

It takes two to tango: Examining productive interactions in urban research collaboration

Helka Kalliomäki*, Sampo Ruoppila**, Jenni Airaksinen***

*University of Vaasa, helka.kalliomaki@uwasa.fi

**University of Turku, sampo.ruoppila@utu.fi

***University of Tampere, jenni.airaksinen@tuni.fi

Published in *Research Evaluation*: <https://doi.org/10.1093/reseval/rvab028> (open access)

Abstract

The science-society relations of social sciences and humanities have been increasingly discussed under the concept of productive interactions, which refers to the mutual learning processes between researchers and stakeholders for the benefit of societal development. While most studies have analysed the societal impact from the research performers' perspective, in this article we examine the practitioners' side. We contribute to the evaluation theory by offering a new perspective to examine the emergence of productive interactions. Based on an empirical analysis of collaborative practices in two Finnish urban research programmes and how the practitioners reflected on them, we argue that practitioners' competencies are essential in leveraging societal impact. The improvement of these 'pracademic competencies' need to be raised as an issue in research policy and evaluation promoting responsible research and innovation.

Keywords: productive interactions, collaborative research, pracademic competencies, societal impact, responsible research and innovation, social sciences and humanities

1. Introduction

The efforts to demonstrate the value for society of the academic community's work, in other words “an effect on, change or benefit to the economy, society, culture, public policy or services, health, the environment or quality of life, beyond academia” (Higher Education Funding Council for England 2014), have led to rich discussions on how such value is created and how it can be supported. The applied research policy measures include increased collaboration between the scientific world and other stakeholders, emphasis on transdisciplinarity and ‘real-world problems’ in research funding, and the involvement of expert users of the research (Bornmann 2013). Expectations of how research is organised (de Jong et al. 2016a) and how its impacts are evaluated (see Bornmann 2013; Greenhalgh et al. 2016; Hill 2016; Cruz Rivera et al. 2017; Sivertsen & Meijer 2020) have transformed accordingly. With emphasis on interaction with stakeholders, traditional assumptions of a linear process between a study, applications, and impacts (e.g. Wooding et al. 2007) have been replaced with an understanding of diverse processes of how benefits may emerge (e.g. Ozanne et al. 2017; Muhonen et al. 2020; Annemans & Heylighen 2020; Sivertsen & Meijer 2020).

In a seminal project, Spaapen and van Drooge (2011, p. 212) defined ‘productive interactions’ as “exchanges between researchers and stakeholders in which knowledge is produced and valued that is both scientifically robust and socially relevant”. Productiveness was considered to be fulfilled “when it leads to efforts by stakeholders to apply research results to social goals, i.e. when it induces behavioural change” (Spaapen and van Drooge et al. 2012, p. 2). While the main idea of productive interactions is easy to agree with, it is disappointing how superficial the original model (Spaapen & van Drooge 2011) has remained, separating only direct or personal interaction between humans (e.g. meetings), indirect interaction through a medium or a ‘carrier’ (e.g. a research report), and financial and/or material exchanges (essentially, funding collaboration).

Operationalised this way, the evaluation focus might be limited to ‘counting interactions’, as Muhonen et al. (2020) put it.

Nevertheless, recent discussions on science–society relations and the societal impact of research have indicated continuing interest in the idea’s further potential, delving into how productiveness unfolds within direct or personal interaction especially (e.g. Laing & Wallis 2016; Muhonen et al. 2020; Annemans & Heylighen 2020; Sivertsen & Meijer 2020). However, a common feature is their major focus on the research performers’ side of the interaction, rising from the prevailing impact evaluation methodologies (Sivertsen & Meijer 2020, p. 69). Nonetheless, “impact cannot be achieved from the supply side alone” (Morton 2015b, p. 51). On the contrary, Morton (2015a, 2015b) has argued for the importance of understanding the gradual process involving research uptake (users engaging with research), research use (users acting upon it), and research impact (change of perception and eventually policy and practice), all depending on a detailed understanding of the context by the users of the research. Moreover, Fobe and Brans (2013) have drawn attention to the relevance of timing the collaboration, explanations of the practical implications, decision makers’ attitudes towards research, and the results’ position vis-à-vis other kinds of evidence. Furthermore, de Jong et al. (2016a) have reminded that societal actor involvement may be either a token activity or a substantial component of the research process, and Muhonen et al. (2020) have drawn attention to collaboration being a two-way street which also allows societal actors to influence scientific actors (for instance, leading to new research questions). Taking the nuanced understanding of collaboration further, Sivertsen & Meijer (2020) have recently suggested that – at least regarding social sciences and the humanities – the term ‘societal impact’ could be replaced with ‘societal interaction’ with a focus on “normal” organisational-level interaction: “Two questions could be asked to both sides: what are you doing—demonstrably—as an organization to take care of creating, exchanging, and making use of new knowledge according

to your purposes? And what can we learn from this to improve—together?” (Sivertsen & Meijer 2020, p. 68).

Hence the title: “It takes two to tango.” In the spirit of the quote above, the aim of this paper is to further develop both the evaluation theory and the operational analysis of ‘productive interactions’ in collaborative research, with an emphasis on the – equally important but less covered – research user side and research policy and evaluation implications involved. We agree with Spaapen & van Drooge (2011) that the focus on ‘productive interactions’ allows distinguishing of “the variegated *contributions* of researchers and stakeholders that taken together can be seen as necessary interim steps in the process that lead to social impact” (ibid., p. 214, italics original). To dig into that in detail, we present a theoretical framework with three auxiliary concepts: research phases, boundary work, and competencies, all to be introduced in the next section. Empirically, we demonstrate the benefits of the suggested theoretical advancement through an analysis of productive interactions in two Finnish urban research programmes. Urban research, or urban studies, is a field rooted in social sciences but with a profoundly transdisciplinary character (Ramadier 2004). Ever since the emergence of academic urban studies in 1920s Chicago, the field has had strong links in conceptualising urban governance and ‘urban problems’ as well as shaping urban policy. Today, this link is essential as the importance of cities is increasingly recognised in future policy agendas on economic growth, sustainability, or social development goals. Nonetheless, combining critical analytical distance and demand of involvement in policy-making has not been unproblematic in this field either (e.g. Gurran 2018). The two analysed Finnish urban research programmes were systematised collaborative frameworks (akin to strategic research programmes) in which municipalities funded academic urban research and collaborated with universities to gain policy advice.

The study’s results have broad relevance given the widespread aim to increase knowledge sharing and co-production in multi-actor networks (e.g. Joas et al. 2013; de Jong et al. 2016a). This

is reflected also in the ambitions of European research and innovation policy, in particular the goals regarding Responsible Research and Innovation (Shelley-Egan et al. 2020). Against this backdrop, our empirical analyses offer an interesting case, as the two programmes stand out internationally as ambitious attempts to systematise research-based urban policy advice based on productive interactions. Echoing Sivertsen & Meijer's (2020) emphasis on the importance of "normal societal impact", a result of regular interaction along collaborative research, we argue that practitioners' capacities should be given much greater attention alongside those of researchers, and consequently their individual and organisational competencies to operate at the science-society interface should be raised as an issue in research policy and evaluation frameworks.

2. Productive interaction in research collaboration

The productive interaction perspective emphasises impact creation in complex, multi-actor learning and knowledge-creation processes, spreading to different directions, also unplanned, and possibly escaping any precise, predefined indicators (Spaapen & van Drooge 2011). Literature has well-established diversity in research utilisation (Weiss 1979), research-policy relations (Boswell & Smith 2017), and impact pathways (Muhonen et al. 2020). Our focus is the collaborative research setting in which academics and practitioners create practices to improve understanding together. To advance the theory of productive interactions in this context, we suggest using three auxiliary concepts: research phases, boundary work, and competencies.

While former work has established the importance of numerous formal and informal collaborations in creating an impact (see Molas-Gallart & Tang 2011), in order to analyse their focus in a structured manner, we apply Mauser et al.'s (2013) division of the knowledge co-creation process into three phases: co-design, co-production, and co-dissemination of results. Mauser et al. (2013) suggest that stakeholders are relatively more involved in setting funding rules, influencing the research themes, as well as in disseminating the results, as compared with the researchers'

dominating role in the actual research work. From our viewpoint, the question is rather what the collaboration is about at different phases. This echoes de Jong et al. (2016a, p. 1399), for instance, who have previously noted the societal actors' different roles in the process, as well as works that have drawn attention to the role of practitioners in building and leveraging the impact (Mauser et al. 2013; Morton 2015b; de Jong et al. 2016a; Sivertsen & Meijer 2020).

With 'boundary work' we refer to how the demarcation between science and practical issues is tackled, including exploring, negotiating, and realigning science-society boundaries (cf. Velter et al. 2020), as well as managing interactions across them (e.g. Faraj & Yan 2009). In other words, this comprises how academics and practitioners operate when they reconcile the targets, framing, and usability of the research at the different phases of collaboration. Boundary work includes, for instance, explaining knowledge interests, considering generality of research results, or discussing their interpretation. The experiences gained in boundary work can contribute to long-term capacity building among the individuals and the organisations involved. The collaboration between practitioners and academics is not necessarily easy (Weiss 1979; Boswell & Smith 2018; Macduff & Netting 2000), given the tensions rooted in different ways of perceiving knowledge and learning (Posner 2009, p. 22; de Jong et al. 2016b). Yet, in a dialogue the imagined boundaries can at best be spanned or reinterpreted, resulting in diffuse and shared understanding (e.g. Gorman 2010; Alvesson & Sandberg 2011).

'Competencies' refers to a set of skills and abilities required from the participants to succeed in the boundary work. In the complex, reciprocal process of knowledge production, a set of different, complementary skills is required. Höyssä (2013, p. 63) differentiates between analytical skills (e.g. framing problems and formulating questions), methodological skills (e.g. selecting suitable scientific methods), inventive skills (e.g. using new methods and approaches), and application skills (e.g. applying research skills to explain a social phenomenon and its conditions). In addition, communicating skills to explain the contexts, questions, and results in multiple ways

must be noted (see Gorman 2010). While research evaluation literature is not short of suggestions on how academics could perform better, the collaboration perspective also requires examining practitioners' competencies. This includes, for instance, whether they understand the basics of knowledge formation (e.g. what can be expected from a single study) or are able to identify the results and their potential relevance (Iorio et al. 2017; Rau et al. 2018). Adding to the complicated nature of the situation, the practitioners are a diverse bunch in terms of having a background with scientific knowledge utilisation. Some are highly skilled, well-educated, autonomous professionals (e.g. teachers, medical doctors, or social workers), whereas others are less rooted in one profession (e.g. project managers, program coordinators) (Nutley et al. 2007; Leino et al. 2018, p. 10). Moreover, their knowledge interest varies. A professionally oriented practitioner might seek quite particular knowledge, while a topics-based team might look for different perspectives. Some working with a locally motivated question could seek contextualised research, and another with a pragmatic outlook might want answers to specific, practical questions (Nutley 2007, pp. 186, 239). Some may need to expand their understanding of alternatives, while others look for clarification of choices in formulating policies (McNie et al. 2016, p. 884; Nutley 2007; Macduff & Netting 2000).

The oft-heard, broad criticism of academic research being too general, time-consuming, complex, and giving too contingent results to serve policy makers' practical needs (e.g. McNie et al. 2016, p. 884; Nutley 2007, p. 239) have also invited organisational solutions, such as the emergence of a collaboration professional, the 'knowledge broker' (Meyer 2010; Joas & Theobald 2013; Bornbaum et al. 2015; Leino et al. 2018). This title refers to people or organisations facilitating connections, mutual understanding, and knowledge transfer (i.e. the boundary work between the researchers and the practitioners). Brokering involves dialogical processes of explaining, coordinating, and aligning between different knowledge interests. It also includes gathering, summarising, and synthesising research results into an easily understandable form, as well as translating policy problems into researchable questions. Brokers can also support collaboration by

identifying opportunities for practitioners to get involved in a suitable and rewarding way (e.g. having some ownership of the collaboration). (Joas & Theobald 2013; Bornbaum et al. 2015.)

We suggest reserving the title of ‘knowledge broker’ for professionals, while using the term ‘pracademic competencies’ for the specific learned skills – as well as abilities, knowledge, and behaviours – required from a broad spectrum of actors to contribute in research collaboration (cf. Bird 1995). Previously, the term ‘pracademic’ has mostly been used about practitioners who have become academics – or the other way round – and are active in connecting scientific evidence to solving practical challenges, drawing on practical experience to strengthen theory building, or otherwise bridging theory and practice in education or professions (Posner 2009). Concerning research collaboration, the question is rather about suitable competencies to succeed in boundary work between science and practice (Rosbach 2012). At the individual level, this refers to the complementary set of skills discussed above. They all contribute to operating in the nexus between research and practice in a supportive, collegial partnership (Macduff & Netting 2008). The organisational competency, in turn, refers to “repeatable, learning-based and therefore non-random ability to sustain the coordinated deployment of assets and resources” (Freiling 2004, p. 30). In this case, it means the institutionalised practices that enable organisations to utilise research collaboration in achieving their goals.

3. Two urban research programmes

The theoretical framework is applied in an empirical analysis of collaboration between academic researchers and municipal practitioners in two Finnish research programmes focusing on urban issues: the Helsinki Metropolitan Region Urban Research Programme (henceforth HMR programme), active in 2009–2018, and the Turku Urban Research Programme (henceforth Turku programme), active from 2009 onwards. In both cases, the programme themes were drawn from the municipalities’ strategic aims and thematically covered all kinds of local development topics,

ranging from economic development policy to social well-being, and from sustainable development to good governance. Both mainly involved researchers from social sciences and the humanities. Studies were expected to be based on theoretical frameworks and leading to both academically relevant results and applicable information to the municipalities. Efforts were made to elicit policy advice through collaborative practices, which we will analyse in detail here. Both programmes stand out internationally as ambitious research-based city-university initiatives grounded in systemic knowledge sharing and collaboration in multi-actor networks.

The Finnish municipalities, especially the large cities, are strong actors in all kinds of local development issues. Their position is based on self-government with democratic decision-making and the right to levy taxes, but also broad responsibilities, including providing statutory basic services to their residents. The municipal management is divided into political and professional sides. The political decision-makers consider important that the preparatory texts are based on trustworthy information (Niiranen et al. 2013, p. 58). Most municipal officials consider researched information as relevant and factual, although their following of research is usually sporadic. In the decision-making process, the key persons are those who prepare the proposal texts for the decision-makers. Ideally, these key persons can form a functioning link to support the knowledge flow from the academic world and back – if they are willing to do so. Hence, a pracademic in this position can increase research impact considerably, whereas a practitioner with a hostile attitude to academic work or lacking competencies may block it (Niiranen et al. 2013; Askim 2007). Policy makers and practitioners with a high level of education or personal experience in research work are generally the ones most willing to apply research results, but overall willingness and attitudes vary between sectors and individuals (Nutley 2007, pp. 72–73).

In Helsinki Metropolitan Region, urban research collaboration has a long tradition. The City of Helsinki has had its own urban research unit since the 1980s, and pronounced university collaboration since the early 1990s. Helsinki and other municipalities involved in the initiative –

Espoo, Vantaa, and Lahti – have collaborated in funding academic urban research from 1999, when 15 new co-funded professorships specialising in urban research in various disciplines were established at the University of Helsinki and the Helsinki University of Technology (now Aalto University). The professorships had a coordinating office, held first by the research director of urban studies (resembling the knowledge brokerage idea), but later downgraded into a less demanding coordinator position. By the end of the 2000s, most professorships were converted into permanent positions funded by the universities themselves, and the municipal co-funding was shifted to research projects. This marked the start of the HMR programme in 2009 (Jaakola & Majander 2009). In addition to the HMR programme, the cities of Helsinki, Espoo, and Vantaa also had their own urban research and statistics offices all along. The HMR programme lasted until 2018, when it was replaced by the Helsinki Institute of Urban Studies established at the University of Helsinki (in co-operation with Aalto University) with collaborative funding from the same HMR municipalities.

In Turku, certain professors who had followed the developments of the HMR programme proposed a similar collaboration with the municipality. In 2008, the then-mayor acknowledged the opportunity and preparations began. The first programme document, which reported what sort of co-operation the municipality and the local universities had had and might have, was accepted in 2009, and a jointly appointed research director was recruited to lead and develop the programme. Turku had a small statistics office but, unlike the HMR municipalities, no in-house researchers. Urban research was quite widely represented at two local universities, yet in a marginal position within most disciplines aside from the geography and history departments. The new research programme marked a considerable shift in recognition of this specialisation and led to Turku being another multidisciplinary centre of urban research in Finland during the 2010s. The programme is currently in its third period (2019–2023).

The partners of the HMR programme were the University of Helsinki, Aalto University (2009–2014) and Hanken the Swedish Business School, together with eight universities of applied sciences, four municipalities (Helsinki, Espoo, Vantaa, and Lahti), and two ministries (Ministry of Environment and Ministry of Finance). Each partner was represented in the programme steering group, which made all the principal and operative decisions. The universities were represented by professors and the applied universities by leading teachers from the relevant fields, the municipalities by the heads of their research units or other people experienced in university collaboration, and the ministries by senior specialists in urban and regional policy. The programme had a full-time coordinator responsible for practical matters. Each funded research project had a steering group consisting of selected experts from each participating municipality. The HMR programme's annual budget was 850,000€ funded by the municipalities (50%) and the universities and applied universities (50%), each relative to their size. The ministries' role was limited to raising the status of the collaboration and improving uptake of the results in national urban policy.

The partners of the Turku programme were the City of Turku (municipality), the University of Turku, and Åbo Akademi University. In addition, the West-Finland Housing Association of Public Utility partnered in research funding competitions, supporting housing research. The programme had a high-profile steering group, including the mayor, the rectors of both universities, some leading officials from the municipality, and four university professors representing relevant fields. The research director assigned by the universities and the municipality together acted as the operational manager, whose tasks included those of a knowledge broker. Each funded project had either a steering group, consisting of select experts from the central and sector administrations, or an expert contact person in the case of small projects. The annual programme funding was 750,000€ in 2017 (the City of Turku's share being 67%) and 830,000€ in 2018 (the City of Turku's share being 58%).

4. Materials and methods

The research material was collected in external evaluations of the two urban research programmes, which were conducted by the authors of this paper in two separate evaluation processes (Ruoppila & Kalliomäki 2017; Airaksinen 2018). In both cases, these analyses focused on the functioning of the collaboration between researchers and practitioners, with the views of both sides being considered, yet emphasising knowledge transfer to the municipal side as crucial for the programmes' perceived benefit. The decision to analytically concentrate even more on the practitioners' side was made later for research purposes in response to the gap identified in the literature. The overall productivity of the programmes, including academic publications produced, was not analysed.

The HMR data was collected in 2017 (concerning the years 2015–2017) and the Turku data in 2018 (concerning the years 2015–2018). The latter Turku data collection was able to apply the HMR evaluation's framework and interview questions, which enabled the combination of anonymised materials later for research purposes. The core materials include interviews of academics and practitioners (10 in the HMR and 21 in Turku). In the HMR, data was also collected with open-ended questions sent by e-mail to all principal investigators (11 of 14 responded) and all research project steering group members (11 of 48 responded) of the projects running in 2015–2016. The already completed projects were chosen in order to reflect the experiences during all phases. The interviews, as well as the e-mailed questionnaires (in a limited manner), dealt with the parties and recurrence of interaction; practitioners' participation and roles in different phases of research projects; possibilities to influence the direction of research; the nature and scope of collaboration; and the type of knowledge exchanged and co-produced, as well as ways of disseminating research results. Furthermore, the benefits, challenges, and experienced value of research collaboration (at both the project and programme levels) were elaborated on, along with the relevance and applicability of research results in relation to practitioners' daily work. The

secondary data included the programme documents, research project reports, short research communications or briefings of the results, and other relevant policy documents.

The data was first analysed by utilising the principles of theory-driven content analysis by thematising data according to the three research phases presented by Mauser et al. (2013). Next, the analysis followed an abductive logic, iterating between empirical data and theoretical development (cf. Dubois & Gadde 2002). This was done mostly because of the data-driven insights concerning practitioners' competencies in research collaboration. Based on the practitioners' elaboration concerning their skills, we went back to the literature to search studies on what we call the pracademic competencies at both individual and organisational levels. Henceforth, we dug into what kinds of interaction and collaboration took place during the phases. All of the citations present the practitioners reflecting on the issues.¹

5. Productive interactions in the research programmes

5.1 Co-design

The joint framing of the research programme and its implementation principles constituted most of the co-design phase in both programmes. This work was primarily conducted in the programme steering boards, who met 2–4 times a year in both cases, discussed joint interests in developing knowledge, and made the decisions on how the programmes should be implemented. The programme steering boards were perceived as generally valuable instruments to promote continuous dialogue and commitment between academics and practitioners. The role of the board differed significantly in the two cases, however, with major consequences in collaboration practices.

¹ One of the authors, Sampo Ruoppila, acts as the research director, i.e. the knowledge broker in the Turku programme, which is why the other authors were primarily responsible for the empirical analysis.

In the multi-municipal HMR programme, the programme steering group became the central node of all the programme activity. It acted as the “collective brain” for the programme, as one of the interviewed members put it, although the relatively large size of the group (approx. 20) was considered a challenge for having discussions in which everyone engaged. A programme coordinator was employed full-time, but his role was rather that of an assistant. Knowledge brokerage duties were neither expected nor carried out. The programme was managed only by the steering group and lacked operative leadership that could have boosted or nourished productive interactions above the singular projects.

In the one-municipality Turku programme, the programme steering group had a broader directing role, compared with the HMR programme. An organisational innovation was the jointly appointed research director of urban studies, a knowledge broker whose core tasks were to facilitate, nudge, and nurture existing and new connections both at the programme and project levels, as well as act as an operating director of the programme. The interviewees considered this position as a stable “hinge” and a necessity for the programme’s functioning. The position was described as a translator of different knowledge interests, setting frames for and developing joint objectives and activities at the interface of member organisations. The role therefore brought together “the tasks of a mailman, a director and a bridge-builder”, as one interviewee put it. The broker duties included framing the dilemmas, posing questions requiring answers and thus guiding the work of various groups, and searching for versatile connections through which constantly growing and transforming network-like collaboration could unfold. The importance of direct interaction, including frequent physical presence at the municipal administration was highlighted, as the experience was that many ideas came up outside formal meetings or organised interaction. Yet, the importance of maintaining a neutral ‘university role’ with a certain distance to practical decision-making (to avoid political collision) was also emphasised.

The HMR programme comprised 10 themes, which related broadly to the city region's strategic aims and challenges, and reflected the cities' strategic objectives. These themes were applied in funding competitions for two-year projects. In addition, the projects were required to address 'metropolitan area specificity', which was considered to add practical relevance. In the HMR programme, the programme steering board also acted as the funding competitions' evaluation committee. An unwritten agreement was that each university and applied university should receive at least as much funding as they were allocating to the programme. This hampered fair competition based on the quality of proposals, and eventually it also called into question the programme's legitimacy (Ruoppila & Kalliomäki 2017). Apart from the competitions, the HMR programme funded only a few invited, tailored research projects through its years of operation, reflecting not a lack of needs but the lack of measures to convert them into projects. Even if the interviewed practitioners of the HMR programme's steering board were self-critical in terms of how much more they could have collected the interests and topical needs from their respective municipalities, professional support would have certainly helped.

The Turku programme's themes were based on the City of Turku's strategy. The programme document explained how the strategic aims could be transformed into research questions and that the programme focused on social and spatial change, as well as the municipality's options to influence the development. The explicit strategy connection was considered a strength in setting an understandable yet loose frame for research topics, but also a framework to identify project ownership within the administration. Since 2017, the funding competitions had focused on two-year projects, while previously in some years the competitions were held for one-year grants for PhD students and postdocs. The competition evaluation committees had been separately nominated each time, consisting of municipality and university representatives. Apart from the competitions, the Turku programme also funded 2–4 tailor-made

research projects yearly, based on the municipality's timely needs raised by experts directly to the knowledge broker and transformed into small research projects with his help.

Municipal representatives considered making themes for the funding calls as a useful measure to direct the research projects. Already at this point, the discussions on a wide range of research topics, including ones which would not have necessarily ended up on the practitioners' tables otherwise, broadened perspectives. Yet, in both programmes this involved demarcation issues. Especially in the HMR programme, making themes for the calls was considered a somewhat difficult task, which would have required specific analytical and communication skills. Interviewees referred to a lack of organisational "procurement competence" in terms of pointing to the identified informational gaps yet at the same time leaving enough room for academics to formulate the theory-based research questions. During Turku programme's first years, in the early 2010s, municipality representatives had argued for using quite specific themes whereas university representatives had argued for the usefulness of loose theming to allow freedom in formulating research questions, but also to get a good variety of proposals to choose from. After a couple of years of implementation, the municipality representatives had agreed that the latter was a best practice. Nonetheless, practical relevance was one of the stated project selection criteria in both programmes. Another discussed issue in the HMR programme was its broadness: many interviewed steering board members thought that the programme could have had more impact had they concentrated on fewer themes.

In both cases, the co-design was emphasised at the programme level, but the project steering groups – nominated separately for each funded project – also had some room to negotiate with the researchers. In principle, once the projects were selected, they were expected to follow their research plan. However, if there was dialogue on topical municipal information needs that could be met with some adjustments, many researchers agreed to do so. Both the researchers and the practitioners considered such dialogue rewarding, and slightly modified research settings or reporting with a certain contextualisation in mind were not exceptional outcomes. In the interviews,

the programme steering board members wished for the practitioners' ability to think broadly and strategically, in order to use the research collaboration as an opportunity to elaborate on different possibilities. Yet, this was not always the case. In some projects, especially in the HMR programme, the practitioners' interests were perceived to be somewhat narrow, focusing on some topical developments, and lacking the competence to benefit from broader information and form a connection with the practice. Even some of the municipality representatives in the HMR programme's steering board highlighted this as a hindrance of collaboration. In Turku, the formation of a new city strategy in 2014 and the application of its themes also in the research programme had supported perceptions of the strategy connection and relevance of the individual studies. On the other hand, in both programmes, many interviewees perceived their own increased competence in operating at the interface of science and practice as one of the collaboration benefits, and one that exceeded a single project's life cycle. Moreover, interviewees in both cases considered that the programmes had improved research-based collaboration between universities and municipalities as institutions beyond the programme itself, and contributed to shared views of the cities' future, leading even to joint strategic framing on other occasions.

One identified challenge was variation in the commitment of appointed individuals (municipal experts) to attend the project steering groups. The differences could probably be explained by their motivation, judgement, and comprehension of the value of research collaboration, as well as the role of the municipality in it. While it was understood that research projects can bring many kinds of beneficial insights, some projects were considered more relevant and thus got more attention than others. In the HMR programme, the disregarded projects included some which the practitioners considered purely researcher-driven and which had even been left without an active project steering group. In Turku, the research projects did not have this problem, but when the funding had been distributed as grants to individual PhD students and postdocs, some researchers doing more theoretical work had likewise been left without an active contact person in

the municipality. In these few cases, the gap between the knowledge interests was perceived as too wide to even give co-production a chance.

5.2 Co-production

While the research was conducted solely by the researchers, the term 'co-production' points to the collaboratively built understanding of its implications. This refers to the practical significance of the research results but also to researchers' increased understanding of practice affecting their theoretical work. This kind of iterative dialogue primarily took place in the project steering groups set up in both programmes. In the HMR programme, the project steering groups consisted of selected experts from each participating municipality; in Turku, there was only one municipality, and it usually combined experts from both central and sector administrations. Through these appointments, the research projects were connected with the municipalities' ongoing development initiatives: these were the people who acted as a bridge between the two, and the benefits depended on their ability and willingness to make use of it.

In both programmes, the project steering group work was characterised at best by active dialogue and mutually beneficial analytical discussions. However, the HMR programme also had a number of projects whose steering group meetings were considered one-sided sessions, with researchers informing municipal representatives about the proceedings. In the Turku programme, the experience was better. The collaboration was modelled, including short instructions delivered to all the steering group members, as well as the researchers, about the purpose and targets of the steering group work at different phases of the research project. Moreover, the research director participated in all the project steering group meetings and could encourage the dialogue, (re)formulating the interests and concerns for both parties to understand, discuss, and solve problems, if needed. Apart from follow-up, the steering groups had helped some researchers with data access within the municipal organisations.

A key aspect of boundary work in co-production was mutual sparring throughout the research project. Continuity of interaction and the importance of being open to learning new insights were emphasised by many interviewees. Moreover, gaining new information during the research process was considered even more useful than simply getting the results.

I think that you are also sensitive to receiving [insights] once you have thought about it [the topic and the viewpoint of the study] already in an early phase, ...you have opened your interest to it once you have already thought about it and made an effort [to familiarise yourself with it], and then you become interested in what it is that comes out of the process... (HMR programme)

Continuous interaction was considered important especially for iterative policy-making processes. Allocating the required time was crucial for gaining the potential benefits. In the HMR programme, the programme steering groups' impression was that the researchers were more willing to collaborate than the municipal employees – although they all could also name exceptions. Nevertheless, in both programmes, the municipal representatives valued the versatile expertise available through the project-based collaboration. Up-to-date knowledge on important phenomena was considered to help maintain the strategic outlook, while tailored research (more available in Turku) could more directly support policy preparation. Importantly, some practitioners who had been involved in several project steering groups had recognised improvement in their own collaboration skills (i.e. pracademic competencies), including negotiating project details iteratively, and consequently the considered relevance of the results.

We know better what we want, and know how to demand more. (Turku programme)

In Turku, where the programme had initiated systemic research collaboration, many felt that the roles of different actors – as well as understanding what kinds of insights the collaboration might provide – had become clearer over the years. The general impression was that practitioners had

become not only more receptive to academic research but also more reflective in their own practice. In turn, researchers had started to think of the city as their “laboratory”, a test-bed which was easy to approach with new ideas. In the eyes of the City of Turku’s top management, the Turku programme had become an integral part of the municipality’s strategic and knowledge-based management. Within both programmes, the collaborative relationships had “given a face” to academia and the municipal administration. The programmes had created diverse connections that helped people discover each other’s expertise and to share ideas and understanding. The institutionalised collaboration was viewed to be a result of enthusiasm and commitment.

What drives positive development: enthusiasm. It takes a surprisingly long time to get things settled. People have learnt to recognise the benefits. Studies are different, and there are a variety of ways to benefit. (Turku programme)

5.3 Co-dissemination of research results

Both programmes expected the researchers to publish in peer-reviewed outlets but also to write concisely in Finnish for practitioner audiences. The HMR programme published two compilations of executive summaries, one for each 5-year programme period. The Turku programme had its own online series, Research Briefings, where the projects were published one by one. Both programmes also organised events to present the results to expert audiences. Despite these efforts, external evaluations criticised both programmes for insufficient outreach, as broader recognition was viewed to be essential for their legitimacy and continuity. This aspect was clearly demonstrated in the Turku interviews: those who had followed the programme from a distance had the most critical views, while those who had been actively involved recognised a number of benefits. Both programmes had made efforts to widen the circle of those involved, especially with targeted seminars and participation in the project steering group work.

In the HMR programme, the programme steering board's leading role in dissemination turned into a somewhat hampering information gatekeeper role, where much depended on the representatives of each municipality, including their activeness, willingness, and capacity to encourage dialogue within their administration. In the interviews, one of the members defended this choice with the view that the organisations would have few persons with interest to follow the projects closely, ponder the practical implications, and disseminate the information selectively. In other words, they suggested that there would be few people with the required pracademic competencies. However, this viewpoint can be questioned by the success of Turku's decentralised model. The large and siloed municipal organisations of the Helsinki metropolitan region created an additional challenge to get the message through. In Turku, the oral dissemination efforts were decided by the project steering groups, who already comprised the key municipal experts in the field and were supported by the knowledge broker. They had no problems of access wherever they felt the results should be presented, and they could easily identify those who should be invited and could also personally pass the information along. But there too, the passing of information within the administrative sectors depended on how actively their representatives participated in the project steering group work. When presenting to live audiences, the most rewarding occasions were those with fruitful discussion and debate, revealing the municipalities' information needs, and at best initiating new research ideas and problem framings – in other words, the occasions in which a feedback loop to co-design was established.

In both programmes, the perceived applicability of the research results correlated with the strength of the dissemination efforts that the project steering group members on the municipal side were partaking in. As already pointed out, especially the HMR programme had the problem that recognising the value of more theoretical research was seen as depending on the “receiving end” (i.e. their competence in connecting the information to the municipalities' ongoing development efforts). Studies that tackled topics that did not have clear ownership in the city organisation were

another challenging category.² In Turku, the relevance of the results was actively discussed in the project steering groups. Nonetheless, how to actively elaborate the consecutive steps on the municipal side was identified as a problem in both programmes.

The interviewees agreed that municipalities should take more responsibility in encouraging dialogue on applicability within the projects but also within their own organisations, hence emphasising ‘co-dissemination’. Instead of traditional information dissemination, this activity is a continuity of co-production: a discussion of what the results could mean in terms of strategic targets, development choices, budget allocations, and ways of working. It involves active sparring on the usability of the research results. Yet, to achieve research impact requires continuing that effort on the practitioners’ side.

In the [sector’s] executive committee the leader asked if I meant that the project had failed. I said no, but perhaps people haven’t really made an effort to think how it should influence us. (Turku programme)

We [contact persons] shouldn’t just drop the results on the table and expect that they [other practitioners in city organisations] will check and use them. It is not enough. We need to talk about the results and get together to think about how they could be utilised and in what kind of circumstances... We need... to be able to think together how the results affect the municipality’s activities. (HMR programme)

The challenges that the interviewees could identify included a lack of competencies and incentives. Those who had been actively involved agreed that “the right people” were needed. In our terminology, those are the people with pracademic competencies: those able to think about and

² In the mid-2010s, the sharing economy was mentioned as an example of an undeniably important yet somewhat abstract theme that did not have clear ownership within a municipal organisation.

elaborate on connections between theoretical knowledge and practical developments, possessing the required analytical, inventive, and application skills. In addition, these people usually have relevant background knowledge, topical interest, and motivation to collaborate.

It is good that the theoretical framework is there, but before the produced information can be used in the city, we need people who can translate the results into the language of action.

This is probably the biggest problem in applying the results. (Turku programme)

For the municipalities, this meant that nominations of the project steering group were crucial. It was mentioned that some of the “best translators” had some background in research work. With their will and skills, the chances increased for the insights to travel to decision-making, while participating in the same steering groups could be an essential learning experience for their peers. Overall, the experiences certainly varied in both programmes, but if “just somebody” was nominated, the odds were not good. An interesting detail was that those interviewees who were critical of the limited applicability of the results seemed to expect readily formulated solutions or straightforward policy recommendations from researchers. In other words, they did not acknowledge their own part in the collaborative process. In Turku, where it was carried out, knowledge-brokering was highlighted as an additional supportive factor in collaboratively elaborating the practical significance of the results.

6. Discussion

This paper contributes to the ongoing debate on productive interactions in collaborative research by addressing especially the research users’ side, drawing the attention to the pracademic competencies required, and elaborating on the “blind spot” that these two imply in evaluation theory and practice. This stands in contrast with the majority of prior studies, which adapt to the prevailing evaluation methodologies’ relatively one-sided approach to societal impact evaluation and focus on the

researchers. The paper develops the recent suggestion by Sivertsen & Meijer (2020) that societal impact should rather be considered as “normal” interactive processes between researchers and practitioners, preferably rooted in organisational practices. This means actions aimed at creating, exchanging, and making use of new knowledge according to the purposes of those organisations, learning together from this process and improving it (Sivertsen & Meijer 2020, p. 68). Productive interactions are a two-way street, not only providing benefit to researchers from a contextual understanding, but also allowing practitioners to feed insights into theory-building or analytical choices (Muhonen et al. 2020).

To analyse (in-person, primary) productive interactions in two research programmes and the projects they comprise, we applied Mauser et al.’s (2013) phasing that differentiates between co-design, co-production, and co-dissemination. While the efforts in evaluating the societal impact of research are moving away from the linear presentations and models, the differentiation was utilised as an analytical tool to scrutinise the different phase-based practices along collaborative research processes. In reality, these phase-based practices are intertwined and fluctuate depending on the nature of individual research projects.

Instead of analysing who is more or less involved in each phase, or in what role, we contributed by identifying the boundary work – as we call the tackling of the demarcation between academic research and applying its results or insights in each phase – as well as iteration on its societal relevance. In co-design, there is concentration on joint framing of research themes and collaborative processes, in co-production sparring of a research project vis-à-vis its possible practical relevance, and in co-dissemination joint recognition of and reflection on the applicability of the results and identifying further impact pathways (see Muhonen et al. 2020) as well as research topics. Altogether, a key constituent of boundary work is mutual sparring throughout the research programme and its discrete research projects.

The scientific community should certainly remain responsible for the academic research, yet an iterative and reflective learning process is needed to consider the implications of research on practice – or the other way round. We agree with Morton (2015a, 2015b) on the important role of research users in creating an impact, but unlike her we underline the significance of what she calls ‘research uptake’ already when the research process is ongoing. We argue that in the context of strategic research programmes and the like, the phases of co-design, co-production, and co-dissemination should be understood as a continuum of involvement, which may contribute to an understanding of the research utilisation possibilities and ways to leverage societal impact. This finding has, in our view, to date lacked the attention it deserves in the discussion on productive interactions. Unsurprisingly, the opportunity to engage in boundary work enabling enlightening discussions on ideas and results was also considered valuable by researchers (see also Gorman 2010; Alvesson & Sandberg 2011).

To be sure, the above standpoint requires considering societal actor involvement as a substantial component, not a token activity in research collaboration (de Jong et al. 2016a). It also presumes practitioners’ favourable attitudes, which cannot be taken for granted (Nutley 2007; Fobe & Brans 2013), as seen in the troubles of the HMR programme revealed in this study. It also requires competencies to collaborate and the ability to anticipate or even imagine possible benefits, which, in turn, can influence the co-dissemination efforts. The introduced concept ‘pracademic competencies’ refers to the needed skills and abilities of practitioners to successfully operate in the science-society interface. The empirical analyses of the two urban research programmes showed how during the co-design phase such competencies involved recognition and communication of knowledge interests, and during the co-production phase understanding of knowledge formation and recognition of the relevancy and applicability of insights, with the latter also being emphasised during the co-dissemination phase.

Importantly, our analysis – especially regarding the Turku programme – highlights perceived learning of pracademic competencies not only at the individual level but also organisationally as a result of staff participation in systemised collaborative research processes. The results show how the top management thought that Turku had significantly developed the municipal organisation's capacity to utilise research collaboration in knowledge-based management and decision-making. It is an example of how iterative boundary work between academics and practitioners has increased the societal relevance of research. While the HMR programme had similar effects on individual practitioners' competences, the organisational-level effects were not emphasised, presumably because of the programme's detached position from the individual municipalities but also because most of the municipalities already had some practices of research collaboration in place. Under these circumstances, the programme steering board's grip became overwhelming. In the Turku programme, not only co-production but also co-dissemination was taken care by the project steering groups in a more decentralised manner. Another major factor was the organisational difference that the Turku programme applied the knowledge brokerage model (Meyer 2010; Joas & Theobald 2013) while the HMR programme did not. The results emphasise the importance of the knowledge broker in planning, establishing, negotiating, and strengthening collaboration, including establishing a system regarding organisational responsibilities (e.g. the roles of the programme steering board and the project steering groups), especially on the municipal side. The knowledge broker also acted as a programme level representative in the project steering groups, whose members were generally not connected to programme level activities. The main differences of the programmes are shown in Figure 1. The difference in their perceived success is reflected in the cancelling of the HMR programme after two terms (and replacing it with another kind of collaborative practice) and the continuation of the Turku one, now in its third term.

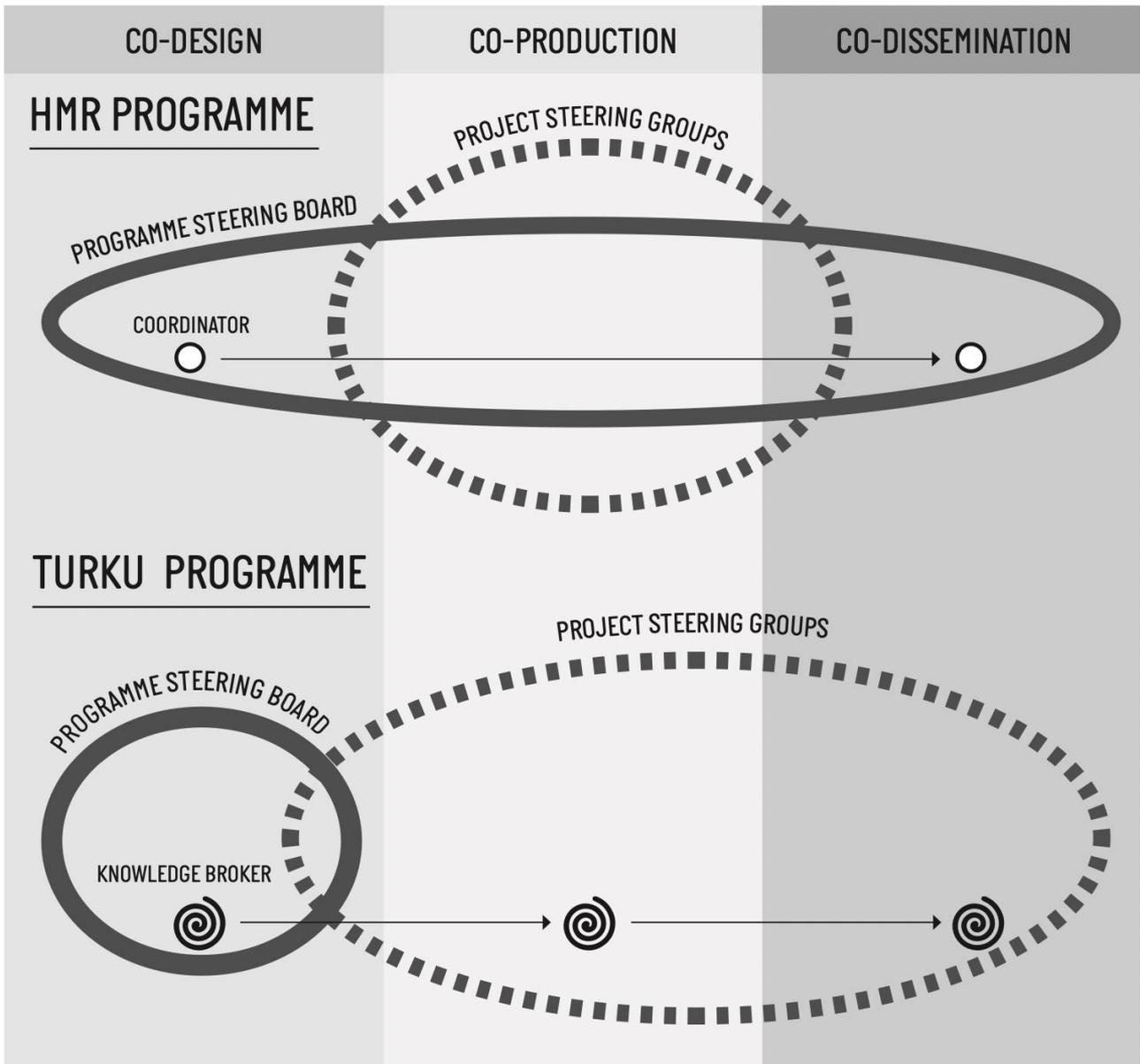


Figure 1. The main differences between the HMR and the Turku programmes.

As to the research policy and evaluation implications, coming back to Sivertsen and Meijer's (2020) recommendation to improve regular interaction, these results draw attention to the required efforts of the organisations on the practitioners' side, alongside those of the research organisations. We suggest employing funding and organisational models requiring regular interaction between the researchers and the practitioners. Neither of these are new measures, as they are regularly applied in strategic research programmes (e.g. Gross & Stauffacher 2014). The blind spot, however, concerns

the competencies of the practitioners involved, that is, the pracademic competencies. While most of these people have academic degrees, it is not necessarily enough for succeeding in roles that are crucial for research impact. There, additional measures are needed.

Active collaboration can be steered through research funding that accompanies set goals and evaluation requirements for interaction and learning between the researchers and the practitioners. The project steering groups are a common tool to address this matter, but there is great variety in their perceived role or functionality, both of which can be revised. Of the two programmes analysed, both applied steering group requirements, but the Turku practice also involved distributed instructions about the steering group work goals at different phases of a research project. This practice might be extended to include the evaluation of learning and competence development along the collaborative research process. Another possible organisational measure is implementation of the knowledge brokerage model, whether as an individual professional employed by the programme (as was the case in the Turku programme) or as an agency hired to carry out specific tasks. Respectively, evaluation of the results of the brokerage tasks and practices may follow. Our results confirm that knowledge brokerage may contribute significantly in supporting collaboration across two or more institutions with different purposes and also (at least partially) different knowledge interests. As to their implementation, we do not recommend full outsourcing, as the organisational pracademic competencies are gained only through commitment (i.e. the practitioners' involvement in all phases of the collaboration, even if facilitated by the broker).

Our research suggests that the research results are generally more likely to get applied if the practitioners have been involved early on in the collaborative process in iterative discussions regarding their relevance and applicability. However, this also requires their own further consideration of the implications and referring to the results within (and beyond) their organisations. This is a crucial matter for the productiveness of the interaction becoming fulfilled (Spaapen et al. 2012). Hence, the research policy question is how the practitioners can be supported

in collaboration, and how their learning, enforcing the impact, can be evaluated ex-ante or ex-post. Most important is how their pracademic competencies can be strengthened in dealing with the research projects. Should it be, for instance, voluntary continuing education provided by the research funders, the universities, or the research programmes for those involved, impact analysis included.

7. Conclusions

The aim of this paper was to contribute to the ongoing debates on societal impact by further developing both conceptual and operational analysis of productive interactions, scrutinising especially the practitioners' side in collaborative research settings. The full potential of the productive interactions concept has not been made use of, due to the prevailing impact evaluation perspective overemphasising the role of researchers in collaboration. We contribute to the debate by offering nuanced qualitative understanding through a theoretical framework focusing on phases, boundary work, and pracademic competencies related to productive interactions. Based on an empirical examination of two Finnish urban research programmes, we highlight the important role of research users for productive interactions, and argue that practitioners' competencies in leveraging societal impact – the pracademic competencies – need to be better addressed by policies seeking to support and evaluate the societal impact of research.

The results offer interesting insights for the wider international responsible research and innovation community on institutionalised collaboration to support and “normalise” (see Sivertsen & Meijer, 2020) productive interactions as part of everyday organisational processes, thus expanding the scope of competence building from research to the public policy domain. Sivertsen & Meijer (2020, p. 68) call for pronounced emphasis “on the real and normal organisational level interaction according to the aims and purposes on both sides”. Our paper has taken a step in this direction by broadening understanding of the practitioners' role in the process and showing the

value of institutionalised collaboration and organisational measures that contribute to the strengthening of pracademic competencies, leading to more efficient research utilisation. Future research should seek to obtain detailed understanding of the pracademic competencies needed and the appropriate research policy and evaluation measures to address them.

References

- Airaksinen, J. (2018) *Dialogia ja tiivistyvää yhteistyötä: Turun kaupunkitutkimusohjelman 2014-2017 arviointi*. Turun kaupunki, kaupunkitutkimusohjelma, tutkimusraportteja 2/2018.
- Alvesson, M., and Sandberg, J. (2011) 'Generating research questions through problematization', *Academy of Management Review*, 36: 247–271. <https://doi.org/10.5465/amr.2009.0188>.
- Annemans, M., and Heylighen, A. (2020) 'Productive interactions to exchange knowledge in healthcare building design', *Building research & information*. <https://doi.org/10.1080/09613218.2020.1749822>.
- Askim, J. (2007) 'How do politicians use performance information? An analysis of the Norwegian local government experience', *International Review of Administrative Sciences*, 73: 453–472. <https://doi.org/10.1177/0020852307081152>.
- Bird, B. (1995) 'Toward a theory of entrepreneurial competence. Advances in Entrepreneurship', *Firm Emergence and Growth*, 2: 51–72.
- Bornmann, L. (2013) 'What is societal impact of research and how can it be assessed? A literature survey', *Journal of the American Society for Information Science and Technology*, 64/ 2: 217–233. <https://doi.org/10.1002/asi.22803>.
- Bornbaum, C. C., Kornas, K., Peirson, L., and Rosella, L. C. (2015) 'Exploring the function and effectiveness of knowledge brokers as facilitators of knowledge translation in health-related settings: A systematic review and thematic analysis', *Implementation Science*, 10: 162.
- Boswell, C., and Smith, K. (2017) 'Rethinking policy 'impact': four models of research-policy relations', *Palgrave Communications*, 3: 44. <http://doi.org/10.1057/s41599-017-0042-z>.
- Cruz Rivera, S., Kyte, D.G., Aiyegbusi, O.L., Keeley, T.J., and Calvert, M.J. (2017) 'Assessing the impact of healthcare research: A systematic review of methodological frameworks', *PLoS Med*, 14/8: e1002370. <https://doi.org/10.1371/journal.pmed.1002370>.
- de Jong, S. P. L., Wardenaarc, T., and Horlingsd, E. (2016a) 'Exploring the promises of transdisciplinary research: A quantitative study of two climate research programmes', *Research Policy*, 45/7: 1397–1409. <https://doi.org/10.1016/j.respol.2016.04.008>.
- de Jong, S. P. L., Smit, J., and van Drooge, L. (2016b) 'Scientists' response to societal impact policies: A policy paradox', *Science and Public Policy*, 43/1: 102–114. <https://doi.org/10.1093/scipol/scv023>.
- Dubois, A., and Gadde, L. (2002) 'Systematic combining: An abductive approach to case research', *Journal of Business Research*, 55: 553–560. [https://doi.org/10.1016/S0148-2963\(00\)00195-8](https://doi.org/10.1016/S0148-2963(00)00195-8).

- Faraj, S., and Yan, A. (2009) 'Boundary work in knowledge teams', *Journal of Applied Psychology*, 94/3: 604–617. <https://doi.org/10.1037/a0014367>.
- Fobé, E., and Brans, M. (2013) 'Policy-oriented foresight as evidence for policy making: conditions of (mis)match', *Evidence & Policy*, 9/4: 473–492. <https://doi.org/10.1332/174426413X662789>.
- Freiling, J. (2004) 'A competence-based theory of the firm', *Management Revue*, 15/1: 27–52. <http://doi.org/10.5771/0935-9915-2004-1-27>.
- Gorman, M. E. (2010) *Trading zones and interactional expertise: creating new kinds of collaboration*. The MIT Press.
- Greenhalgh, T., Raftery, J., Hanney, S., and Glover, M. (2016) 'Research impact: a narrative review', *BMC Medicine*, 14: 78. <https://doi.org/10.1186/s12916-016-0620-8>.
- Gross, M., and Stauffacher, M. (2014) 'Transdisciplinary environmental science: problem-oriented projects and strategic research programs', *Interdisciplinary Science Reviews*, 39/4: 299–306. <http://doi.org/10.1179/0308018814Z.00000000093>.
- Gurran, N. (2018) 'Public cities, public scholars? Questioning urban policy and research in Australia', *Urban Policy and Research*, 36/1: 1–10. <http://doi.org/10.1080/08111146.2017.1347499>.
- Higher Education Funding Council for England (2014) *REF Impact*. <http://www.hefce.ac.uk/rsrch/REFImpact/>.
- Hill, S. (2016) 'Assessing (for) impact: future assessment of the societal impact of research', *Palgrave Communications*, 2: 16073.
- Hoysä, M. (2013) Where science meets its use: exploring the emergence of the practical relevance of scientific knowledge in the regional context. *Publications of Turku School of Economics, Series A*.
- Iorio, R., Labory, S., and Rentocchini, F. (2017) 'The importance of pro-social behavior for the breadth and depth of knowledge transfer activities: an analysis of Italian academic scientists', *Research Policy*, 46: 497–509. <https://doi.org/10.1016/j.respol.2016.12.003>.
- Jaakola, A., and Majander, H. (2009) 'Under preparation: urban research and collaboration programme to support metropolitan development', *Helsinki Quarterly*, 4/09: 42–44.
- Joas, M., Theobald, K., Garzillo, C., Kuhn, S., and McGuinness, D. (2013; eds) *Informed cities making research work for local sustainability*. Routledge/Earthscan.
- Joas, M., and Theobald, K. (2013) 'Understanding knowledge brokerage for urban sustainability'. In: Joas, M., Theobald, K., McGuinness, D., Garzillo, C., and Kuhn, S. (eds) *Informed cities: making research work for local sustainability*, pp. 1–19. Routledge/Earthscan.
- Laing, M., and Wallis, P. J. (2016) 'Scientists versus policy-makers: building capacity for productive interactions across boundaries in the urban water sector', *Environmental Science & Policy*, 66: 23–30. <https://doi.org/10.1016/j.envsci.2016.08.001>.
- Leino, H., Santaoja, M., and Laine, M. (2018) 'Researchers as knowledge brokers: translating knowledge or co-producing legitimacy? An urban infill case from Finland', *International Planning Studies*, 23/2: 119–129, <http://doi.org/10.1080/13563475.2017.1345301>.
- Macduff, N., and Netting, E. F. (2000) 'Lessons learned from a practitioner-academician collaboration', *Nonprofit and Voluntary Sector Quarterly*, 29/1: 46–60. <http://doi.org/10.1177/0899764000291004>.

- Mauser, W., Klepper, G., Rice, M., Schmalzbauer, B.S., Hackmann, H., Leemans, R., and Moore, H. (2013) 'Transdisciplinary global change research: the co-creation of knowledge for sustainability', *Current Opinion in Environmental Sustainability*, 5: 420–431. <https://doi.org/10.1016/j.cosust.2013.07.001>.
- McNie, E. C., Parris, A., and Sarewitz, D. (2016) 'Improving the public value of science: a typology to inform discussion, design and implementation of research', *Research Policy*, 45: 884–895. <https://doi.org/10.1016/j.respol.2016.01.004>.
- Meyer, M. (2010) 'The rise of knowledge broker', *Science Communication*, 32/1: 118–127. <https://doi.org/10.1177%2F1075547009359797>.
- Molas-Gallart, J., and Tang, P. (2011) 'Tracing “productive interactions” to identify social impacts: an example from the social sciences', *Research Evaluation*, 20/3: 219–226. <https://doi.org/10.3152/095820211X12941371876706>.
- Morton, S. (2015a) 'Progressing research impact assessment: a ‘contributions’ approach', *Research Evaluation*, 24: 405–419. <https://doi.org/10.1093/reseval/rvv016>.
- Morton, S. (2015b) 'Creating research impact: the roles of research users in interactive research mobilisation', *Evidence & Policy*, 11/1: 35–55. <https://doi.org/10.1332/174426514X13976529631798>.
- Muhonen, R., Benneworth, P., and Olmos-Peñuela, J. (2020) 'From productive interactions to impact pathways: Understanding the key dimensions in developing SSH research societal impact', *Research Evaluation*, 29/1: 34–47. <http://doi.org/10.1093/reseval/rvz003>.
- Nutley, S. M., Walter, I., and Davies, H. T. O. (2007) *Using evidence: how research can inform public services*. Bristol University Press, Policy Press.
- Niiranen, V., Joensuu, M., and Martikainen, M. (2013) Millä tiedolla kuntia johdetaan? *Kunnallisan kehittämissäätiön Tutkimusjulkaisu-sarjan julkaisu nro 74*. Vammalan Kirjapaino Oy, Sastamala.
- Ozanne, J. L., Davis, B., Murray, J. B., Grier, S., Benmecheddal, A., Downey, H., Ekpo, A. E., Garnier, M., Hietanen, J., LeGall-Ely, M., Seregina, A., Thomas, K. D., and Veer, E. (2017) 'Assessing the societal impact of research: the relational engagement approach', *Journal of Public Policy & Marketing*, 36/1: 1–14. <https://doi.org/10.1509%2Fjppm.14.121>.
- Posner, P. L. (2009) 'The pracademic: an agenda for re-engaging practitioners and academics', *Public Budgeting & Finance*, 29: 12–26. <https://doi.org/10.1111/j.1540-5850.2009.00921.x>.
- Ramadier, T. (2004) 'Transdisciplinarity and its challenges: the case of urban studies', *Futures*, 36: 423–439. <https://doi.org/10.1016/j.futures.2003.10.009>.
- Rau, H., Goggins, G., and Fahy, F. (2018) 'From invisibility to impact: recognising the scientific and societal relevance of interdisciplinary sustainability research', *Research Policy*, 47/1: 266–27. <https://doi.org/10.1016/j.respol.2017.11.005>.
- Rosbach, D. (2012) 'Building a transdisciplinary trading zone', *International Journal of Science in Society*, 3/3: 17–29.
- Ruoppila, S., and Kalliomäki, H. (2017) *Kaupunkitutkimus metropolialueella tutkimus- ja yhteistyöohjelman (Katumetro) arviointi*. Helsinki: Katumetro.
- Sivertsen, G., and Meijer, I. (2020) 'Normal versus extraordinary societal impact: how to understand, evaluate, and improve research activities in their relations to society?', *Research Evaluation*, 29/1: 66–70. <https://doi.org/10.1093/reseval/rvz032>.

Shelley-Egan, C., Gjefsen, M. D., and Nydal, R. (2020) ‘Consolidating RRI and open science: understanding the potential for transformative change’, *Life Sciences, Society and Policy*, 16: 7. <https://doi.org/10.1186/s40504-020-00103-5>.

Spaapen, J., and van Drooge, L. (2011) ‘Introducing “productive interactions” in social impact assessment’, *Research Evaluation*, 20/3: 211–218. <https://doi.org/10.3152/095820211X12941371876742>.

Spaapen, J., van Drooge, L., Propp, T., van der Meulen, B., Shinn, T., and Marcovich, A. (2012) SIAMPI final report. Social impact assessment methods for research and funding instruments through the study of productive interactions between science and society. http://www.siampi.eu/Content/SIAMPI_Final%20report.pdf

Velter, M. G. E., Bitzer, V., Bocken, N. M. P., and Kemp, R. (2020) ‘Sustainable business model innovation: the role of boundary work for multi-stakeholder alignment’, *Journal of Cleaner Production*, 247: 119497. <https://doi.org/10.1016/j.jclepro.2019.119497>.

Weiss, C. H. (1979) ‘The many meanings of research utilization’, *Public Administration Review*, 39/5: 426–431. <https://doi.org/10.2307/3109916>.

Wooding, S., Nason, E., Klautzer, L., Rubin, J., Hanney, S., and Grant, J. (2007) *Policy and practice impacts of research funded by the economic and social research council: a case study of the future of work programme, approach and analysis*. Report prepared for the ESRC. Santa Monica, CA: Rand Corporation.