

Proximity dimensions and dynamics within an organisation:

Experiences from a change process

Accepted for publication in International Journal of Innovation Management, May 2022

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Abstract

Proximity between actors within an organisation can be relevant for interactive learning and innovation because it promotes collaboration and knowledge exchange. However, proximity has mainly been studied as a characteristic of the relationships between actors belonging to different organisations. In this paper, a case study of a faculty at a university is used to investigate proximity within this organisation and related to a change process. Based on 23 interviews and a self-ethnographic approach, we offer a detailed micro-perspective on how the geographic, cognitive, and social dimensions of proximity influence interactive learning and innovation between employees within the organisation. We also identify two distinct proximity configurations that have emerged during the change process. Finally, we analyse how the proximity dimensions are balanced within these configurations and offer two propositions explaining their influence on interactive learning and innovation. We thereby contribute to the existing theory on proximity by extending the insight into proximity from an inter-organisational to an intra-organisational level and by adding new knowledge to the understanding of proximity dynamics.

1. Introduction

Economic geography literature has for a long time seen proximity as important for interactive learning and innovation between organisations, such as in collaborations between universities and the industry (Giones 2019; D'Este, Guy, and Iammarino 2013; Villani, Rasmussen, and Grimaldi 2017), in networks (Broekel 2015) and in clusters (Capone and Zampi 2019). In this study, we argue that proximity is also relevant between actors *within* organisations. It is well documented that geographical proximity, i.e., co-location, and other forms of proximity, i.e., cognitive, and organisational proximity, are key components for learning and innovation because they promote collaboration and knowledge sharing (Boschma 2005). Our argument is that this closeness is just as important for actors within an organization as for actors from different organisations. However, little empirical research has been undertaken in the field of business and management to understand proximity at an intra-organisational level (Christensen and Pedersen 2018). For example, in times when physical co-presence is replaced with digital technology, the role of geographical proximity for interactive learning and innovation between employees is of particular interest. Moreover, at the intra-organisational level and in an ever-changing working life, the question of how organisational changes may influence proximity is specifically relevant. Thus, the main objective of this study is to explore proximity between employees within an organisation and in relation to a change process. We believe that there is a need to conduct more research that can help us understand more about how proximity change on an intra-organisational level and how this may influence interactive learning and innovation between employees.

To explore proximity within an organisation and related to a change process, we have chosen to focus on dimensions and dynamics of proximity. A focus on the dimensions of proximity will serve as an interesting starting point for this study and implies an investigation

of what types of proximity that are in play within organisations. Moreover, most existing studies examine proximity from a static perspective (Balland, Boschma, and Frenken 2020). A static perspective includes for example the effects of proximity on learning and innovation at a given point in time (see for example Boschma 2005). However, some existing studies do apply a dynamic approach, as for example Balland, Boschma, and Frenken (2015) and Broekel (2015). A limitation of these studies is normally that to the extent that change is considered, it is mostly implemented using comparative static approaches by investigating whether the effect of proximity is changing over time (Hoekman, Frenken, and Tijssen 2010; Balland, De Vaan, and Boschma 2013; Ter Wal 2014), or whether the network structure itself affects the formation of new ties in the next period (Balland, De Vaan, and Boschma 2013). In addition, significantly different interpretations of what the dynamic approach is have been proposed (Bouba-Olga et al. 2015). For example, when studying proximity dynamics across the various phases of innovation (i.e. idea generation, problem-solving, and implementation), Tanner (2018) found that geographical proximity plays a role in all stages of the process, but its form varies, whereas other studies found that geographical proximity between actors lose importance with time (Ter Wal 2014; Balland, Boschma, and Frenken 2015). Thus, further research with a dynamic perspective is required (Balland, Boschma, and Frenken 2020), and especially with the organisation as the level of analysis. Based on this background, our focus in this study will be on both proximity dimension and on proximity dynamics, and we address the following research question: How does proximity dimensions and dynamics influence interactive learning and innovation between employees within an organisation?

To answer this question, we explore the change-related experiences that the academics at a university faculty have been through during two recent mergers. The government in the country of relevance has proposed the development of larger units for creating more robust and innovative research and teaching communities and has, therefore, stimulated mergers

between existing higher-education institutions. Consequently, many relatively small independent units in colleges and universities have been merged into larger organisations. As a result, the number of institutions has decreased, and the new organisations are geographically dispersed and decentralized. Becoming a part of a larger and more geographically dispersed organisation provides the opportunity to study how proximity influence interactive learning and innovation between employees during a change process.

The rest of the paper is structured as follows. First, we present the theoretical background we build on related to proximity dimensions and dynamics. Then, the method is presented. In this study, we adopt a single case study in combination with a self-ethnographic approach. The following sections present and discuss the findings. In the final section we provide the conclusions and discuss some limitations and possibilities for further research.

2. Theoretical background

2.1. Proximity dimensions within an organisation

To understand more about intra-organisational proximity and its dynamics during a change process, we first focus on various dimensions of proximity. Boschma (2005) describes the following five dimensions of proximity: geographical, cognitive, social, organisational, and institutional. *Geographical* proximity refers to the physical distance between actors, and *cognitive* proximity refers to the similarities in their knowledge bases (i.e., the way actors perceive, interpret, understand and evaluate the world) (Knoben and Oerlemans 2006; Boschma 2005). *Social* proximity is defined as socially embedded relations between agents based on friendship, kinship and experience (Boschma 2005). We argue that, within an organisation, both organisational and institutional proximity are less important. The dimension of organisational proximity suffers from relatively high levels of ambiguity (Knoben and Oerlemans 2006), however, if we continue to follow Boschma's idea,

organisational proximity indicates the degree to which relations are shared in organisational arrangements. Moreover, while social proximity indicates trust at the micro level, institutional proximity indicates trust and shared norms and values at the macro level (Boschma 2005). As such, organizational and institutional proximity dimensions are more relevant and critical when considering interactions between organisations, because within an organisation, there are high levels of both organisational and institutional proximity between the actors.

Within an organisation, *geographical proximity* refers to the physical distance either between the various organisational units or between individual employees. Given the detailed and in-depth perspective of this study, we understand the geographical dimension of proximity in terms of the physical distance between individual employees. Geographical proximity, or co-location, significantly influences learning and innovation, mainly because it reduces uncertainty and addresses problems of coordination (Boschma 2005). Despite the limited knowledge at the intra-organisational level, a recent study has found that geographical proximity positively affects knowledge-sharing within organisations through both a direct effect on the frequency of knowledge-sharing and an indirect effect through its promotion of social relationships (Christensen and Pedersen 2018). Being physically close facilitates interpersonal interactions whereby knowledge and resources are exchanged (Inkpen and Tsang 2005; Bolzani, Rasmussen, and Fini 2020). The most important insight obtained from the proximity school in economic geography is probably that “geographical proximity per se is neither a necessary nor a sufficient condition for learning to take place” (Boschma 2005, p. 61). In addition, according to existing research, for academics, face-to-face contact is often intertwined with other mechanisms of collaboration, particularly modern communication tools and *temporary geographical proximity* (Werker and Ooms 2020). Temporary geographical proximity indicates the creation of temporary meeting places where some or all partners have to make their own ways (Rychen and Zimmermann 2008) and has been found to be sufficient

for partners to exchange the information required for cooperation (Torre 2008, 2011). Within a large and geographically dispersed university, this can include short-or medium-term visits to another campus or the arrangement of seminars and meetings outside the campuses.

Cognitive proximity indicates the similarities in the knowledge bases between actors (Boschma 2005) and influences the way actors perceive, interpret, understand and evaluate the world (Knoben and Oerlemans 2006; Wuyts et al. 2005). At the inter-organisational level, the significance of cognitive proximity can be easily understood, for example, when the collaborating actors belong to distinct knowledge contexts, such as universities and private firms (Garcia et al. 2018; Mathisen and Jørgensen 2021). However, cognitive proximity can also play a significant role in employee relationships within organisations. Within an organisation, cognitive proximity occurs when the collaborating colleagues belong to the same professional discipline. Being cognitively close helps to communicate through a shared language and to more effectively understand, absorb, and process new information from the colleagues (Boschma 2005). Moreover, cognitive proximity between colleagues can promote exchange of tacit knowledge that is embodied persons and must be externalised to achieve learning and innovation (Nonaka, Takeuchi, and Umemoto 1996). However, similar to inter-organisational relationships, collaboration between employees within the same organisation entails a trade-off between the advantages of the high novelty value of a partner's knowledge and the disadvantages of less mutual understanding when cognitive proximity is low (Wuyts et al. 2005).

Research at the inter-organisational level has also emphasised *social proximity* as important for collaboration and knowledge-sharing between organisations. Social proximity indicates the socially embedded relationships at the micro level, and as mentioned above, relationships are socially embedded when they involve trust based on friendship, kinship and experience (Boschma 2005). Hence, social proximity acts as the glue of collaborations

(Ooms, Werker, and Caniëls 2018). Being defined at the micro level, social proximity includes the human factor of connections at the individual level and fits well with our emphasis on relationships between employees in this study. Social proximity has been defined as the strength of the social relationship between colleagues, and such strong social relationships produce more knowledge-sharing (Christensen and Pedersen 2018). This is because strong social relationships promote high levels of trust, norms of reciprocity and mutual obligations, reducing individuals' perceived costs of asking for help or helping others.

2.2. Proximity dynamics during organisational change

The proximity dimensions are not static; they change with changes in the organisation. In this section, we will focus on the interactions between the dimensions and their relative importance on learning and innovation within what is labelled as proximity configurations, and how these interactions can be balanced to increase interactive learning and innovation.

2.2.1. Proximity configurations

One relevant perspective is that proximity itself is subject to change and co-evolves with changing activities with time (Balland, Boschma, and Frenken 2015). Existing literature has suggested that *proximity configurations* can be used as an analytical tool to understand the dynamics of network-related proximity (Broekel 2015). Similarly, we argue that the concept of proximity configurations can be useful in understanding the dynamics related to an organisational change process. This is because as an analytical framework, it is equally important for the knowledge ties between people within organisations as those between people across organisations. The proximity dimensions within an organisation are present to varying degrees and are not uniformly dynamic. Some dimensions might display a higher degree of stability, because changes along these dimensions imply higher economic costs

(Balland, Boschma, and Frenken 2015). As a result, the relative importance of the dimensions for interactive learning and innovation between employees can be changed (Mattes 2012).

According to Broekel (2015), a proximity configuration describes all realised links between actors of a specific population—for example, a network—along one of the five (cognitive, social, organisational, institutional, and geographic) proximity dimensions. Given this definition, the proximity configuration is linked to the degree of a specific dimension of proximity, and at the network level, it represents this specific proximity type by summarising the distribution of degrees of this proximity between linked pairs of actors within the network. The dynamic is thereby linked to the co-evolution between proximity configuration, and three types of such co-evolution are identified: simultaneous co-evolution, long-term co-evolution, and temporal autocorrelation (Broekel 2015). To use these concepts of proximity configurations and how they are developed during organisational change processes, we argue that Broekel's framework should be further developed. Doing so, we understand one configuration as comprising various proximity dimensions and the dynamics as how these dimensions interact with each other within this configuration. This is in line with how Kuttim (2016) understands proximity configuration when differentiating between different national and international configurations while studying university–industry knowledge transfer. Our next point is that, within a proximity configuration, the distance between actors must be balanced, and that this is an important issue related to organisational change processes.

2.2.2 Balancing interactions and their influence on interactive learning and innovation

In this study, we also explore how the emerging proximity configurations are balanced during the mergers and how this might influence interactive learning and innovation. Exploring how the dimensions are balanced can help us understand the dynamics of an organisational change process in detail. Interactive learning between colleagues occurs in the

processes in which they communicate and cooperate in the creation and utilisation of new useful knowledge (Lundvall et al. 2002). Previous research has demonstrated the relative and combined influence of different proximity dimensions on interactive learning and innovation (Leszczyńska and Khachlouf 2018; Mattes 2012). An important starting point here is that developing either too little or too much proximity within a configuration can be harmful to interactive learning and innovation (Boschma 2005). Moreover, existing research at the inter-organisational level on the interplay between the various proximity dimensions is rather inconclusive and points in various directions. This is probably because there are many different contextual conditions, for example, the characteristics of the involved organisations (Steinmo and Rasmussen 2016) or the type of knowledge being produced (Davids and Frenken 2018; Mattes 2012). In a change process, a geographically dispersed organisation requires people to be situated or re-situated at specific locations. A large emphasis on geography during the process will place location at the centre of the decisions (Balland, Boschma, and Frenken 2015). The choice of location is a complex process involving many uncertainties and high sunk cost (Stam 2007). Being co-located will make it easier to meet and communicate. However, geographical proximity is neither a necessary nor a sufficient condition for collaboration to occur (Boschma 2005), and employees can be co-located without interacting and interact without being co-located (Knoben 2009; Ooms, Werker, and Caniëls 2018). In addition, geographical proximity probably facilitates the establishment of other forms of proximity (Balland, Boschma, and Frenken 2015). In contrast, developing excessive geographical proximity can impede innovation because it can create spatial lock-in situations that have a negative influence on learning and innovation (Letaifa and Rabeau 2013; Molina-Morales, García-Villaverde, and Parra-Requena 2014). In addition, temporary geographical proximity (Torre 2008, 2011) can play a significant role in achieving satisfactory balance. How geographical proximity, whether permanent or temporal, is

balanced against cognitive and social proximity in new configurations is a particularly interesting question in this setting.

During change processes in a knowledge-intensive organisation, such as a university, developing cognitive proximity in the relationships between the academics can be of particularly high priority. This is because cognitive proximity is the most fundamental requirement for effective knowledge-sharing (Balland, Boschma, and Frenken 2015) and, therefore, the most essential dimension to increase interactive learning and innovation. Based on this, we attempt to investigate how the development of the cognitive dimension is balanced against the geographical and social dimensions during the change process. Existing research underline that, for both knowledge acquisition and innovation, cognitive proximity is more relevant than geographical proximity (Molina-Morales, García-Villaverde, and Parra-Requena 2014). Without an overlap in the knowledge base between academics, meaningful interactions are impossible. Cognitive proximity between people belonging to the same ‘community of practice’ can help communicate effectively and share knowledge despite large geographical distances (Knoben and Oerlemans 2006). Moreover, the interaction between cognitive proximity and temporary geographical proximity can be significant for collaboration or co-creation to occur (Mathisen and Jørgensen 2021). Cognitive proximity is a substitute for geographical proximity because a shared knowledge base stimulates long-distance collaboration (Garcia et al. 2018). However, excessive cognitive proximity between employees within an organisation can also weaken the knowledge exchange and learning because it requires complementary knowledge (Boschma 2005). However, finding an *optimal cognitive distance* (Nooteboom 2000; Wuyts et al. 2005) cannot be seen in isolation but in connection with other forms of proximity in a configuration. How cognitive proximity is prioritised and balanced against other proximity dimensions in a change process remains unknown.

Finally, how the social dimension interacts with the other dimensions in the development of a new proximity configuration is interesting and needs to be further explored. While geographical proximity helps employees meet each other and cognitive proximity provides opportunities to share and develop knowledge, social proximity is the glue that empowers collaboration (Ooms, Werker, and Caniëls 2018). According to existing research, social proximity positively influences knowledge-sharing (Christensen and Pedersen 2018). In contrast, and similar to both geographical and cognitive proximity, excessive social proximity also has a negative side as it may cause lock-ins and cliques, which can be detrimental to learning and innovation (Contreras Romero 2018). Meanwhile, the notion of decoupling is relevant for studying social proximity dynamics (Balland, Boschma, and Frenken 2015). Decoupling refers to the autonomisation of personal relations (i.e., when a strong relationship is decoupled from its original context and ends up existing for itself) (Grossetti 2008). However, we still do not know how this occurs in the context of organisational change processes.

3. Method

3.1. Research design

The research design adopted in this study is a theory-developing, embedded single case study with a qualitative approach (Welch et al. 2011; Stake 1995). Our case is a faculty at a multi-campus university, which is a result of the reconstruction of higher-education institutions, and our unit of analysis is the experiences academics employed at this faculty have with two recent mergers. Qualitative research and case study are fit when the issues under study are processes significantly linked to their contexts. A single case study affords the opportunity to explore and richly describe a phenomenon (Siggelkow 2007; Yin 2003);

moreover, it is appropriate when the aim is to develop new theoretical insights into proximity dimensions and dynamics within organisations.

At the time of data collection, all three researchers were employed at the faculty under study, one of whom was newly hired. This indicates a self-ethnographic approach building on in-depth direct knowledge and reports obtained from real-life operations (Alvesson 2003; Brannick and Coghlan 2007). This self-ethnographic approach facilitates a rich set of observations of aspects potentially hidden in external observations (Bleiklie, Enders, and Lepori 2015). The researchers have thorough and valuable inside information, which can be valued as a prerequisite for obtaining a deeper insight and, thus, considered a strength of the current investigation. However, this approach requires discretion and caution, and a particular focus on research ethics. This implies that we as researchers may be blind to certain conditions due to their pre-conceptions, and it may be a challenge to observe and articulate the obvious and the implicit. This threatens the validity of the study and is addressed by posing critical questions and offering alternative explanations in ongoing discussions between us.

3.2. Presentation of the case

Our case study is a faculty at a university that, after two mergers, one in 2014 and a latter in 2016, comprises four departments and five campuses (see Figure 2). The faculty has approximately 220 employees and 5000 students. Furthermore, each of the four departments has a leader, and each study programme has a coordinator, who has no formal management status. Department 1, the largest, is organised purely geographically (i.e., on one campus). Another department (4) is also located only on one campus. The other two departments are located on two different campuses. That is, faculty employees on campuses 2 and 3 are organised as one department, whereas department 3 has employees mainly on one campus (campus 4), in addition to a few (i.e., six at the time of our data collection) employees on one

of the other campuses (Campus 5). The departments are large, with numerous employees reporting to one department leader. Hence, within each department, various hierarchical models emerge or are under development.

Insert Figure 1 about here

3.3. Data sources and data collection

The main source of data was the interviews conducted with academics at the faculty. A qualitative research interview is an appropriate tool for capturing individual experiences and perceptions. We used a purposive sampling technique where the employees at the faculty were considered as the best qualified participants to answer our research question (Bryman and Bell 2015). We interviewed ordinary employees, program coordinators, and leaders. The informants were selected based on an aim to have variation related to department and professional affiliation, as well as leadership responsibilities (for an overview, see Table 1). Further details about the informants have been omitted to avoid identification. Altogether, data from 23 informants were collected. The interviews were conducted over a period of four months in 2018, after both the mergers were carried out. The participants signed an informed consent form, and the data is anonymised in the presentation. The project was approved by the Norwegian Data Service for Social Sciences (ethical approval no. 56827).

Insert Table 1 about here

The interviews were conducted based on a semi-structured interview protocol, which ensured that the same topics were covered throughout the interviews. We started with a grand

tour question: ‘How do you perceive your work situation in a merged higher-education institution?’ This grand tour question was open and intended to direct the informant to the topic, but even more so, an open first question was asked to obtain answers that were not tinted by theory or the researchers’ pre-understanding and to capture elements not previously explored by extant research. Following the grand tour question, the protocol comprised five sections with the aim to cover both the situation before and after the mergers: The perceived climate at work, the structure of the faculty and the departments, the employees’ work life experiences and practices, the changes introduced by the merger in terms of their work and their thoughts on the future of the organisation. The interviews were recorded and transcribed verbatim. Three researchers were involved in conducting the interviews, and one researcher was present for each interview. After the first interview was conducted, the other interviewers listened to the recordings to get a picture of the approach so that the remaining interviews could be conducted on the same lines.

3.4. Analysis and theory building

The analysis was a stepwise and iterative process conducted in three main stages: initial interpretation, initial coding, and focused interpretation. This process included both interpretive sense-making (Stake 1995; Weick 1995; Welch et al. 2011) and coding (Charmaz 2006) as strategies for analysing the empirical data material. Interpretive sense-making is a way of theorising from case studies, with a strong emphasis on contextualisation and less emphasis on identifying causal explanations. Interpretive sense-making and coding are somewhat contrasting analytical strategies; however, we found the approaches useful at different stages in the process and in combination with the insight obtained from the self-ethnographic approach. By combining these strategies differently in the three phases, we could achieve in-depth understandings that are likely to be hidden for external researchers.

In the first phase, we conducted several rounds of interpretations and discussions, trying to make sense of what the informants said in relation to both an emerging theoretical understanding and to our own experiences. In this phase, we emphasised sense-making as a strategy. As we were employees at the faculty, we had direct knowledge of both the case and the context, and it was important for us to understand the informants' personal experiences. In the second phase, we conducted an initial coding of data. First, one researcher coded data from the interviews using NVivo 11. This coding was based on three codes, all of which were theoretically driven: geographical, cognitive, and social proximity (see Table 2 for an overview).

Insert Table 2 about here

A report of the codes was printed (50 pages) and formed an important basis for the final step of the analysis. Here we undertook a more focused interpretation of the data with the aim of building new theoretical insights on proximity dimensions and dynamics within organisations. We interviewed three different groups of academics (leaders, program coordinators and employees), but in the analysis, we were interested in focusing on the differences among these groups. This is mainly because the academics' experiences with the changes that occurred during the mergers were more related to individual characteristics than to their position at the university.

4. Findings

4.1. Proximity dimensions and interactive learning and innovation within the faculty

Based on the data obtained from our informants, we can identify the three dimensions of proximity within the faculty: geographical, cognitive, and social. In this section, we describe in more detail how these dimensions influence interactive learning and innovation between the employees. Within the faculty, we perceive geographical proximity to be high when the academics are co-located on the same campus and low when they are located on different campuses. Being co-located on the same campus means that the academics can meet and exchange both explicit and tacit knowledge, as well as other resources, relevant for teaching and research. Many of our informants also point to the fact that they must relate to and collaborate with colleagues on other campuses. Based on our experience, temporary geographical proximity (i.e., temporary physical meetings and seminars across campuses where some or all participants meet) is not very common—especially related to teaching. *‘A faculty where the activities are organized across campuses will be very expensive. And the leaders will spend most of their time in cars’* (Employee-6). Many of our informants emphasise that new technologies can supplement the physical meetings, but they also underline that the use of this technology cannot replace the physical closeness of being co-located. The main picture is that geographical proximity is seen as both a necessary and a sufficient condition for interactive learning and innovation related to teaching activities, but as we shall return to, this is not the case related to research activities.

The cognitive dimension of proximity between academics is perceived as being disciplinarily close by belonging to the same academic discipline. Being cognitively close to an academic colleague is described by our informants as, for example, having the same external networks and the same ideas about which conferences and journals are the most important ones. The essence of the campus structure is to preserve the geographical proximity between academics related to teaching, which also means that not all colleagues located on

the same campus are necessarily disciplinarily close. Belonging to the same faculty and teaching the same students might create a somewhat common knowledge background which can be positive for interactive learning; however, with an average of approximately 50 employees at each of the five campuses and with many disciplinary fields to be covered in each study program, our informants consider the cognitive proximity to be quite low.

Coordinator-4 expresses it like this: *'I do not have much professional overlap with those who work here'*. Being disciplinarily close to one's nearest leader is expressed in this way by

Employee-8:

'My first conversation with him, it's a conversation I think of as one with a professional leader. Then we talked about what I did, what I wanted and not least how I prioritised my time and how I prioritised the different things. And then he initiated that we should present the work to each other, with a focus on research and talked us up a lot. He has a professional weight (..) I have learned a lot, so imagine if I had such a head of department (..). I can dream of that'.

While cognitive proximity is considered relatively low in each campus, there are many academics at the faculty who belong to the same discipline across campuses. To take care of and develop this disciplinary closeness during mergers, research groups have been established according to academic disciplines.

A high level of social proximity means that there are close and friendly relationships between academic colleagues and can be seen as the glue of these collaborations. The importance of the social dimension is underlined by some of our informants, who indicate that being both geographically and disciplinarily close is not sufficient for learning if you do not have the right personal or social connection. Our findings indicate that building social proximity at the collective level on each campus has been important during the mergers.

Leader-4, who leads Department 4, emphasises this as follows:

‘We have a culture that makes us show up at work (...) because it creates an environment. Socially, not least. And I am very concerned that the social environment should be good. I do not think you do a good job if you do not feel good socially in your workplace. So that's why it's so important to us.’

4.2. Emergence of two distinct proximity configurations

Proximity configurations can serve as a framework to understand how learning and innovation between academics develop during the mergers. Our informants talk about proximity dynamics in this setting related to various employee relationships. For example, the faculty leaders express a concern about a larger distance to the rectors and their group, and many of our informants mention lack of proximity to the administration and other faculties. In addition, the academics emphasise preserving proximity to students and local business partners. In this analysis, we focus on the dynamics within two proximity configurations: the relationships between academics related to teaching and those related to research. This is because teaching and research are the most central activities at a university and because these two configurations seem to have followed quite different development patterns. Moreover, the teaching and research proximity configuration illustrates the greatest challenge during the mergers: finding a suitable balance between geographical and cognitive proximity. The two configurations are illustrated in Table 3.

Insert Table 3 about here

In the teaching proximity configuration, there has been a strong emphasis on preserving geographical proximity in the relationships between academics on the existing campuses. Before the mergers, there were three units located on the five campuses. Preserving geographical proximity during the mergers means that all five campuses have continued to

exist (see Figure 1). This represents the development of a proximity configuration in which the high geographical dimension goes along with a high degree of social proximity at the expense of cognitive proximity. There are many arguments related to organising in this way rather than prioritising cognitive proximity across campuses. Several of our informants indicate the importance of preserving geographical closeness in the relationships between academics and their nearest leaders. Leader-5 says,

‘When it comes to the individual subordinate, it is obvious that there are meetings in the hallway, they come by and ask, or I go by and ask. And then it is a great advantage to be place specific manager, like I am, and have all my subordinates here.’

The benefits of high geographical proximity at the campus level are also connected to less *‘wear and tear in the organisation’* in terms of meeting and travelling between campuses and less *‘coordination bureaucracy’* (Employee-4). The department leaders rarely perceive the lack of a mutual knowledge base, or cognitive proximity, as a problem. Several say, however, that they would prefer an organisational model after the mergers with higher degree of cognitive proximity. It is furthermore apparent that how the leaders view cognitive distance varies considerably. Some of them view the academic profession in general as sufficient for being cognitively close: *‘I am also very competent, and I have 25 years of service in this organization. And I know it inside out’*. In contrast, others clearly see cognitive distance as a challenge, but not a problem. However, the strong emphasis on preserving geographical proximity during mergers appears as a paradox considering this being a knowledge-intensive organisation where the autonomy is high, academics are travelling a lot and modern technology makes it possible to work independently of time and place.

The research proximity configuration is related to how research is organised after the mergers and the establishment of research groups. This involves a proximity configuration which is distinct from the teaching configuration because it has a higher degree of cognitive

proximity (i.e., the academics in the group belong to the same discipline). Leader-9 expresses this:

‘So, I have great faith in the establishment of those research groups, if we can make it work. And it is campus-wide, it is academic, and it is people with common interests who have chosen themselves into a research group on the basis of their professional interests’.

The members of a research group will, for example, have the same knowledge about most important conferences and journals in the field. They will also share some professional networks that are important for the recruitment of new employees (e.g., PhD candidates) and collaboration related to applications for external funding. However, as these groups are organised across campuses, this implies low degrees of geographical and social proximity. In practice, the high cognitive proximity between academics is combined with temporary geographical proximity, which means that academics meet in short meetings and seminars.

Coordinator-6 finds the low emphasis on geography related to research quite normal:

‘And research is about writing some paper with some other people. And geography is perhaps not very important there.... But research lives its life no matter what the organization chart looks like. I have little faith in thinking that one could organize oneself towards a completely new type of research, or research activity, compared to what we have today’.

Some informants also indicate the challenges related to managing the research groups across campuses: ‘*But then we also see that it is a bit complicated to get the research groups to function operationally and actively when they consist of people across places*’ (Leader-1).

4.3. Balancing proximity during the mergers

Many of our informants' express concerns about how the different dimensions of proximity are balanced during the two mergers. A worst scenario is articulated in the following quotation:

'Firstly, then we have a [colleague] who is sitting on another campus, and secondly a [colleague] that you do not know, and thirdly that the person in question has a different professional background than you have' (Employee-4).

This above quote illustrates a situation in which lack of geographical proximity (the colleague is located on another campus) interacts with low degrees of social proximity (they do not know each other) and cognitive proximity (the colleague belongs to different academic disciplines). This situation harms interactive learning and innovation between the academics at the university. In the following sections, we will present two especially interesting results related to how the proximity dimensions are balanced during the mergers. The first, found in the teaching proximity configuration, is that a strong emphasis on the geographical dimension, usually in interplay with the social dimension, may have a negative effect on interactive learning at the faculty level. The second is that a strong emphasis on the cognitive dimension, in combination with temporary geographical proximity, as in the research proximity configuration, will have a positive influence.

When clarifying how and why the interplay between geographical and social proximity will have a negative influence on knowledge-sharing and learning, we observe, at least in our two proximity configurations, that social and geographical proximity tend to follow the same path. In our study, an emphasis on the social proximity dimension during an organisational change process positively influences the learning in relationships between employees that are already geographically close (i.e., located on the same campus). This interaction can have a negative influence on knowledge-sharing between employees at the

faculty level (i.e., between campuses). The main reason for this is that the strong focus on the geographical and social aspects of the change process results in a lack of disciplinary focus at the campus level. This is, for example, expressed by Leader-3: *'We become spokespersons for a geographical area and not for an academic discipline'*. Moreover, this affects the leadership of the campuses, as the department leaders are overwhelmed with several administrative and HR-related tasks and do not have the time, resources, or necessary cognitive proximity to their subordinates to act as academic leaders. The emphasis on geographical proximity on the campuses in these change processes can also limit the academics' access to other important knowledge sources.

Furthermore, a strong emphasis on developing the cognitive proximity dimension during organisational change, usually in combination with temporary geographical proximity as in the research proximity configuration described above, can positively influence knowledge-sharing and learning between academics at the faculty level. The main argument here is that cognitive proximity, a shared research interest and expertise, can stimulate academics to collaborate with their geographically and socially distant colleagues. In addition, research is a more place-independent activity than teaching, as underlined by Leader-4 in the following statement: *'We can think more independently of place when students are not involved'*. However, the situation related to the establishment of the research groups during the mergers is not clear-cut, and our informants indicate some challenges there as well. The academics already have their research networks, often internationally, so what about them? Should they instead start working with their colleagues on other campuses? Also, the emphasis on temporary geographical proximity (short meetings and seminars) is questioned, as, for example, in this statement from Employee-8:

'Yes, it is because you lose all the spontaneous interaction, which is very important when you develop a research project, and if it is to take place by email, or take place every other week,

according to a plan, then there is no room for the spontaneity that can occur when meeting each other and discussing’.

Finally, some of our informants also indicate that the cognitive distance to their colleagues in the research group they belong to, is too large and that they must redefine their academic identity to fit in.

5. Discussion

Earlier research demonstrates that proximity provides a nuanced framework for understanding collaborative learning processes between organisations in greater depth (Steinmo and Rasmussen 2016). Overall, our study shows that proximity can also offer a detailed micro-perspective that can help to better understand interactive learning and innovation between academics (i.e., department leaders, programme coordinators and ordinary employees) within a university and related to two mergers. In these mergers, three former higher-education institutions became a larger and more geographically dispersed organisation. Our findings demonstrate how the geographical, cognitive, and social dimensions of proximity influence interactive learning and innovation between the employees in one of the faculties. Further, we identify two distinct proximity configurations that have emerged during the mergers and present two propositions that explain their influence on interactive learning and innovation between the employees.

5.1. The influence of proximity dimensions

Our findings related to the question of how proximity dimensions influence interactive learning and innovation within an organisation helps broadening the proximity theory from an inter-organisational to an intra-organisational setting and, thus, extending its field of

application. Our empirical findings clearly demonstrate the role of the proximity dimensions within an organisation. The understandings of geographical, cognitive, and social proximity at the intra-organisational level are found to be quite similar to those at the inter-organisational level. However, while these dimensions are, in general, superficially described at the inter-organisational level, exploring them as experienced closeness between academics at the individual level, enables us to grasp a more detailed perspective. Other dimensions of proximity, such as organisational and institutional proximity (Boschma 2005), seem to play a less significant role within organisations than between organisations, because they are high and stable within an organisation. Our results confirm that geographical proximity (i.e., co-location on the same campus and opportunities for face-to-face contact) plays a surprisingly important role for achieving interactive learning and innovation within a knowledge-intensive organisation, which has many possibilities to use new technologies to communicate across geographical distances and where employees travel a lot.

5.2. The influence of proximity dynamics

In our study, we have explored the influence of proximity dynamics on interactive learning and innovation related to an organisational change process. To capture proximity dynamics and the interrelated nature of the proximity dimensions, we use proximity configurations as an analytical tool (Broekel 2015; Kuttim 2016) and find that such configurations must be balanced in specific ways to have a positive influence on interactive learning and innovation. We understand one configuration as comprising various proximity dimensions and the dynamics as how these dimensions interact with each other within the configuration. Our findings identify two distinct proximity configurations, one related to teaching and the other to research. Thus, we add an extra dimension to the concept of proximity configurations: *an activity*. This is in line with what Kuttim (2016) when she

distinguished between national and international proximity configurations. This means that the relationships between academics mainly related to one activity contain one type of proximity configuration, whereas those related to other activities contain other configurations.

At the inter-organisational level, terms such as evolving and co-evolving are used to describe the dynamics related to proximity (see for example Broekel 2015). Our findings indicate that to achieve a specific outcome as a result of the change process, organisations must manage to balance the dimensions within each proximity configuration. Hence, we perceive a configuration as a balanced structure of dimensions and degrees of proximity in an organisational unit at a given time. Based on our findings, we suggest two propositions that highlight how balancing proximity dimension can influence interactive learning and innovation between employees within an organisation and is related to a change process. In the first proposition, we believe that a strong emphasis on the interplay between geographical and social proximity during a change process can negatively influence interactive learning and innovation between employees. Our study thereby confirms previous findings on how geographical and social proximity often follow a similar development path (Broekel 2015), and that the effect of geographical proximity on knowledge-sharing also has an indirect path through strong social relationships (i.e., high degree of social proximity) (Christensen and Pedersen 2018). A strong focus on geographical proximity keeps location debates alive (Balland, Boschma, and Frenken 2015) and a strong emphasis on social proximity can cause lock-in situations and cliques on each campus (Contreras Romero 2018). Our findings related to the teaching proximity configuration demonstrate that this is a type of proximity configuration that compromises cognitive proximity and can, therefore, be harmful to interactive learning and innovation. Based on this, we suggest the following proposition:

Proposition 1: An emphasis on the interplay between geographical and social proximity during an organisational change process will have a negative influence on interactive learning and innovation.

Our findings related to the research proximity configuration confirm that cognitive proximity is the most fundamental requirement for achieving interactive learning and innovation (Balland, Boschma, and Frenken 2015). It seems rather clear that academics, based on a shared research interest or expertise, can collaborate with geographically and socially distant colleagues. This is in line with existing research, according to which cognitive proximity can largely substitute geographical proximity (Garcia et al. 2018). Moreover, interactive learning between colleagues requires a particular focus on the exchange of tacit knowledge because externalization of tacit knowledge is essential in such processes (Nonaka, Takeuchi, and Umemoto 1996). However, tacit knowledge is embodied in persons and is much more difficult to transfer and use than explicit knowledge. Colleagues within an organisation also need to meet face-to-face to be able to externalise tacit knowledge. Our findings provide considerable evidence that temporary geographical proximity, rather than permanent co-location, can serve this function within an organisation. Moreover, an emphasis on temporary geographical proximity can remove an unwanted focus on location issues. Therefore, in our second proposition, we suggest that the interplay between cognitive and temporary geographical proximity can positively influence interactive learning and innovation.

Proposition 2: An emphasis on the interplay between cognitive and temporary geographical proximity during an organisational change process will have a positive influence on interactive learning and innovation.

6. Implications for practice, future research, and conclusion

6.1. Implication for practice

Our findings have implications for practice for university managers and politicians. At the individual level, our data clearly demonstrate that geographical, cognitive, and social closeness is important for academic and their colleagues. For university managers, who are responsible for carrying out the change processes in practice, it is critical to understand that the proximity between academics—including proximity to their own subordinates—can change dramatically during organisational change processes. It is, therefore, important to find a satisfactory balance among the geographical, cognitive, and social dimensions of proximity. Proximity matters for interactive learning and innovation between academics, and decisions related to, for example, employee location and how to organize activities across campuses may have a significant impact. Finally, politicians at the national level need to be aware of the effects that changes in the higher education system, such as restructuring towards larger and more geographically dispersed organisations, may have on proximity in relationships between the academics. For decision-makers it is relevant to note that developing proximity configurations with strong emphasis on geographical and social proximity between employees at the campus level, may promote an ongoing focus on location issues, which might be detrimental to interactive learning and innovation.

6.2. Suggestions for future research

In this study, we demonstrate that proximity dimensions and dynamics play a central role within organisations and in relation to organisational change processes. Our findings demonstrate many similarities between proximity in relationships between actors at the inter-

organisational and intra-organisational levels; however, there might be many large differences as well. Further research on the aspects of proximity within organisations is, therefore, in demand. In this study, we perceive geographical proximity as high when academics are co-located on the same campus and low when they are located on different campuses. Being co-located does not necessarily mean that academics are physically close to each other and have daily face-to-face contact. Existing research distinguishes, for example, between horizontal and vertical geographic distance between employees at one location, where the horizontal distance indicates the value in meters between the workspaces and vertical distance as the number of floors (Christensen and Pedersen 2018). The results indicate that a negative effect of the horizontal distance starts to decline at approximately 30 meters. Thus, we need a more detailed investigation of geographical proximity in intra-organisational settings. We explain in detail two proximity configurations: teaching proximity configuration and research proximity configuration. However, based on the main activity or who is involved in the relationship, there can be other significant forms of proximity configurations. Particularly interesting for further research is a so-called managerial proximity configuration (i.e., proximity between employees and their immediate leaders). Our data indicate that geographical and social proximity play an essential role in these relationships. Further research is required on these issues. Moreover, proximity dynamics are sometimes investigated by referring to complementarity (a combination of the various dimensions) or substitutability (a weakness in one dimension is compensated by another one) (Bouba-Olga et al. 2015; Hansen 2015; Kuttim 2016). This is an interesting area for further research and provides a better understanding of how the various dimensions interact in configurations and how organisations can find a suitable balance in their proximity configurations. Finally, some of the inherent limitations to this type of study may also spur further research. While a single case study

offers detailed and in-depth insight, other designs and research methods can add valuable knowledge to these issues.

6.3. Conclusion

The main objective of this study was to explore proximity between employees within an organisation and in relation to the change process. To do this we have focused on proximity dimensions and dynamics, and we asked the following question: How does proximity dimensions and dynamics influence interactive learning and innovation between employees within an organisation? Overall, the findings offer a detailed micro-perspective that help understand more about how proximity dimensions and dynamics within an organisation. Our findings show how geographical, cognitive, and social proximity influence learning and innovation between employees at the intra-organisational level. They confirm that organisational and institutional proximity play minor roles in this setting and that geographical proximity still is surprisingly important. This contributes to broadening proximity theory from an inter-organisational to an intra-organisational setting and, thus, extending its field of application. Moreover, based on a theoretical extension and the empirical investigation of proximity configurations, we identified two distinct proximity configurations that emerged during the change process. In our discussion, we indicated how these configurations are connected to various activities at the university. Finally, we emphasised that how these configurations are balanced can influence interactive learning and innovation in significant ways. We suggested two propositions that explain how balancing the proximity configurations can have both a positive and a negative influence on interactive learning and innovation between employees. As such we have added new knowledge to the understanding of proximity dynamics.

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Proximity dimensions and dynamics – Figures

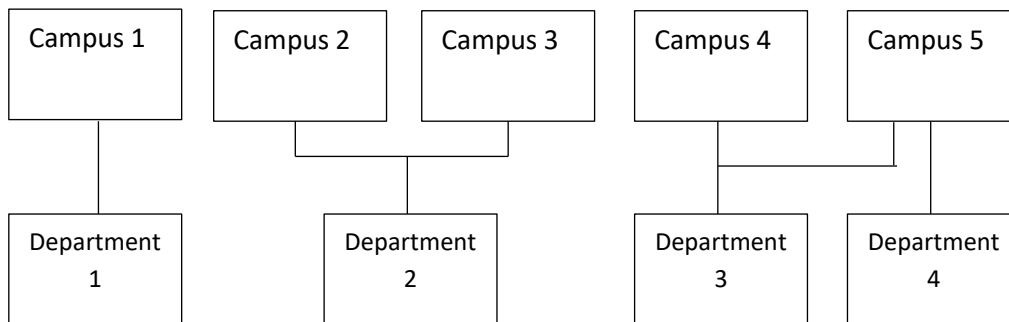


Figure 1: Geographically dispersed faculty with four departments and five campuses

Proximity dimensions and dynamics – Tables

Table 1: Selection of informants

Affiliation	Informants
Department 1	Six informants (Leader-5, Leader-8, Coordinator-2, Coordinator-3, Employee-1 and Employee-2)
Department 2	Four informants (Coordinator-4, Coordinator-5, Employee-5 and Employee-8)
Department 3	Seven informants (Leader-6, Leader-7, Leader-9, Coordinator-1, Employee-3, Employee-4 and Employee-7)
Department 4	Three informants (Leader-4, Coordinator-6 and Employee-6)
Top management	Three informants (Leader-1, Leader-2 and Leader-3)

Table 2: Operationalisation of the proximity dimensions

	Low degree of proximity	High degree of proximity

Geographical proximity	Academics are located at different campuses	Academics are co-located on the same campus
Cognitive proximity	Academics belong to different disciplinary fields	Academics belong to the same disciplinary field
Social proximity	Arm-length relationships between academics	Close relationships between academics characterized by trust and friendship

Table 3: *Two distinct proximity configurations*

	Geographical proximity	Cognitive proximity	Social proximity
The teaching proximity configuration	High	Low	High
The research proximity configuration	Low	High	Low