DIMENSIONS OF PROXIMITY IN STAKEHOLDER CHOICE REFLECTED IN THE CREATION OF KNOWLEDGE-BASED INNOVATION ECOSYSTEM PARTNERSHIPS

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ABSTRACT

In order to better understand the stakeholder choices of knowledge-based organisational actors, this study focuses on a novel application of Huber's (2012) dimensions of proximity salience, namely spatial proximity, social proximity and cognitive proximity. The population of the study is made up of knowledge-based organisational actors involved in developing an innovation ecosystem, in terms of stakeholder network creation. The extent to which the three proximity dimensions of stakeholder salience is evident in the stakeholder choices of these innovation-focused actors seeking knowledge-based collaborators is explored. Our findings show how various forms of proximity prompt the decision of who to work with among a diverse population of experts involved in building a cross-national innovation ecosystem. The various explanations that motivate stakeholder choice matched Huber's proximity dimensions. The findings provide new insight into stakeholder choice among knowledge-based organisations, and highlight a new proximity dimension indirectly linked to cognition proximity. Termed the "potential proximity" dimension, it involves attraction to stakeholders that represent strategic value.

Keywords: Stakeholders, Knowledge-based, Innovation, Case study, Teamwork

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1 INTRODUCTION

With company performance increasingly reliant on interactions with collaborators and network position (Koch and Windsperger, 2017), innovation and development become networked endeavours (Nambisan et al., 2017). In the past two decades, these partnerships have shifted from an emphasis on physical resources to knowledge-based resources (Powell and Snellman, 2004; Asher, Mahoney, and Mahoney, 2005). A widespread outcome of this change has been a reliance on joint value creation built around interdependent stakeholder relationships (Bridouz and Stoelhorst, 2016). Successful innovation is grounded in understanding how decision-making by different actors influences the process, and how this can support innovative processes and thinking (Cantamessa,. Cascini and Montagna,. 2012).

As collaboration in innovation ecosystems continues to evolve into new applications of diverse business models and collaborative methods, the ways in which stakeholders are chosen continues to be central to understanding the origin of knowledge-based partnerships. Here, understanding how knowledge-based organisational actors come together to innovate is fundamental in determining what kinds of preconditions or priorities might be valuable in facilitating stakeholder relationships - and hence, designing effective collaborative networks for innovation. Overlap in expertise, experience, collaboration expectations and past stakeholder relationships all come into play in framing the human elements of partnership creation.

In order to better understand the stakeholder choices of knowledge-based organisational actors for innovation networks, we apply theoretical iterations of Mitchell et al.'s (1997) pivotal work on stakeholder salience. More specifically, we focus on a novel application of Huber's (2012) dimensions of proximity salience, namely spatial proximity, social proximity and cognitive proximity, to organisational actors' accounts of significant factors involved in determining collaborative partnerships. In doing so, our findings show how various forms of proximity facilitate the decision of who to work with among a diverse population of experts involved in building a cross-national innovation ecosystem, which in turn highlights new dynamics of how organisations come together to innovate. Furthermore, our findings highlight a novel parallel proximity dimension that may help to counteract the innovation risks involved with excessive proximity. The emergence of an additional proximity dimension provides a strategic lens through which the formation of innovation teams can be understood. The findings are relevant to both innovation researchers as well as innovation team managers and team leaders.

2 LITERATURE REVIEW

2.1 Choosing collaborative partners for cross-organizational innovation: dimensions of stakeholder salience

Stakeholder theory, a broad umbrella covering the approach of this study, is primarily concerned with the nuances of the relationship between the organisational actor and their collaborative partners, or stakeholders. At the core of this approach are the effects of these relationships in terms of outcomes or processes for the organisational actor(s) and their stakeholders (Driscoll et al., 2004). In this article, we adhere to the commonly used definition of stakeholders as individuals, groups or organisations that influence or are influenced by the organisational activities of the source actor. Appropriate identification and accurate assessment of such stakeholders to match organisational priorities is a key process for decision makers (Jawahar and McLaughlin, 2001; Neville et al., 2011).

Mitchell et al.'s work on stakeholder salience (1997) remains one of the most significant contributions in the development of stakeholder research (Neville et al., 2011). Who or what really matters to stakeholders from the perspective of leadership decision making was a core concern in their research, with three core attributes emerging in determining stakeholder value: (1) the ability to influence the organisation through power, (2) the perceived legitimacy of the relationship between the organisation and the stakeholder, and (3) the urgency of the stakeholder's contribution to the organisation in a strategic sense (Mitchell et al,. 1997). The salience of the link between stakeholder and organisation is positively related with how many of these three characteristics are present (Mitchell et al., 1997;

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Driscoll et al., 2004). However, legitimacy has been seen as particularly vague and in need of reassessment as an attribute, with contrasting views of legitimacy - on one hand, practical assessments of the stakeholder tie as an instrumental mechanism, and on the other, relationally driven views more concerned with normative considerations (Driscoll et al., 2004).

2.2 Proximity as a defining characteristic of stakeholder salience in knowledge-based partnerships

While helpful concepts to assess stakeholder relationships, the comprehensiveness of the three salience attributes of influence, legitimacy and urgency in capturing the full value of relationships has been questioned (Neville et al., 2011). Here, Driscoll and Starik's (2004) expansion of Michell et al.'s (1997) work lends itself to a more networked view of stakeholder salience by introducing a fourth salience attribute to the relation dimension: proximity: In their research, they put forth that being proximate in terms of being nearby, accessible for short-term cooperation and sharing concrete interfacing will translate to sought-after salience.

This salience through proximity is closely linked to the degree to which stakeholders are embedded in the priorities, processes or goals of the organisation, and remains understudied (Tashman and Raelin, 2013; Lähdesmäki et al., 2019; Mitchell et al., 2011). Proximity here can be expressed in several ways, from physical proximity to proximity in ideas, action, industry approaches or expertise, for example (Bansal and Roth, 2000). Furthermore, organisations sharing stakeholders with collaborative overlap also share a stakeholder proximity; this proximity dimension can play a significant role in stakeholder selection and interaction where greater proximity tends to lead to a higher likelihood of stakeholder relationship development (Lähdesmäki et al., 2019).

Huber (2012) categorises the various types of proximity into three forms. First, spatial proximity has been used in research on the stakeholder effects of shared physical accessibility with the implication that being nearby leads to greater collaboration. Second, social proximity refers to the strength of interpersonal ties between the organisation and the stakeholder where a stronger social tie through shared experiences or values, for example, tends to foster trust and valued knowledge-based collaboration (Gertler, 2004). Third, cognitive proximity refers to shared practical understanding, and expertise, for example, represents a position of shared cognition as a precognition of effective communication and knowledge transfer (Wyuts et al., 2005).

Huber (2012) puts forth that some form of proximity is a necessary precondition of successful knowledge-based stakeholder partnerships. Yet too much proximity can be detrimental for innovation, especially in the case of cognitive proximity (Huber, 2012; Boschma and Frenken, 2010; Nooteboom et al., 2007). As such, more nuance is called for in examining how stakeholder salience and proximity in particular influences organisational responses to stakeholder choice (Neville et al., 2011; Lähdesmäki et al., 2019). In light of the call for more research on 1) nuanced approaches to understanding stakeholder choice linked to stakeholder salience dimensions, 2) proximity as a relevant dimension of stakeholder salience and 3) the types of proximity relevant in knowledge-based stakeholder choices, the current study seeks to answer the following research question: *To what extent are the three proximity dimensions of stakeholder salience evident in the stakeholder choices of innovation-focused actors seeking knowledge-based collaborators?*

3 METHODOLOGY

The ATTRACT[1] initiative focuses on an open science and open innovation paradigm, and aims to realise innovative products, services and systems from sensing and imaging technologies. Central to the initiative's mission is the formation of knowledge sharing partnerships across consortia 'forging links' between stakeholder from academia, research infrastructures (RIs) and industry (ATTRACT, 2021) to "jointly pursue and generate breakthrough innovation in close and equal partnership" (Pennings, Tello and Nordberg, 2017, p 4). The current study examines a pool of ATTRACT funded consortia based on interviews with project coordinators. In Phase 1 of ATTRACT, 170 projects with

1 https://attract-eu.com/

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breakthrough technology potential had been selected and funded from across Europe. These funded initiatives and organisations were then able to evolve their consortia and apply for a second round of funding. Eighteen projects were selected for further funding to support the continuation of technology development toward more market ready products or product prototypes. The current study examines these Phase 2 projects, examining the innovation consortia formation and composition.

3.1 Case study: ATTRACT Phase 2 consortia

An invitation to participate in the study was extended to all project coordinators. Participation was voluntary and from the 18 funded projects, 13 coordinators accepted the invitation[2]. The project sample of 13 consortia represented a range of consortia sizes, from two to nine organisations per consortia. Figure 1 details the number and types of organisations included in these consortia. The diverse organisation types represent the need for a range of skills, knowledge, and ability in order to develop the breakthrough technologies and their applications. Diverse organisation consortia allow all member organisations to contribute in line with their speciality to the joint innovation endeavour. To ensure anonymity of both the project coordinators and the projects, project pseudonyms were allocated based on the Greek alphabet.[3]

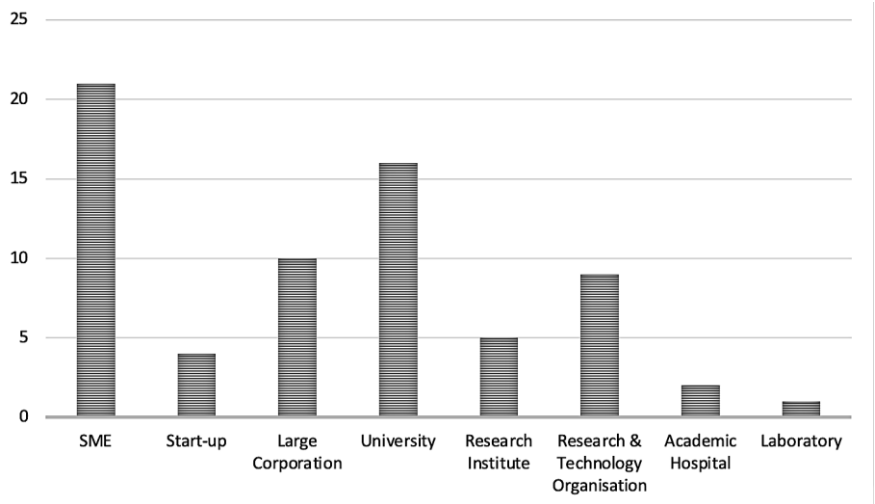

Figure 1. Organisation type[4] represented in ATTRACT phase 2

3.2 Data collection

Data were collected through a set of interviews (n=13) with project coordinators, once informed consent had been obtained and the nature of data usage explained. The average length of each interview was 46 minutes. The sample represented coordinators based in a wide range of represented organisations. This is critical as the role and contribution of each organisation type within the consortia may differ. The semi-structured interview consisted of open-ended questions prompting participants to reflect on their project progress to date, their various project partners and how they came to be part of the final consortium as well their past experiences when trying to push for innovative ways of working.

Participants were assured that they would not need to disclose any proprietary details of breakthrough technologies being developed. The audio recordings were transcribed for subsequent data analysis. For enhanced researcher understanding of the interview context, project descriptions on institutional webpages and project summaries published by the initiative were also reviewed. The final units of

[2] Consortiums were active within the following areas: healthcare imaging systems, environmental monitoring and improvement of quality of life, augmented reality systems for healthcare, optical systems for visible light, highly efficient photon detection, quantum information technologies, and breakthrough point of care detection systems for healthcare.
[3] Alpha, Beta, Gamma, Delta, Epsilon, Zeta, Eta, Theta, Iota, Kappa, Lambda, Mu, Nu
[4] The organisational types were aligned to those used by coordinators during the original funding call.

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observation were the self-reported perceptions of consortium coordinators regarding the identification, selection and eventual inclusion of stakeholders within the context of knowledge-driven collaboration.

3.3 Data analysis

The study utilised Huber's (2012) dimensions of proximity as a thematic guide and also highlighted instances of proximal relationships that fell outside spacial, social and cognitive dimensions. A Qualitative Data Analysis (QDA) process of coding and categorising was carried out in order to facilitate descriptive and interpretive approaches (Chenail 2012) while allowing for the acknowledgement of different perspectives (Streubert and Carpenter, 1995).

Using the proximity dimensions, data were coded in-vivo to retain the voice of participants. Following the initial categorisation of findings according to the dimensions, each dimension was open coded to identify nuances that informed the formation of consortia focused on knowledge-driven collaboration. The process revealed the extent to which the three proximity dimensions were evident in the formation of a knowledge-based consortium. An example showing the code progression is included as Table 2.

Table 2: Coding sample for Huber's (2012) social proximity dimension

Social Proximity Dimension	**In Vivo Code from transcript**	**Coding for qualities of collaboration**
Stronger social ties can cultivate trust and contribute to meaningful knowledge-based collaboration (Gertler 2004)	"But with these guys, it was natural. We started with one small project, then the second one. It was easy for me to work with them so I kept collaborating with them." Zeta	Amicable relationships support extended knowledge-based collaboration.
	"It was very natural the collaboration, because we were already in the same mindset, and that's difficult to find." Alpha	Shared frames of mind support extended knowledge-based collaboration.
	"…it created a network of commitment, which is something stronger than being bound. We were, say, in phase, we were working together to get the maximum amount of the project." Lambda	Commitment supports high performance during knowledge-based collaboration.

4 RESULTS

4.1 Spatial proximity

Spatial proximity was identified by many interviewees (n=9) as contributing to collaboration and the sharing of knowledge across the partners. These instances (n=7) reflect interviewees' desire to be in proximity to stakeholders during knowledge-sharing activities or co-creation:

> And we have to try to keep contact not only remotely, but if you can do some meetings, I think that would be very useful as well, because when you meet personally, things are much easier to discuss and to understand and to avoid misunderstandings. (Delta)

In a few (n=2) instances, spatial proximity to a potential stakeholder was noted as an incentive to invite them to join the consortia. In both instances the potential new stakeholders were academic institutions. In one instance, the organisation was a start-up company exploring collaboration opportunities with the university at which the company was based. In the second, the potential stakeholder was an academic hospital associated with the same university as the coordinating research group.

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> I'm very lucky for the fact that our university also has a university hospital… So, it was very easy for me to get in contact with people doing that. (Nu)

4.2 Social proximity

Social proximity was noted (n=9) as critical for active collaboration and the emergence of longer-term collaborations, often transcending a single project. Within the complex context of innovation-based knowledge-sharing partnerships, longer-term relationships were noted (n=3) as being grounded in a proven ability to deliver and commitment to continued performance:

> … the requirements from the industry anyway forces you to think about new solutions, to propose something that is able to solve the problems of the company. And on the other side, I think in a long term collaboration, the company really trusts you. I mean they know that we as an institute are reliable. We are able to answer in a defined time, because this is very important in my opinion. (Gamma)

Social connections and successful knowledge-sharing activities can evolve beyond just a collaboration to a relationship grounded in trust and commitment (n=5). Amicable relationships and shared frames of mind supported extended collaboration. This way of interacting was seen to support team performance, project delivery and the formation of longer-term knowledge sharing commitments:

> …it created a network of commitment, which is something stronger than being bound. We were, say, in phase, we were working together to get the maximum amount of the project. (Lambda)

> We're just very compatible, when it comes to motivation and ambition and passion for things that we think are cool science, cool technology. (Iota)

The evolution of knowledge sharing relationships were highlighted in the findings. Relationship building may begin with smaller commitments and grow into larger and longer collaborations. Once established the working relation may lead to a sense of trust among partners. Opportunities to continue the collaboration may, however, be dependent on the stakeholders ability to present a competitive advantage:

> We started with one small project, then the second one. It was easy for me to work with them so I kept collaborating with them. (Zeta)

> Having an already established collaboration between individuals of several organisations helps because you already broke the ice and you have a relationship, which is hopefully full of trust. (Beta)

> There are existing relationships, but we wanna make sure that they are the best option. So, even though we have a good feeling for many of them, and a good relationship with many of them, uh, we're really exploring what the other opportunities are and talking basically to everybody before we make such an important decision. (Iota)

Coordinators noted that they would be willing to collaborate with an unknown stakeholder if the stakeholder was perceived as having a successful collaborative relationship with an organisation the coordinator trusts or have successfully collaborated with in the past. This presented an opportunity for stakeholders to leverage existing knowledge sharing collaboration and working relationships to expand their current and future networks.

4.3 Cognitive proximity

Complementary expertise was viewed as an enabler for collaboration and knowledge sharing (n=8). Interviewees expressed that shared expertise contributes to a natural 'flow' during collaboration. Shared expertise was also noted as a gateway to identifying, and possibly initiating, collaboration with new and associated stakeholders.

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> So their background knowledge complements a lot of what we do in the research lab. And you know, again this makes things flow naturally… I think we sort of liked each other scientifically speaking. (Alpha)

> I didn't know more specifically the guys that are working with us, but I knew that they actually had a previous project on [related technology]. I knocked at the door. I was introduced by the people I knew. We had a couple of days' discussion and then they said, okay, we are onboard… Everybody knew that they were contributing to the development, and everybody felt that his skills were complementary to others. (Lambda)

Although overwhelmingly noted as an enabler, shared expertise may also contribute to complications during collaboration. Shared expertise may result in potential conflicts should knowledge sharing yield different perspectives or focus areas within the consortium. If these conflicting perspectives emerge prior to the concretization of working relationships, they may hinder formal collaboration.

> I would say that it felt like a good fit because we really had compatible technologies… so it was a good match, and it wasn't that complicated. It kind of made sense. With some of the other groups that we tried to contact it was much more complicated because we had a technology we wanted to push and they had their technology they wanted to push, and we had to try to find common ground, and it wasn't always easy. (Eta)

4.4 Proximity beyond the established dimensions

Many interviewees (n=6) alluded to a willingness to engage with new stakeholders, with no connection to them directly or via existing collaborative relationships with other organisations or individuals. In these instances, a shared expertise was not present. Rather, the potential collaborator here represents a key knowledge domain that has been identified as potentially essential to successfully complete the project or required task, which is outside of the knowledge domains represented among existing project partners.

> We need their expertise and to collaborate with them once we have our first prototype, fabricated out of the project… But we think it's important to start to build a connection right now. (Iota)

> So, what we need are strategic partners that will step on board… and it would be nice if they already knew they believed in us, and they believe in the project… (Epsilon)

The key knowledge domains identified range from complementary technological knowledge to knowledge of implementation, commercialisation, and final use-case testing. Use-case partnerships here presented a facilitated opportunity to collaborate with potential end-users toward co-creating valuable insights that informed subsequent development.

5 DISCUSSION

This article presents a novel application of dimensions of proximity to the accounts of stakeholder choice among a variety of organisational actors involved in creating a knowledge-based innovation ecosystem. Identifying types of stakeholders, and understanding their expectations, can traditionally be challenging when mapping possible stakeholders (Jepsen and Eskerod, 2009). The findings provide new insight into stakeholder choice among knowledge-based organisations and highlight a new proximity dimension indirectly linked to cognition proximity that may highlight the value of methods-based expertise, for example. Our new insights provide the basis for an additional proximity dimension to expand on the three dimensions of Huber (2012), titled potential proximity, illustrated in Figure 2.

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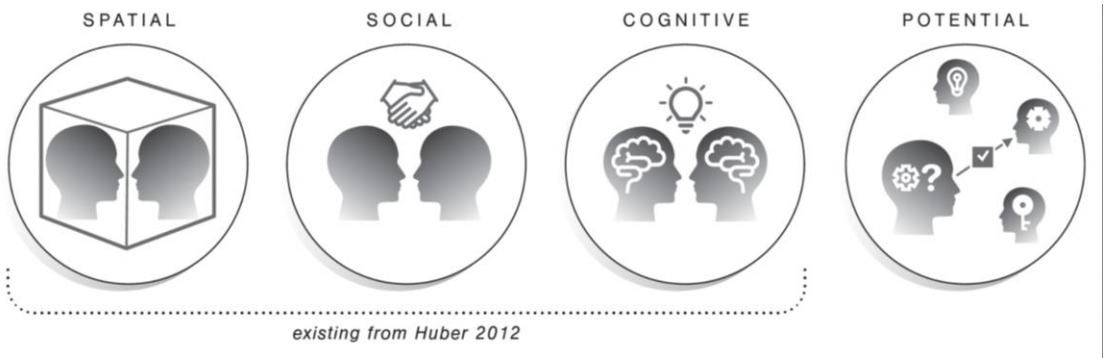

Figure 2. Four types of proximity dimensions in stakeholder selection in innovation consortia

Of Huber's (2012) three dimensions of proximity, spatial proximity was least evident in the data, and did not play a significant role in the formation of the innovation ecosystem compared to the social and cognitive dimensions. Notably, the effects of COVID19 may very well have skewed choices away from spatial considerations.

In terms of the social proximity dimension, networked trust emerged as a key factor. Given that participants were involved in creating a multinational innovation ecosystem, knowledge of working relationships between an unknown potential stakeholder and a trusted stakeholder could create a willingness to develop a new collaborative partnership with the unknown actor. It may be that the ecosystem of the population of the present study is particularly relationally driven regarding stakeholder choice, given that the network being created was broad and dynamic in terms of created partnerships and potential networked connections. Notably, network commitment was seen to inspire collaboration more than the shared responsibility in ensuring project deliverables, which seems to highlight a prioritisation of social bonds with the wider network.

The cognitive proximity dimension was particularly prevalent in our findings with complementary expertise giving rise to trust, shared motivation and giving way to relational potential. Given the knowledge-based nature of the participants' collaborative actions, the cognitive dimension's role in stakeholder choice is unsurprising. However, several cases, despite containing expertise as a defining factor, did not fit neatly into this cognitive proximity dimension as the expertise was not shared.

Our fourth dimension of proximity, the "potential proximity" dimension, is built around new areas of specialised knowledge bringing strategic value to the organisational actor while being disconnected from the existing stakeholder network and spatial proximity. The perception of potential stakeholders' expertise as essential and thus desirable is also in line with Mitchell et al.'s (1997) original urgency stakeholder salience category, where emphasis is placed on the degree to which a stakeholder's contribution fills an urgent organisational need. However, in the case of potential proximity here, the stakeholder's expertise and related contribution is unrealized. Rather, this dimension represents a wish list of sorts based on potential stakeholder contributions stemming from novel expertise and as such the stakeholder does not yet have any leverage over the organisation based on withholding needed action. Interestingly, this potential proximity category might well counteract the very real risk of a "proximity paradox" (Boschma and Frenken, 2010) where innovation is hindered by excessive proximity, especially in the cognitive dimension (Huber, 2012; Nooteboom et al., 2007). Furthermore, this dimension may be closely linked to process- or methods-based stakeholder contributions such as design, where stakeholder legitimacy is linked to potential outcomes based on trust of methodological capability whose unique applications cannot yet be known.

Taken together, the present findings provide a new categorisation of stakeholder proximity dimensions relevant to knowledge-based stakeholder choices. They also highlight the role of otherwise disconnected potential proximity that may well counteract the risks of excessive proximity while setting the stage for more established dimensions of proximity once partnerships are created. This study provides a novel dimension, which connects the characteristic of having unique or specialised knowledge, such as established methods that can be applied to unique challenges toward opaque but valued outcomes, as a factor impacting innovation team formation. The need for a detailed

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understanding of the possible dimensions that impact knowledge-based networks is rooted in the competitive nature of innovation endeavours. Findings are relevant to both those who study innovation stakeholder management and network formation, as well as those in the process of forming knowledge-based innovation networks. More research is needed in determining the relationship between the proximity paradox and cognitive proximity in knowledge-based partnerships, especially to inform tactics associated with bringing in non-proximal stakeholders to better enable innovation ecosystem development.

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