findings among academics and practitioners, build basis for new research and new research collaborations, and get merit for their research work. It would appear that with the right attitudes and attributes, the potentials offered by joint publications outstrip the issues that arise in trying to untangle relative contributions, and that with an ever more globalized context to our research, the ability to operate in tightly defended intellectual silos (or paradigms perhaps) is reducing—particularly as governments and society call for more systems level solutions to address some of the global grand challenges. Therefore the more we learn about our own attractiveness, abilities and performance, and the more we understand about how to search, select and implement collaborative writing partnerships, the more were are able to gain the rewards associated with joint publications. This could lead to a trend for globalization in publications, rather than a regression towards a more nationalized agenda.

To extend our study, we could refocus on two main areas of contribution. To create a practical guide to co-authoring, which the extant literature confirms is currently missing, we must undertake some validation of the findings and summary elements, shown in table 1. Some of the definitions and attributes lack operationalization and we must first explore practical definitions and then validate them with our peers before assembling them into simple steps, or a simple heuristic or framework, that will enable us to present them as "best practice". In this exercise, it needs to be considered how 'success' is defined, for example. Workshops or networking events may create empirical opportunities to validate them, from a practical perspective.

Secondly, more academic contribution may arise from our work in the form of less conceptual, more empirical work. This could be undertaken by extending our work toward some carefully constructed data collections that explore a number of the trends arising from our study. For example, we could examine contingency factors in co-authoring to the extent that they are relevant regarding how researchers can signal and demonstrate their most important attributes. We could also explore the relative networks, network power and co-authorship practices in relation to the circulation and centrality of certain concepts, tools or theories in a specific field. In innovation management, such an exercise could result in mapping and elucidating the intellectual structure of the field. Consequently, we could contribute to better understanding which and how certain organizational and interpersonal attributes, as well as academic kinships established in conferences and other such platforms affect the ways knowledge assumes prevalence in theory and practice.

Despite the direction of future steps, our conviction is that as the research on innovation and innovation management advances, it becomes ever more important to understand how the knowledge produced can be more efficiently and effectively diffused through partnerships and publications. After all, at the end of the day, research is not done for the sake of research, but to improve the topic of the research.

References

Abbasi, A. (2016). A longitudinal analysis of link formation on collaboration networks. Journal of Informetrics, 10(3), 685-692.

Abramo, G. & D'Angelo, C. A. (2015). The relationship between the number of authors of a publication, its citations and the impact factor of the publishing journal: Evidence from Italy. Journal of Informetrics, 9(4), 746-761.

Acedo, F. J., Barroso, C., Casanueva, C., & Galán, J. L. (2006). Co-authorship in management and organizational studies: An empirical and network analysis. Journal of Management Studies, 43(5), 957-983.

Alexander, A. T., & Childe, S. J. (2011, September). A Framework for the Transfer of Knowledge between Universities and Industry. In IFIP International Conference on Advances in Production Management Systems (pp. 534-548). Springer, Berlin, Heidelberg.

Alexander, A. T., & Childe, S. J. (2013). Innovation: a knowledge transfer perspective. Production Planning & Control, 24(2-3), 208-225.

Alexander A.T., Martin D.P, Miller K, & Mancholev C (2018) Have you tried rebooting?' Introducing 'meta-rules' as a framework for resolving conflicting priorities in the management of knowledge transfer between higher education institutions and industry. Journal of Technology Transfer (citation awaited).

Almeida, P., Hohberger, J., & Parada, P. (2011). Individual scientific collaborations and firm-level innovation. Industrial & Corporate Change, 20(6): 1571-1599.

Azoulay, P., Graff Zivin, J.S., Wang, J., 2010a. Superstar extinction. Quarterly Journalof Economics 125, 549–589.

Bagire, V., & Punnett, B. J. (2017). The Team Process: Insights from the LEAD Experience. AIB Insights, 17(1), 7.

Bandodkar, N. R., & Grover, V. (2016). Factors Influencing the Extent of Co-Authorship in IS Research: An Empirical Investigation. Communications of the Association for Information Systems, 38, 84-105.

Bidault, F., & Hildebrand, T. (2014). The distribution of partnership returns: Evidence from co-authorships in economics journals. Research Policy, 43(6), 1002-1013.

Bloor, D., 1985. Wittgenstein. A social theory of knowledge. And is advanced here Gergen, K.J., 2012. *Toward transformation in social knowledge*. Springer Science & Business Media.

Bozeman, B., & Corley, E. (2004). Scientists' collaboration strategies: implications for scientific and technical human capital. Research Policy, 33(4), 599–616. http://doi.org/10.1016/j.respol.2004.01.008

Bozeman, B., & Youtie, J. (2016). Trouble in paradise: Problems in academic research co-authoring. Science and engineering ethics, 22(6), 1717-1743.

Bozeman, B., & Youtie, J. (2017). The Strength in Numbers: The New Science of Team Science. Princeton University Press.

Burt, R.S. (2017). Structural holes versus network closure as social capital. In *Social capital* Routledge. 31-56.

Cainelli, G., Maggioni, M. A., Uberti, T. E., & De Felice, A. (2015). The strength of strong ties: How co-authorship affect productivity of academic economists?. Scientometrics, 102(1), 673-699.

Calero, C., van Leeuwen, T., & Tijssen, R. (2007). Research cooperation within the bio-pharmaceutical industry: Network analyses of co-publications within and between firms. Scientometrics, 71(1): 87-99.

Ductor, L. (2015). Does Co-authorship Lead to Higher Academic Productivity? Oxford Bulletin of Economics and Statistics, 77(3), 385–407. http://doi.org/10.1111/obes.12070

Ede, L., & Lunsford, A. (1983). Why write... together?. Rhetoric Review, 1(2), 150-157.

Emden, Z., Calantone, R.J. & Droge, C. (2006). Collaboratingfornewproduct development: selecting the partner with maximum potential to create value. Journal of Product Innovation Management, 23 (4), 330–341.

Endenich, C., & Trapp, R. (2016). Cooperation for publication? An analysis of co-authorship patterns in leading accounting journals. European Accounting Review, 25(3), 613-633.

Fafchamps, M., van der Leij, M.J., & Goyal, S. (2006). Scientific networks and co-authorship. Economics. Oxford: Working Papers, University of Oxford, p. 256.

Feng, B., Fan, Z. P., & Ma, J. (2010). A method for partner selection of codevelopment alliances using individual and collaborative utilities. International Journal of Production Economics, 124(1), 159-170.

Fisher, B. S., Cobane, C. T., Vander Ven, T. M., & Cullen, F. T. (1998). How many authors does it take to publish an article? Trends and patterns in political science. PS: Political Science & Politics, 31(4), 847-856.

Floyd, S. W., Schroeder, D. M., & Finn, D. M. (1994). "Only if I'm first author": conflict over credit in management scholarship. The Academy of Management Journal, 37(3), 734-747.

Gibbons, M., Limoges, C., Nowotny, H., Schwartzman, S., Scott, P., & Trow, M. (1994). The new production of knowledge: The dynamics of science and research in contemporary societies. Sage.

Harsanyi, M. A. (1993). Multiple Authors, Multiple Problems--Bibliometrics and the Study of Scholarly Collaboration: A Literature Review. Library and Information Science Research, 15(4), 325-54.

Jabbehdari, S., & Walsh, J. P. (2017). Authorship Norms and Project Structures in Science. Science, Technology, & Human Values, 42(5), 872–900. http://doi.org/10.1177/0162243917697192

Katz, J. S., & Martin, B. R. (1997). What is research collaboration?. Research policy, 26(1), 1-18.

Koseoglu, M. A. (2016). Growth and structure of authorship and co-authorship network in the strategic management realm: Evidence from the Strategic Management Journal. BRQ Business Research Quarterly, 19(3), 153-170.

Laband, D. N., & Tollison, R. D. (2000). On secondhandism and scientific appraisal. The Quarterly Journal of Austrian Economics, 3(1), 43-48.

Laband, D., & Tollison, R. (2006). Alphabetized coauthorship. Applied Economics, 38(14), 1649-1653.

Li, E. Y., Liao, C. H., & Yen, H. R. (2013). Co-authorship networks and research impact: A social capital perspective. Research Policy, 42(9), 1515–1530. http://doi.org/10.1016/J.RESPOL.2013.06.012

Lowry, P. B., Curtis, A., & Lowry, M. R. (2004). Building a taxonomy and nomenclature of collaborative writing to improve interdisciplinary research and practice. The Journal of Business Communication (1973), 41(1), 66-99.

Lozano, G. A. (2013). The elephant in the room: multi-authorship and the assessment of individual researchers. Current Science. Current Science Association. http://doi.org/10.2307/24097994

Lunsford, A., & Ede, L. (1986). Why write... together: A research update. Rhetoric Review, 5(1), 71-81.

Maskell, P., 2000. Social capital, innovation, and competitiveness. In *Social capital* (pp. 111-123). Oxford University Press.

Miller, K., Alexander, A. T., Cunningham, J., & Albats, E. (2017). Entrepreneurial academics and academic entrepreneurs: A systematic literature review.

Murray, F. (2002). Innovation as co-evolution of scientific and technological networks: exploring tissue engineering. Research Policy, 31(8), 1389-1403.

Narin, F., Stevens, K., & Whitlow, E. S. (1991). Scientific co-operation in Europe and the citation of multinationally authored papers. Scientometrics, 21(3), 313-323.

Posner, I. R., & Baecker, R. M. (1992, January). How people write together (groupware). In System Sciences, 1992. Proceedings of the Twenty-Fifth Hawaii International Conference on (Vol. 4, pp. 127-138). IEEE.

Samitas, A., & Kampouris, E. (2017). Empirical investigation of co-authorship in the field of finance: A network perspective. International Review of Financial Analysis.

Santonen, T., & Ritala, P. (2014). Social Network Analysis Of The Ispim Innovation Management Community In 2009-2011. International Journal of Innovation Management, 18(1), 1450010.

Stewart, A., & Aldrich, H. (2015). Collaboration Between Management and Anthropology Researchers: Obstacles and Opportunities. Academy of Management Perspectives, 29(2), 173–192. http://doi.org/10.5465/amp.2013.0161

Sutter, M., & Kocher, M. (2004). Patterns of co-authorship among economics departments in the USA. Applied Economics, 36(4), 327-333.

Tucker, B. P., Parker, L. D., & Merchant, K. A. (2016). With a little help from our friends: An empirical investigation of co-authoring in accounting research. The British Accounting Review, 48(2), 185-205.

Von Bergen, C. W., & Bressler, M. S. (2017). Academe's Unspoken Ethical Dilemma: Author Inflation in Higher Education. Research in Higher Education Journal, 32. Retrieved from https://eric.ed.gov/?id=EJ1148909