

# Chapter 13

## Proximity: Synthesis, Six-Dimensional Typology, and Significance for Cooperation Performance



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**Abstract** In recent years, the concept of proximity becomes more popular not only in the field of economic geography but—surprisingly—also in strategic management. The growing attention paid to the considerations about proximity stems from the fact that it may be perceived as a significant factor leveraging effectiveness and performance of both cooperating (or coopting) organizations and inter-organizational networks. Therefore, this paper attempts to explore and synthesize prior literature on proximity and its dimensions. Nevertheless, the main aim is to develop a consistent, logical, theory-based multidimensional proximity framework applicable in any further research investigations undertaken within strategic management, especially those adopting the relational view on strategic advantage. Drawn from existing literature, this paper presents the significance of proximity for collaboration and networking and helps to understand the essence of its particular dimensions. By identifying and limiting the drawbacks of prior approaches to proximity, six—separate hence interrelated—dimensions of proximity are outlined and discussed, thus the holistic proximity framework is developed. The main contribution of this conceptual paper is development of six-dimensional proximity framework (including geographical, cognitive, organizational, social, institutional, and communicational proximities) truly removing substantial barriers for further exploration and exemplification of proximity concept.

**Keywords** Cooperation · Cooptation · Proximity · Networking · Inter-organizational relationships

### 13.1 Introduction

Both theoreticians and practitioners of management are trying to come up with any solution for modeling beneficial external relationships, providing appropriate conditions facilitating coordination of inter-organizational collaboration and networking.

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It is so, as they are interested in making those relationships, cooperation in dyads and networks effective, efficient, and goal-reaching. Existing management literature suggests that among the factors increasing the probability of success while decreasing the risk of failure when it comes to collaboration, there is an appropriate (i.e., cultural, organizational, structural, strategic, etc.) fit of potential partners [13, 18, 23, 22, 24]. Similarly, the current stock of knowledge in economic geography emphasizes the role of proximity for establishment and beneficial exploitation of inter-organizational relationships. In particular, proximity is defined as the key factor for successful collaboration, especially in a long term. Moreover, in economic geography and regional policy, it is considered as significant success factor for cooperation and competition in macro (e.g., regional, global) perspective. This fast-growing popularity of proximity concept in economic geography [6, 44] resulted in transferring its assumptions into the strategic management considerations. It should not be surprising, as the question for antecedents, factors, or divers of successful cooperation either in dyads or in networks still remain unanswered within the field of strategic management and its relational approach in particular. Indeed, as claimed by Czakon [18], it can be noticed that the researchers' attention has started to more intensively be paid to the proximity hypothesis.

Inter-organizational relationships are complex and multifaceted, hence more often they can be defined using different proximity dimensions [41]. Nevertheless, a high level of ambiguity and inconsistency (see the results of systematic literature reviews—[41, 44, 83] regarding our understanding and conceptualization of particular dimensions of proximity creates a strong barrier for the development of the entire concept. It is claimed that this lack of commonly accepted perception hampers the application and utilization of proximity hypothesis in scientific considerations, research explorations as well as in practical implementation into the relational strategies adopted by organizations focused either on cooperation or competition.

Given the terminological, conceptual, and measurement inconsistencies and other limitations visible in prior literature, this paper aims to thoroughly explore and critically synthesize the existing state of knowledge on dimensions of proximity, hence paying extraordinary attention to the types of specific dimensions, their understanding, and the role played in inter-organizational relationships and networks. Therefore, this paper aims at: (1) organizing the terminology and different labels used in the literature so far; (2) synthesize previous accomplishments in proximity typologies; (3) putting forward the previously proposed conceptualizations of particular dimensions of proximity using much managerial and relational perspective; (4) outlining the significance of different components of proximity for sound and longitudinal cooperation, and (5) developing a holistic, six-dimensional proximity framework applicable—especially—in management. Given the adopted theoretical perspective, namely the relational view and networking, all of the considerations as well as the developed six-dimensional typology of proximity consider proximity and its dimensions as the explanatory and explaining factors having extraordinary importance not only for cooperating organizations but also for networks of those organizations.

This paper was divided into four sections. The first one gives a brief introduction into the proximity concept considered from the perspective of inter-organizational

cooperation. The second part discusses a wide range of issues related to proximity significant in management sciences. Nevertheless, in this section, the greatest focus is paid to the role of proximity for sound, beneficial, and effective cooperation implemented in a long term. The third part depicts specific dimensions of proximity identified during the systematic literature review. One by one, the proximity dimensions—geographical, organizational, cognitive, communicational, institutional, and social ones—are discussed through: the review of definitions and meanings found in extant literature, the originally proposed conceptualization, and the specific significance for inter-organizational cooperation. Finally, in the fourth section, a six-dimensional proximity framework is developed. This typology is shown as an appropriate one in any further investigations of proximity undertaken from strategic management perspective. Moreover, the last part summarizes the main theoretical contributions, indicates managerial implications, describes the most important limitations of the paper, and outlines some future research directions.

## 13.2 The Strategic Management Perspective on Proximity Concept

One of the mainstreams of research in relational view there are drivers, antecedents, conditions, and factors of inter-organizational cooperation, including those which can explain and positively influence the cooperation outcomes. In this paper, the focus is made on one possible explaining factor—proximity. It is claimed that proximity concept—originally developed in economic geography—might be useful in investigation of business, inter-organizational relationships including those included to relational strategies adopted by modern organizations [78] as it “explains how relationships and networks (...) emerge and collaborate” [49, p. 2071].

In the field of management, so far proximity has been explored in a two, separate directions. At the beginning, the researchers’ attention was focused on internal proximity and its impact on effectiveness and performance of organizations [65]. More recently, however, the researchers’ focus has crossed the boundaries of a single organization and researchers have started to concentrate on “external” (“inter-organizational”) proximity. Indeed, the modern and current considerations and explorations of the proximity alludes to “external” proximity only.

*Proximity* refers to “the closeness of actors in the organizational terms” [9: 122]. In a broader sense, proximity can be understood as a “convergence of physical space, social and mental relationships, shared cultural values or institutional conditions” [18: 16]. Within the proximity concept, the underlying premise is that the proximate (i.e., somehow closer or more similar) entities are more willing, more eager, more capable, and more tended to cooperate. It is so, as the more similar entities either individual or collective ones are more cable to find a linking bridge and thus making cooperation possible, goal-reaching, and effective. All in all, at the core of the concept of proximity (labeled also as the proximity hypothesis), there is an assumption that

organizations are becoming more inclined to cooperate with external partners which are similar and close in some aspects of their activity or profile [5].<sup>1</sup>

Investigation of proximity in the context of relational view is gaining growing importance as the critical role of proximity for establishment, implementation, and outcomes of inter-organizational cooperation becomes more often emphasized and proved by empirical findings [78]. It should be stressed that although proximity is considered in the area of inter-organizational cooperation for almost two decades, currently it started to be more frequently used in the field of coopection the very specific type of cooperation linking direct or indirect business rivals [39]. Indeed, proximity is claimed as one of the promising concepts which can be used to develop knowledge on coopection phenomena as it suits one of the most interesting and current coopection research discourses, namely processes and practices of coopection including tensions, dynamics, and interactions [66, pp. 4–6]. Furthermore, the need to explore proximity concept from the relational view standpoint is justified as proximity is claimed to be significant success factor not only for cooperation of companies but also for:

- cooperation of universities and industry [23, 73];
- cooperation within academic community between and among university researchers [84];
- trans-regional cooperation aimed at increase of competitiveness at the regional level [33].

Therefore, proximity is claimed to be a significant issue not only for researchers and managers facing the cooperative pressure but also for policy makers [33, 37].

In vast majority of literature related to the proximity concept, proximity is perceived as an exogenous variable describing efficiency and performance of key economic processes in the XXI century, i.e., inter-organizational collaboration [18], creation, transfer and diffusion of knowledge [14, 44, 46, 63], or creation and implementation of innovation [6, 18, 27, 49, 56]. Given the strategic management perspective, the positive impact of proximity on cooperation is recognized in three ways.

First, the *positive impact on cooperation* as proximity: facilitates creation of inter-organizational relationships [35], networks [78] and ecosystems [49]; makes cooperation easier [49]; drives sound cooperation across its goals [6, 10]; impacts process, outcomes, and continuation of cooperation in a long term [35, 84]; leverages outcomes of cooperation including innovation outcomes of innovation networks [24, 43]; increases effectiveness of partnerships [23] as it allows to reduce the coordination costs [35].

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<sup>1</sup>It is worth noticing that the level of proximity may be evaluated in two ways. First, proximity level can be computed as the similarity of two particular cooperating partners, e.g., two members of strategic network. Second, it may be evaluated also based on the similarity of particular network member and all of the other network members. For instance, regarding geographical proximity, it is possible to assess its level either as the distance given in kilometers between two cooperating organizations or as the total distance of the particular organization from all other members of the network. Compare for instance Heringa et al. [37].

Second, the *positive impact on cooperating organizations* as proximity: triggers and stimulates mutual learning processes [23] and wide range of knowledge-related outcomes [37] including development of knowledge base of cooperating organizations [35] as well as intentional and unintentional knowledge flows [23]; improves innovation development [39], output [6, 37, 49] and commercialization [84], develops entrepreneurship [49, 78] or even contributes to the establishment of start-ups [35]; accelerates partners' development in terms of both turnovers and firm's size [35]; increases firms' performance [78].

Third, the *positive impact at the macro-level* as proximity: accelerates regional development [6], increases regional competitiveness and innovativeness [43]; enriches regional human capital [35] thus provides economic effects for local community, population, national institutions, industry, and government [37].

Summing up, most of the authors stress the positive relationships between: (1) proximity and collaboration, (2) proximity and innovation, (3) proximity and competitive advantage. However, those above-mentioned linkages are usually being pointed out in conceptual and purely theoretical publications. It is worth noting that the number of conceptual papers outweighs significantly the number of empirical papers (see the results of systematic literature reviews conducted by Knoblen and Oerlemans [44], or Klimas [41]). Moreover, in majority of cases, the postulates regarding the importance of proximity for creating competitive advantage, establishing and maintaining inter-organizational relationships, learning processes, increasing pace and level of innovation are not supported by—even qualitative—research results (e.g., [6, 7, 44, 45, 58]).

### 13.3 The Dimensions of Proximity

Proximity is a multidimensional [37] and complex [39] construct consisting of variety of dimensions [78]. Unfortunately, as shown by prior literature reviews [41, 42, 44] although the different authors acknowledge the multidimensional character of proximity, they do list different types of its components. Originally, the term “proximity” referred to geographical distance between entities. When proximity was first conceptualized, physical distance was the only aspect considered. Over time, however, the literature became full of differently defined and named layers, components and types of proximity not necessarily referring to pure physical location of collaborating organizations. Indeed, in the newest literature, many different areas of those similarities and fields of convergence have been identified so far (e.g., [6, 12, 16, 37, 43, 59, 78, 88]).

One of the first and simplest approaches divides proximity into spatial and non-spatial dimensions of proximity [29]. Currently, however, as revealed by Klimas [41, 42], it is possible to distinguish more than 30 different dimensions of proximity, including, for instance: expressive, instrumental, geographic, temporal geographic, physical, spatial, co-locational, locational, functional, cognitive, technological, sectoral, industrial, professional, socioeconomic, organizational, organized, positional,

structural, visionary, regarding turnover, institutional, cultural, professional, social, relational, temporal relational, personal, regarding contacts, virtual, electronic, and others. Nevertheless, the most popular approach [37] distinguishes five, complimentary proximity dimensions, namely [6]: geographical, organizational, cognitive, institutional, and social.

Besides the above terminological and structural inconsistencies, in the literature, there are some generally acknowledged aspects. First, the authors do agree that proximity as well as its dimensions are dynamic [39]<sup>2</sup> and change over time, especially during cooperative processes.

Second, given the multidimensional nature of proximity, the authors agree that the dimensions are interdependent [6, 23] and influence one another [49]. Therefore, any of proximity dimensions can be perceived autonomously neither as necessary nor as sufficient for cooperation establishment or optimizing its outcomes. Specifically, as claimed by Hahn [33, p. 104] “only when all dimensions of proximity are balanced, will they be able to serve as a mediator or infrastructure fostering cooperation” [33, p. 104]. Moreover, as suggested by Jakobsen and Steinmo [39], the sound cooperation, especially in case of cooptation, the different, alternative combinations of proximity dimensions may be needed to benefit from synergistic effects, thus to achieve the common goals and make cooperation successful. Theoretically, the interdependencies between and among different proximity dimensions may be examined as two complimentary mechanisms, namely substitution mechanism (where one dimension substitutes another or others) and overlap mechanism (where one dimension facilitates another or others). However, as shown by Hansen [35], the significant substitution mechanism seems to be valid just in case of geographical and institutional proximities, hence the overlap mechanisms seem to be possible but not existing in business reality.

Third, it is commonly acknowledged that proximity should not be maximized but rather optimized, as being too similar does not maximize the outcomes of cooperation [37, 49] or even might be harmful for cooperating partners [40]. It relates to the claims about the inverted U-curve importance of proximity for cooperation as well for outcomes reached by cooperating partners [6] indicating that proximity either facilitates or hampers cooperation [84]. Among the most often discussed negative effects of too high level of proximity, there are the increase in the risk of lock-in [6, 33] and the risk of opportunistic behaviors [35, 84]. Nevertheless, this aspect might be seen as doubtful as there are some studies which have not find evidence for it [37].

The wide range of dimensions and typologies of proximity is one of the main barriers to the development of proximity as it limits and even does not allow to: (1) compare the results of particular research, (2) make comparisons between different considerations, and (3) draw any general conclusion from research based on different classifications of proximity. In other words, in authors’ opinion, the lack of consistency regarding the structure of proximity and the scarcity of fully consistent definitions and conceptualizations of its particular dimensions can be seen as

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<sup>2</sup>Note that there is one exception, namely geographic proximity seen as permanent and constant [78].

current and essential cognitive gap which should be filled with detailed, theoretical, and literature review-based explorations. Following the relational view and the current stock of knowledge in this theoretical paradigm, the terminological chaos, lack of conceptual, operational and measurement consistency among scholars give solid grounds for asking critically important question “Collaboration requires proximity, but what kind of proximity, and how do different proximities interact?” [23, p. 552]. Answering the above questions seems to be particularly important as the above-mentioned positive effects of proximity for both cooperation per se and cooperating partners may depend on the type of cooperation and the type of assumed cooperation outcomes. As suggested by Heringa et al. [37], even though geographical and organizational proximities have positive influence on intangible (soft) outcomes, they negatively impact the tangible (hard) ones. Furthermore, as shown in prior literature, it might be that some dimensions are more important for cooperation-related issues. For instance, organizational and cognitive proximities are claimed to be critical for partner selection [84], hence social and cognitive proximities are argued to be particularly important for outcomes reached either at macro- or at meso-levels [37].<sup>3</sup>

The approaches and dominant perspectives on typology of proximity conceptualized to date were identified as a part of systematic literature review following all of its methodological requirements [51, 72].<sup>4</sup> To collect the relevant literature, four electronic databases were used: ABI Proquest, Ebsco, Emerald, and Web of Science. The searching criteria (including: proximity, external proximity, networking, collaboration, cooperation, and cooperation) allowed filtering the initial database of more than 60,000 papers to narrow it down to 126 articles. The initial dataset was prepared in 2013. Nevertheless, to cover the current stock of knowledge, it has been supplemented by re-searching and re-selection of literature at the end of the year 2018. The update of the dataset allowed us to include further 27 articles identified using the same searching criteria.<sup>5</sup>

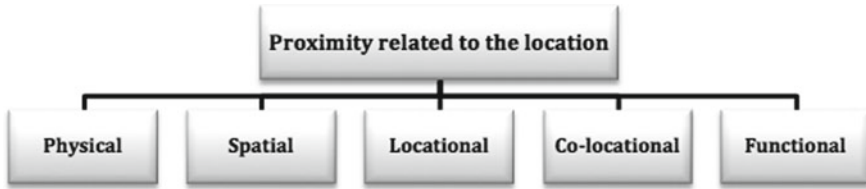
The created literature base (153 articles) was analyzed applying frequency, content, and bibliometric analysis. The frequency analysis allowed identifying the dominant theoretical and research perspectives on conceptualization and operationalization of particular dimensions of proximity. The content analysis was focused on: (1) assessment of prior publication and research including indication of their shortcomings, and (2) recognition of the postulated and investigated significance factors of proximity for inter-organizational collaboration (including cooperation) and networking. Finally, the bibliometric analysis was aimed at identifying the most important publications and authors in the field of proximity (citation and co-citation analyses)

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<sup>3</sup>Compare also with other works showing the “the most critical” dimensions of proximity in the context of inter-organizational cooperation, e.g., cognitive, social, and organizational [49] or technological, cognitive, and social [39].

<sup>4</sup>The detailed description of the systematic literature review can be found in former publications of the author (e.g., [40, 41, 42]).

<sup>5</sup>The one and only one difference there was the intentionally set year of publication. The second round of literature searching excluded papers published before the year of 2013.



**Fig. 13.1** Types of proximity related to physical location of collaborating organizations

to be able to make easier decisions about conceptualizations, definitions and even terminology adopted in case of particular dimensions of proximity.<sup>6</sup>

The main results of the systematic literature review referring (only) to the proximity dimensions and typology of proximity are presented below. In general, it was possible to distinguish six different and separable, however, interconnected (complimentary and to some extent substitutive) dimensions of proximity, namely: geographical, organizational, cognitive, communicational, institutional, and social.

### 13.3.1 Geographical Proximity

The most frequently described, yet rather vaguely defined type of proximity concerning relative location of organizations is geographical (geographic) proximity, perceived using either narrow or wide approach. The former concentrates on physical location of entities relative to each other [29]. Geographical proximity perceived from that angle is referred to as spatial proximity, physical proximity, or just the distance per se. From the other angle, geographical proximity could be perceived either absolutely or relatively [35]. In the first instance, it refers to distance between entities and accessibility of given organization using the infrastructure in place. In the second instance, geographical proximity is expressed by degree of concentration of entities around given area. Employing the wide approach means factoring in various aspects of geographical proximity—physical (spatial), locational (co-locational), and functional at the same time. Hence, as far as geographical proximity is concerned, relatively to specific assumptions the physical, spatial, locational, co-locational, or functional proximity could be referenced (see Fig. 13.1).

*Physical proximity* is also known as *spatial proximity* defined as physical distance between entities concerned [49]. This proximity is measured as distance given in kilometers [76, 80, 84, 87] or as some ratios, indicators, and proxies computed based on the real distance between or among organizations [23]. As this type of

<sup>6</sup>As this paper is a conceptual one, the focus—when presenting the results of systematic literature review—is paid to the content analysis, synthesis of prior and development of new conceptualizations of particular dimensions of proximity. If you are interested in more quantitative findings (e.g., analysis of citations, co-citations, and references carried out using social network analysis) please see Klimas [41].



proximity is constant, some authors label it as *permanent geographical proximity* [78]. *Locational proximity* also refers to distance and reflects the location of entities enabling them to have personal, face-to-face interaction [71]. However, Menzel [58] defines *co-locational proximity* in the same manner. Generally, the rule of thumb is that similar location means the same city or distance up to 50 km. A far broader type of proximity defining location of partners is *functional proximity* [16]. In this case, apart from geometric, pure distance [84] between entities, it also is conditioned by the transport infrastructure and available transport network. Therefore, functional proximity involves simultaneously the reviewing distance, transport availability, time and cost of reaching the other organization [53].

**Conceptualization of geographical proximity.** Geographical proximity is perceived as a construct formed from two components, i.e., physical and functional proximity. Physical proximity refers to physical distance between two organizations. Functional proximity, on the other hand, covers (apart from physical distance) time and cost of travel, infrastructure in place and availability of various forms of transport. Note, that functional proximity as opposed to the locational one does not define the distance itself, but considers how accessible are other entities.

**Significance of geographical proximity.** Scientific efforts of researchers in investigating geographical proximity focus on its indirect influence on businesses performance through its direct influence on inter-organizational relationships, networking, and knowledge-related processes, i.e., creation, exchange, transfer, spillover, etc.

First, geographical proximity favors establishing [60] and tightening inter-organizational collaboration, fosters and stimulates willingness to create inter-organizational relationships. Moreover, geographical proximity is a key for establishing horizontal cooperation [26], creating clusters of SME companies [74], and for collaboration, especially if this collaboration needs a frequent and personal contact [58]. For instance, small distances between partners are important for establishing relationships with suppliers, sub-contractors, and clients as they need to contact quite often. Clusters are also a good example since they are formed through geographical proximity of partners [83]. In particular, in asymmetrical networks, geographical proximity is strategically important for network leaders [21] including other non-leading ego networks [84]. Furthermore, the sufficient level of geographical proximity within the whole network makes network coordination and management more efficient. Notice that geographical proximity is closely linked with direct contact between entities—the closer locations of organizations the more frequent and more efficient is their communication. It is so, as the face-to-face contacts affect all four critical inter-organizational functions, namely: facilitate knowledge transfer, foster mutual socialization, build trust and create informal networks [75]. The latter three functions would prove that geographical proximity indirectly encompasses social and cultural aspects [29]. Thus, usually the greater the physical distance between organizations the greater social and cultural differences between their employees.

Second, geographical proximity is beneficial for knowledge creation, exchange, transfer, and diffusion [23]. As discussed above, it facilitates frequent personal contact involving less time and costs. Therefore, due to the assumed opportunities of

more frequent F2F contacts, it is highlighted that geographical proximity—conversely to other proximity dimensions—not only stimulates knowledge transfer processes [8] but also allows partners to exchange the tacit [28] and sticky knowledge [23]. Personal contact is the best way for transferring the tacit type of knowledge, i.e., experience, skills, methods, and techniques of processes implementation, which is otherwise difficult to write down, codify, or verbalize. In a more general perspective, the processes of knowledge creation, transfer, diffusion, and absorption leveraged by adequate geographical proximity not only improve the growth rate of businesses but also increase their competitiveness [31] and stimulate fast-track innovation [6]. Furthermore, long-term inter-organizational relationships established based on frequent contact of closely located organizations help building trust, thus weakens, limits, or eliminates opportunistic behaviors, expensive mechanism of information protection, and other transactional costs. Moreover, sufficient physical proximity can facilitate the staff turnover between companies, what also streamlines and accelerates the processes of organizational learning and strengthening inter-organizational interdependencies [47].

Third, geographical proximity benefits innovation [52], especially when closely located companies, research institutes, governmental institutions operate within the same industry or sector [85]. Significant gains for innovation stemming from close physical distance are substantiated by popularity of clusters [43], industry agglomerations [54], innovative milieus [27], innovation networks [24], and ecosystems [49]. Another advantage of geographical proximity is the spillover effect, which requires collaborating entities to be closely located [50].

It should be noticed, however, that currently, the physical distance seems to become less important [20], hence in the literature, there are also more explicit statements claiming the death of geography [53, 59]. Indeed, the digitalization of modern social and business life, advancements in telecommunications, development of transport infrastructure, availability and accessibility to different communication forms and ever-shorter traveling cause that knowledge transfer (even of tacit knowledge) does not necessitate physical proximity. In particular, it is emphasized that face-to-face contact can be temporarily arranged during the trade fairs, symposia or conferences (distinguished as the temporal geographical proximity—[64, 78]) making physical proximity over-estimated [37].

### 13.3.2 *Organizational Proximity*

Chronologically second dimension of proximity which has been explored by researchers there is organizational proximity.<sup>7</sup> Given the results for prior literature reviews [41, 43, 44, 82], this dimension, its perception, understanding, and structure

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<sup>7</sup>Note that organizational proximity developed and discussed by Boschma [6] is not the same as organized proximity considered by Torre [78]. Particularly, A. Torre, A. Rallet, and J. P. Gilly perceive organized proximity as a dimension covering not only organizational similarity (here

remain the most blurred one. Indeed, the exiting conceptualizations do differ significantly in terms of the scope of meaning, definition, and sub-components; hence, the latter seems to differentiate the authors the most (see Fig. 13.2).

Boschma [6]—the most cited author in the field of proximity—argues that proximity manifests itself as the convergence of relational space, interactions, coordination of actions, and knowledge bases. The Author sees organizational proximity as extent to which organizations share relations under mutual agreements. In this perspective, organizations sharing the same owner have the highest level of organizational proximity [5]. Even though Boschma’s paper has the highest level of citations, provided conceptualization of organizational proximity seems to have some significant shortcomings. Given the current stock of knowledge, and papers published after Boschma’s seminal study, in particular, his approach suffers from the following limitations: it covers aspects considered under other dimensions of proximity (e.g., cognitive proximity—the similarity of knowledge bases; social or communicational proximities—relational links); it is limited to control mechanisms determining how organizations collaborate, thus making organizational proximity a feature of inter-organizational relationship, as opposed to relative nature all other dimensions of proximity (different levels of analysis—dyad versus node); it assumes that the highest level is reached by organizations having the same owner what remains inconsistent with the general assumption of relational view that in case of inter-organizational cooperation and coepetition the focus is paid on cooperation of independent, or at least interdependent organizations (any ownership is included).

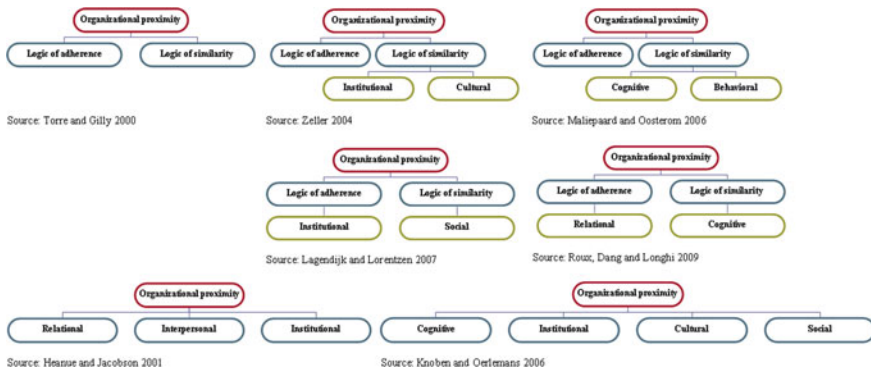


Fig. 13.2 Types of organizational proximity of collaborating organizations

organizational proximity) but also other aspects acknowledged by other authors as separate dimensions of proximity, e.g., cultural values and believes, technological complementarity, relationships including also the interpersonal ones. Specifically, Torre [77] distinguishes organized proximity covering logic of belonging (participation in a wide range of networks) and logic of similarity. In the latter, he considers not only cultural aspects (cultural similarity usually incorporated as a part of informal institutions under institutional proximity) but also mental models, cognitive distance, common languages commonly considered as components of cognitive proximity.

**Conceptualization of organizational proximity.** *Organizational proximity* reflects convergence of autonomous entities with respect to internal and external organizational determinants [6] assessed through the logic of belonging (adherence logic) and the logic of similarity (similarity logic) [29, 78, 79]. In terms of *adherence logic*, organizational proximity reflects overlapping relational spaces where collaborators or competitors do operate together [29]. It boils down to the adherence of partners to the same organization at the higher level of analysis [48], i.e., being part of the meta-organization [32]. Importantly, under the logic of adherence there are covered both direct and indirect inter-organizational relationships [78]. Nevertheless the scope of consideration is limited only to formal and inter-organizational relationships. It is so, as informal (social) and individual (interpersonal) ones are considered within the social dimension of proximity.

Organizational proximity, in terms of *similarity logic*, refers to the homogeneity of separate organizations with respect to the internal organizational determinants and characteristics. It is shaped by the similarity of adopted strategies and organizational goals [84]; the convergence of internal organization, i.e., organizational structures [15, 53] (including the level of internal coordination, hierarchy, bureaucracy [49] and control mechanisms [35]), organizational culture [25, 53, 84], management style [16], company profile [82], adopted organization-specific rules, regulations [84], incentives, and routines [37].

**Significance of organizational proximity.** For inter-organizational cooperation, organizational proximity is expressed as one of the most important from the strategic management perspective [35, 43]. It is so, as organizational proximity triggers creation of new inter-organizational ties [11] and improves the efficiency of cooperation interlinks which have been exploited already [17, 23]. Furthermore, it positively affects cooperation through improvements of coordination [57], building and reinforcing of trust [36], reduction of uncertainty [6], and finally limiting the risk of opportunistic behaviors [5, 6, 35]. Finally, organizational proximity is one of the three dimensions of proximity the most significant for knowledge-oriented collaboration [44]. Given the above, it is claimed that the high organizational proximity provides extraordinary valuable benefits for both cooperation initiatives (e.g., networks) as well as cooperating organizations—Table 13.1.

The current state of knowledge shows that adequate organizational proximity is desired in order to co-create new knowledge [19]. It is argued that similar organizations have greater understanding of what kind of (if any) combination of individually possessed knowledge, competences, and skills is required in order to do implement co-creation processes. Organizational proximity, however, offers much more than that. It improves, intensifies, and accelerates knowledge transfers. Companies are capable to acquire new and develop current knowledge faster as well as disseminate and share the knowledge already obtained more efficiently [62]. Furthermore, organizational proximity provides mechanisms coordinating and improving dissemination of knowledge throughout the network—both within its center and peripheries [45]. All in all, organizational proximity can be assumed as explanatory variable of the

**Table 13.1** Significance of organizational proximity—network cooperation perspective

Author(-s)	Year	Significance of organizational proximity
Heanue and Jacobson Davenport Dangelico, Garavelli and Petruzzelli	2002 2005 2010	Facilitates and accelerates joint creation of knowledge, competences, and skills, including ability to absorb knowledge
Lagendijk and Lorentzem Petruzzelli, Albino and Carbonara Broekel and Boschma Dangelico, Garavelli and Petruzzelli Fu, Schiller and Diez	2007 2009 2009 2010 2011	Reinforces and enhances knowledge transfer (both tacit and codified)
Petruzzelli, Albino and Carbonara	2007	Gives access to knowledge (also this inaccessible at the market)
Heanue and Jacobson	2002	Allows organizations to integrate information and knowledge (including tacit knowledge)
Filippi and Torre	2003	Triggers and accelerate diffusion of technology
Boschma Fu, Schiller and Diez	2005 2011	Favors inter-organizational learning
Fu, Schiller and Diez Coenen, Moodysson and Asheim	2011 2004	Accelerates knowledge diffusion and spillover effect
Boschma Hall and Jacobs Fu and Schiller Klimas Herringa, Horlings, van der Zouwen, van den Besselaar and van Vierssen	2005 2010 2011 2014 2014	Stimulates innovation
Oerlemans and Meeus	2005	Leverages firms' performance
Klimas	2014	Improves innovation network performance

Source Own elaboration using Klimas [43]

overarching objective of innovation networks [43]. If its level is sufficient, it significantly facilitates creation and sharing knowledge, thereby improves innovativeness of individual actors of the network and of the innovation network itself.

### 13.3.3 Cognitive Proximity<sup>8</sup>

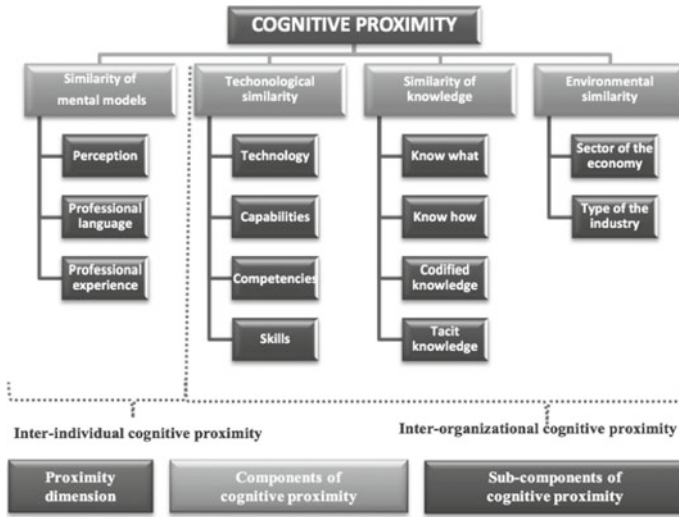
The third dimension of proximity widely discussed in the literature relates to knowledge bases, competences, skills, capabilities, professional experience, technology, and perception of the world. Although, these aspects are acknowledged as critically important for inter-organizational cooperation [44] and cooperation as well [39] it is hard to find one, commonly accepted label covering all of them. So far, those aspects of similarity have been considered under such proximities like: cognitive, technological, sectoral, industrial, and professional. Furthermore, there are authors considering the similarity of knowledge bases, competences, and perceptions under socioeconomic [82], or even organizational [6] and organized proximity [78, 79] making the boundaries among particular dimensions of proximity vague and blurry.

In the most popular, and the widest approach, the *cognitive proximity* refers to similarity of organizations regarding the knowledge bases [16] including the professional knowledge [37], technological competences [6], professional capabilities [23], experiences [63], and expertise [84]. It is emphasized, however, that this similarity is conditioned by, based on, and linked to the way in which organizations—seen as a collective community of employees—perceive, interpret, understand, and evaluate their business environment [58]. Therefore, cognitive proximity besides the knowledge- and technology-related aspects considered at meso- (i.e., organizational) level covers also the similarity of mindsets [88] or mental models [40] considered at the level of individuals (i.e., micro-level of analysis).

Together with the growing interest in cognitive proximity [6, 40, 44] further, more detailed, hence more or less overlapping types of proximities have started to be considered. For instance, *professional proximity* related to the employees' similarity in terms of their way of understanding the surround reality and their competencies [70]; *technological proximity* restricted to the similarity of technologies adopted by cooperating organizations [44, 61]; *sectoral (industrial) proximity* understood as running business activity in the same sector of the economy [53]. All in all, we claim that those aspects of similarity, as all are related to common understanding, knowledge, and experience should not be seen as separate proximity dimensions, hence as sub-dimensions included under the cognitive dimension of proximity.

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<sup>8</sup>This dimension has been explored in great details in Klimas [40] whose conceptualization is fully adopted here. Nevertheless, as this paper aims at holistic typology of proximity, its cognitive dimension had to be included and discussed. However, this section should be seen as a brief—re-written, developed, and updated—summary of proposition deeply discussed in the above-mentioned article.



**Fig. 13.3** Dimensions of cognitive proximity. *Source* Klimas [40, p. 17]

**Conceptualization of cognitive proximity.** Cognitive proximity is defined as convergence in specific knowledge and professional competencies owned by organizations, taking its source and influenced by similar ways in which employees perceive, interpret, understand, and assess the surrounding world. Following the results of literature review [40], cognitive proximity comprises four areas of similarity between organizations, i.e., mental, technological, sectoral, and knowledge-related one (see Fig. 13.3).

Following the typology developed by Klimas [40], cognitive proximity covers four interrelated sub-dimensions including three considered at meso- (organizational) level and one at micro- (individual) level of analysis. *Similarity of mental models* is the only one sub-dimension considered at micro-level of analysis. It results from shared perception (including mental models and ideological beliefs—e.g., [53]), common professional experience (including knowledge about regulations, norm, standards but also past work and educational experience—e.g., [83]), and understanding of professional language (including specific terminology, codes, jargon, or even non-verbal messages—e.g., [39]). At the meso-level of analysis, three sub-components are considered, namely technological similarity, similarity of knowledge, and environmental similarity.

First, there is *technological similarity* determined by the compliance, coherence, complementarity, and similarity of the adopted technologies (including technological solutions, implemented processes, and utilized machines and equipment—e.g., [40], professional capabilities (including mainly the codification capabilities—e.g., [23]), competencies (including mainly the manual ones—e.g., [78]), and finally both technical and non-technical skills—e.g., [35]).

Second, there is *knowledge similarity* resulting from the similarity of different types of professional knowledge [37, 68] and expertise [84] including, in particular: know-what, know-how [40], codified, and tacit knowledge [23].

Last but not least sub-dimension of cognitive proximity considered at meso-level there is *environmental similarity* resulting from running activity under the same sector and even the same type of the industry [40]. Regarding this sub-dimension of cognitive proximity, it should be emphasized that even though it used to be perceived as taken for granted in case of cooperation restricted to one industry [35], however, due to the growing technological complexity, increasing specialization we should not assume that cognitive proximity is high for all members of particular industry. For instance, video-game industry seems to be a multifaceted regarding the technological solutions, knowledge, and expertise. There are companies targeting the console gamers, mobile players, or PC hardcore gamers, hence games played by those types of gamers do significantly differ in terms of technologies adopted, e.g., compare games played on PC like the *Witcher* (developed for four years using the latest technological advancements) with games played on smartphones like *Angry Birds* (developed for several months using simple technological and graphic solutions).

**Significance of cognitive proximity.** The significance of cognitive proximity is reflected by its positive impact on inter-organizational processes as it improves communication and is particularly beneficial for a wide range of knowledge management processes. First, cognitive similarity accelerates communication by making it more precise [18], more efficient [39], and more informative [35]. Beneficial influence on effectiveness of communication processes further enhances knowledge management processes [6, 63, 68, 84], development of absorptive capacity of partners [39] as well as its profitable exploitation [35]. Second, cognitive proximity significantly enriches and develops knowledge management processes including [40, p. 15]: knowledge creation, knowledge access, knowledge acquisition, knowledge transfer, knowledge absorption, knowledge assimilation, knowledge interpretation, knowledge categorization, and knowledge exploitation. It is highlighted, however, that the positive impact of cognitive proximity on knowledge-related processes seems to be the strongest and the most valuable regarding the stages of codifying and decoding information and knowledge by partners [23]. Cognitive proximity provides relevant benefits, however, once it exceeds a certain level it could bring also opposite effect to those being intended by cooperating partner. This phenomenon is labeled as the paradox of cognitive proximity and represented by a parabolic (inverted “U”) character of the relationship between cognitive proximity and—especially but not only—innovativeness [84]. Therefore, maintaining an accurate level of cognitive proximity is challenging, since it involves much more than just maximizing it. Indeed, this is continuous balancing between no cognitive proximity (misunderstandings, communicational difficulties, no common business areas) and maximum cognitive proximity (homogeneity of knowledge limiting or decreasing innovativeness, e.g., [6]).

It is worth to note that the above effects of cognitive proximity should be seen not only as valuable for cooperating partners but also as significant for regional development, as at the macro-level, it contributes to knowledge spillover effect [50] and



technological acceleration [24]. Last but not least, given the general understanding of proximity concept, its cognitive dimension is claimed to be excellent substitute for geographical proximity [63] and significant accelerator for social proximity as it builds trust and informal contacts between experts [70].

### 13.3.4 *Communicational Proximity*

Many authors interested in proximity hypothesis stress its importance for inter-organizational communication [67, 78]. The relationship between proximity and communication seems to be extraordinarily important and strong as some scholars have started to introduce—more or less explicitly—components or sub-components of proximity reflecting both indirect and direct inter-organizational communication (for instance, see, the latest publications by A. Torre). Given the current stock of knowledge on proximity, as well as the specific link between cooperation and communication expressed in relational view, we claim that communicational proximity should be isolated as a separate dimension of proximity. Furthermore, acknowledging communication-orientated dimension of proximity stems also from the fact it could be perceived as complementary, substitutional [59], or moderating [23] for geographical proximity. Communicational proximity enables capturing involvement of partners to collaboration, crucial for inter-organizational relationships. This proximity dimension encompasses areas of communication referred in prior literature as: (1) relational proximity dedicated to indirect and direct communication [24], (2) virtual proximity dedicated to indirect communication, or (3) temporary geographical proximity dedicated to direct, F2F but time-limited communication processes [78].

**Conceptualization of communicational proximity.** The first component of communicational proximity is *relational proximity* determined by the frequency [67] and intensity of inter-organizational communication and involvement of partners in mutual communication processes. In that sense, relational proximity derives from strength of inter-organizational relationships [24], nevertheless the strength of inter-organizational contacts does not include the informal and interpersonal contacts (a part of social proximity or personal proximity in terms of [84]). When discussing relational proximity, we refer to organization–organization contacts (B2B), dedicated to business meeting targets, compliance with procedures and executing operations fundamental for those collaboration-oriented contacts. Hence, the interest lies in relationships underpinned by data feed instrumental for delivering on common goals. The relational proximity seen from the perspective of communicational relationships between separate organizations is a key for longevity of those relationships, however, formal and inter-organizational (not interpersonal and informal) relationships only. According to prior research [30], the strength of relationship (level of relational proximity) impacts network cohesion; the importance of particular nodes; information and knowledge diffusion. Nevertheless, beyond all of the above, it determines the level of heterogeneity and radicality of jointly accessible knowledge, thus the novelty co-innovation as it does influence both the bridging and bonding social

capital [24]. Importantly, as in case of cognitive proximity, the relationship between relational proximity and performance of collaboration is represented by an inverted “U”. Exceedingly high relational proximity could lead to the paradox of proximity which may result, for instance, in the higher risk of opportunistic behaviors.

Second aspect considered under the communicational proximity is *virtual proximity* (*electronic proximity*). It is created when communicating organizations are using IT technology and electronic (audio, video, audio–video) devices to contact with each other [88]. Virtual proximity is determined by the frequency, intensity, and involvement of electronically communicating partners (indirect electronic communication). To a large extent, achieving high virtual proximity depends on access to the Internet and current IT technologies facilitating communication at distance. Communication media critical for virtual proximity are e-mail, video and virtual conferencing, phone calls, chats as well as wide range of digital communicators (including internet communicators such like Messenger, WhatsApp, Telegram, Signal; voice communicators such like TeamSpeak, Xfire; communicators available through social media, e.g., through Facebook) which in great proportion replace regular face-to-face interactions. It should be emphasized that current technical advancement makes virtual proximity an equivalent or even superior to geographical proximity due to the growing mobility, development of ICT, accelerating internet speed, and global digital revolution.

Third component of communicational proximity is *temporal* (*temporary*) *geographical proximity* occurring between organizations in a certain, usually quite short amount of time [53]. Temporary geographical proximity as opposed to geographical proximity is highly time-variable. Its dynamics is contingent on mobility of organizations which collaborate [77]. Temporary geographical proximity is achieved through taking the real part in inter-organizational meetings as it covers direct, F2F, and time-bounded contacts [78]. The latest findings [35] show, however, that temporal geographical proximity does not restrict to regular and planned meetings (e.g., during annual fair trades, conferences, symposia, convents, exhibitions, etc.) but covers also occasional ones (e.g., during periodically and ad hoc realized joint activities like lobbying or joint ventures like R&D consortia). According to prior research, obtaining periodically high geographical proximity (here temporal geographical proximity) could be an effective defense mechanism against the lock-in effect [64]. Direct and intensive contact, although brief, creates an opportunity for intensive exchange of information, experiences and knowledge with current and potential clients, competitors and all other stakeholders. In other words, the periodical—regular or occasional—maintenance of high temporary geographical proximity postpones until a later time or prevents altogether from materializing the cognitive proximity paradox. As virtual proximity is, temporal geographical proximity is a tool for making an organization more flexible [69] and accelerating the efficient flow of tacit knowledge [77]. The importance of temporal geographical proximity increases in case of long-term collaboration with multiple organizations, especially if this multi-actor cooperation is irrespective of physical distance or geographical proximity [23]. Importantly, as claimed by Sternberg [74], the personal contacts covered by both the relational and

temporal geographical proximities are substantially more important for efficiency of communication than even the lowest geographical distance.

### 13.3.5 *Institutional Proximity*

The level of proximity between organizations can be discussed in terms of similarity of determinants, factors, and aspects considered at the macro-level of analysis, e.g., industry, country, region, etc. The macro-perspective draws attention to institutional and cultural faces of proximity. *Institutional proximity* is reflected in similarity of institutional conditions imposed by specific administrative geographical territories [84] under which organizations operate. Companies similar in an institutional sense are established in the same institutional environment, e.g., country, region. Thus, they have to comply with similar political [78],<sup>9</sup> regulatory, and legislative frameworks put in place by the relevant bodies [38]. At the macro-level, the second significant dimension of proximity discussed in the literature there is a *cultural proximity* reflected in similarity of cultural surroundings [24]. It should be highlighted that Eklinder-Frick et al. [24] understood cultural proximity broadly, in a not commonly acknowledged way covering not only similarity of national cultures but also the closeness of organizational cultures of cooperating organizations. We claim, however, that cultural proximity relates to similarity of national cultures only. Our claim is reasoned as follows: (1) cultural proximity is considered at macro- (not meso-/ organizational) level [84]; similarity of organizational cultures is considered at meso-level under organizational proximity [25, 43, 53, 78]; national cultures which similarity is considered under cultural proximity [27, 83] are seen as an informal institutional environment [38]. In this perspective, cultural proximity is seen as not covering issues related to organizational cultures. Furthermore, as it is conditioned by macro-factors, including informal institutional aspects, it should be incorporated into institutional proximity.

Institutional proximity is seen as closeness of both formal and informal rules and regulations, thus including cultural aspects [49, 78, 84]. It is so, as the institutional environment is created by the network of formal (established on institutional level) and informal (emerging in an evolutionary manner) institutions. The formal institutional environment is constituted by a framework of legal standards and bodies appointed to execute them. Informal institutions (also referred to as social or cultural), on the other hand, are founded spontaneously and emerge from current moral standards, ethics, tradition, fixed action patterns, mindsets, habits, and customs [38]. Nonetheless, the issue of whether to distinguish formal and informal institutional environment is subject to a fierce discussion about proximity determined by factors considered at the macro-level and the two specific views are found across the current literature.

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<sup>9</sup>It should be noticed that A. Torre does not distinguish institutional proximity but considers its aspects under the logic of similarity covered by organized proximity.

The first one, in which both formal and informal institutions are classified under the institutional proximity [29, 35, 49, 78, 84]. In this perspective, the institutional proximity is defined in a broad way. The second view distinguishes institutional proximity concerning formal institutional environment and cultural proximity concerning informal institutional environment [44]. Note, however, that although the second approach emphasizes the close relationship between these two (macro) dimensions of proximity [24], the first one expresses that cultural proximity is a sub-component and co-creates institutional dimension of proximity [35].<sup>10</sup> All in all, the dominant approach is the broad one, implementing into institutional proximity also the cultural threads. Indeed, Boschma [6] who gets the most quotes and citations incorporates both formal (laws, political rules) and informal (culture, social norms, and standards) institutional aspects into institutional proximity.

**Conceptualization of institutional proximity.** It is generally recognized that institutional proximity is considered on the macro-level, i.e., where formal and informal institutional environments are convergent [35, 84]. Therefore, *institutional proximity* is the dimension of proximity stemming from similarity of macroeconomic conditions under which organizations operate. Institutional dimension of proximity is constituted by two components reflecting similarity of formal (e.g., legislation) and informal (e.g., culture, customs, and social standards) factors for business operations. In that vein, the level of institutional proximity is determined by hard and soft factors [57]. Among the hard-institutional factors, there are laws, administrative regulations [29], political regulations [78], economic practices, and general trade regimes [88]. Simultaneously, the elements such as standards, virtues, social and cultural routines [27], environmental and cultural restriction, official language [83], national habits, social rules [35], national values [78], and social and cultural norms and standards [49] are all the soft factors. The underpinning of the above-mentioned approach is an assumption that both hard and soft factors co-determine the institutional proximity by creating a mixture of sociocultural, economic, political, and legal context for inter-organizational collaboration [6].

When discussing the level of institutional proximity, and evaluation of this proximity among cooperating partners, in particular, it is noteworthy to point out one groundless and mistakenly accepted assumption. Because of its nature, institutional dimension of proximity is closely linked to location (country) where organizations operate (e.g., legislative differences, moral and cultural virtues). Therefore, some authors argue that in case of research restricted to a single country, institutional proximity should be excluded from analysis, as organizations operating in the same country are highly institutionally proximate [34]. In reality, however, it would be irrelevant and unreliable to undertake in advance that organizations operating in the same country display maximum level of institutional proximity. For instance, the institutional environment affecting activity of organizations varies relatively to their types or size (e.g., the differences between public, private, and non-government

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<sup>10</sup>It is worth to note that there are some authors who identify institutional proximity with cultural proximity [80], but as others criticize [19] in such an approach some aspects, crucial for collaboration, could be overlooked.

organizations; the differences in financial regulations for large, medium, small, and micro-companies). Furthermore, the culture (i.e., norms, standards, common habits, etc.), in some countries, varies by location and particularly strong cultural hotspots are found near borders.

**Significance of institutional proximity.** Institutional proximity is perceived as a factor advantageous for establishing inter-organizational relationships as it gives grounds for building inter-organizational trust and lowering uncertainty [78]. Moreover, once the relationship is established, institutional proximity strengthens its meaning as it fosters development of a common ethos and mutual engagement [88] thus limiting the risk of opportunistic behaviors [84]. Significance of institutional proximity is also visible for efficient implementation of organizational learning and knowledge exchange. Organizations operating in similar formal institutional environment are more likely to build mutual trust, consequently fostering exchange of synthetic knowledge. Similarity of informal institutional environments, on the other hand, through literacy in current social and cultural standards expedites the transfer of symbolic knowledge [57] and improves the efficiency of tacit knowledge flows [60]. It is emphasized, however, that the role of institutional proximity in efficient implementation of knowledge- and innovation-related processes is time-variable. Its importance is most explicit at the preliminary stages of cooperation aimed at recognizing the potential areas of new knowledge/innovation development and identifying its hypothetical value. Nevertheless, as organizations strive together to devise knowledge and explore areas of common interest, the significance of institutional proximity decreases [86]. Furthermore, if cooperating organizations are too much institutionally similar the innovation outcomes are not maximized [49]. It is worth noting that given the multidimensional and complex nature of proximity, the significance of institutional proximity seems to be extraordinary important. As shown explored by scholars, it complements the low-level geographical [35] and temporary geographical [45] proximities. Moreover, it is the factor moderating and controlling any interaction between organizations at both micro- (interpersonal relationships thus social proximity) and meso-level (inter-organizational relationships thus organizational proximity) [53].

### ***13.3.6 Social Proximity***

It is only the social dimension of proximity that fully reflects micro-determinants (personal in terms of Hansen [35]) within the framework of proximity concept, i.e., people affiliated with collaborating organizations and maintaining inter-organizational relationships. In the literature, the social surroundings considered from proximity hypothesis standpoint are discussed using three different labels, but the scope of understanding taken by particular authors is quite similar. In general, proximity based on interpersonal relationships is being referred as relational (e.g., [24]), personal (e.g., [35]), or social proximity (e.g., [82]).

As far as *social proximity* is concerned, it is considered whether collaborating partners share any social roots or social embeddedness [78] using more sociological perspective [30], which is reflected in social consistency [15]. If organizations are similar in a social sense, should their employees have interpersonal relationships [82] based on trust [34, 39], friendship, kinship [15, 49], other family ties [78] as well as shared passions and interests [45], or past experiences [7, 37, 78].

*Relational proximity* relates to multivariate (vertical, horizontal, and lateral) interpersonal relationships [87] and less temporal interactions [24] between organizations based on trust, friendship, or acquaintance. Ramirez-Pasillas [64] divides relational proximity into *permanent* and *temporary relational proximity*. Permanent relational proximity is reflected by constant—or maintained in a long time—vertical, horizontal, and lateral multi-directional interpersonal relationships. It is complemented by temporary relational proximity regarding ties and interactions lasting for certain amount of time, e.g., during business trips.

The very last dimension of proximity related to interpersonal relationships found by means of literature review is *personal proximity* reflecting not only personal relationships and ties [35] but also personal contacts and acquaintances [70].

**Conceptualization of social proximity.** Bearing in mind previous approaches to relational, personal, and social proximity, it is fair to say that their logical content almost fully does overlap and differences between them are mainly caused by the nomenclature used. Nevertheless, two remarks should be discussed.

The first point needed to be highlighted seems to be an inclusion of formal (or even inter-organizational) relations under either social or relational proximity. Following, the mainstream of understanding social proximity is social, and it covers interpersonal relations [39] and should be considered at micro- (personal) level of analysis [35]. Thus, formal and inter-organizational relationships need not be considered here.<sup>11</sup>

Second, some authors draw a line between discussed dimensions of proximity by a virtue of assumption that the social dimension boils down to the acquaintance (e.g., consequence of shared past professional, education, and private experiences), whereas relational to the relationships currently maintained between people [44] either occasionally or regularly [64]. Distinguishing between the two is substantiated by the arguments that the people coming from the same backgrounds and sharing the social roots may maintain any contacts (e.g., they stopped contacting each other due to the lack of sympathy, they have never met while studying, etc.). Nevertheless, we do believe that the social proximity incorporates both active (currently used) and passive (currently maintained and existing but not used) interpersonal relationships. We claim it is important to include the passive relationships under social proximity, as even though they are not exploited in any shape or form as per today, they allow individuals to have an opportunity to exploit them in future, in a point of time when they would be a valuable source of first contact. In that manner, the passive interpersonal relationships can be seen as “ready to be used”, thus limiting significantly the

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<sup>11</sup>Furthermore, as discussed earlier, such relationships are covered by communicational proximity and its relational sub-component, in particular.

time-to-market reaction in comparison with the lack of past contacts, experiences, or social backgrounds.

**Significance of social proximity.** Among the most important implications of social proximity, there are improvement and acceleration of communication processes [2], creation of sound climate for cooperation [49], and improvement of cooperation performance [39]. Employees feel much more ease of working with and exchanging knowledge with people they know as they are “linked” by, e.g., friendship, kinship, university, education, work experience, etc.). Given the more detailed perspective, social proximity is seen as a vital factor influencing the scope and pace of knowledge co-creation, mutual learning, and successful co-innovation [39]. It is so, as social proximity is critically related to trust [35]. On the one hand, it is based on and driven by trust [78], on the other, it enhances trust [39] what makes social proximity crucial for creation, transfer, and diffusion of tacit knowledge [1]. As shown in research conducted in Chinese region of Pearl River Delta, a high social coherence improves and stimulates innovative behaviors of partners as well as innovativeness within the innovation networks [27].

Often emphasized in literature is that social proximity is a key for innovation-orientated projects carrying substantial risks [34]. Indeed, among all dimensions of proximity, the social one is acknowledged as the most important for limiting the risk of opportunistic behaviors [35]. Particularly, social proximity hampers and limits the tensions between and among cooperating competitors [39] seen as critically important success factor regarding cooperation performance [66]. The literature shows, however, that although social proximity reduces the risk of opportunism, too much of it significantly increases the risk of opportunistic behaviors of partners [49]. Therefore, reaping the very best benefits from social proximity does not mean constant strive for maximizing it.

The relationship between social factors and innovation is nonlinear and represented by an inverted “U” [81]. This parabolic relationship acknowledged in sociology finds its reflection in social proximity paradox. In order to optimize the benefits of social proximity, it has to be adequately moderated. Excessively low social proximity could result in a lack of involvement from partners in establishing inter-organizational relationship and increase the uncertainty of reaching the common goals. On the other hand, too close and intensive interpersonal relationships could lead to unintentional and uncontrolled leaks of both knowledge and information (at certain stage, employees are oblivious to the fact they represent separate or even competing organizations) and waste of time on activities generating little in the way of intended outcomes of collaboration. What is more, high level of social proximity could also cause other negative phenomena: favoritism, nepotism, corruption [34], or—as discussed above—opportunistic behaviors. Therefore, for smooth cooperation, it is important to monitor the level of social proximity to ensure that the valuable interpersonal relationships are maintained, while at the same keeping them at bay to protect partner against the problem of “over-embeddedness” [24, p. 996].

### 13.4 Discussion and Conclusion

Analysis of literature published to date reveals inconsistencies, overlaps, and shortcomings in how proximity is defined. There is an agreement, however, that proximity is a highly complex and multidimensional concept [44]. Nevertheless, this multifaceted character and intrinsic difficulty to define it (caused by intangible and abstract nature of proximity) have led to terminological chaos, difficulties in comparing results of prior research, and problems in generalizing. The willingness to limit the conceptual ambiguities and amend inconsistent definitions resulted in development of six, separate but interlinked dimensions of proximity including: geographical, organizational, cognitive communicational, institutional, and social (see Fig. 13.4).

The six-dimensional proximity framework includes:

- four dimensions of proximity based on convergence of organizational attributes (meso-level): geographical proximity, communicational proximity, cognitive proximity, and organizational proximity;
- one dimension of proximity based on convergence of attributes of institutional environments (macro-level)—institutional proximity;
- one dimension of proximity based on interpersonal relationships between people (micro-level)—social proximity.

The multifaceted character of proximity requires defining relationships between its dimensions [4]. If we take the perspective of the formal logic, the following assumptions and remarks should be highlighted:

- the sum of all of the identified dimensions of proximity does not necessarily provides the complete picture of overall proximity;

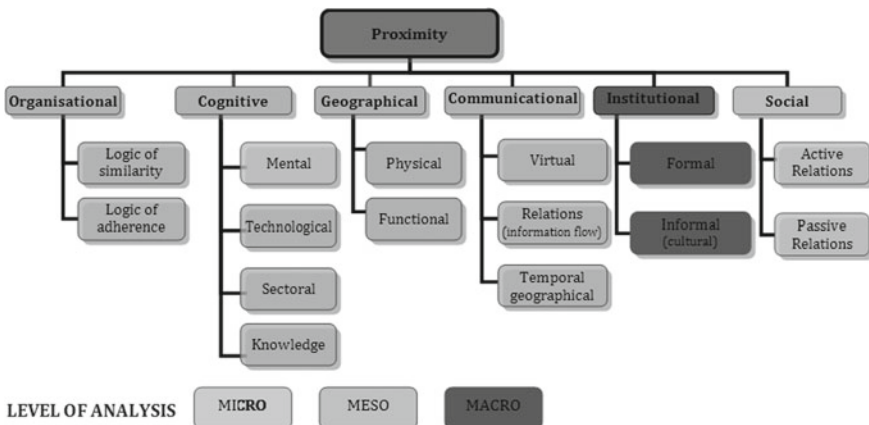


Fig. 13.4 Six-dimensional proximity framework



- all of the separated dimensions are considered at first level of division (at the current state of knowledge the particular dimensions of proximity could not be hierarchically ordered, thus for now, they are perceived as equal);
- the particular dimensions of proximity are not mutually exclusive;
- the logical contents and scope of understanding of particular dimensions of proximity are separate;
- all of the particular dimensions of proximity are mutually complementary, hence to some extent, they might be substitutive.

The dimensions of proximity should be seen as complimentary and quite substitutive. One should bear in mind, however, that their substitutive interdependency is restricted, as the minimum level of each dimension of proximity is needed. We see the developed six-dimensional proximity framework valuable as it constitutes both proximity concept and relational view considered within strategic management.

The originality of the considerations being the most important theoretical implication abolishing prior barriers to the further development of the proximity concept. It should be highlighted that the typology proposed above eliminates or at least decreases limitations of distinctions previously made in the literature.

First, our framework provides understanding and definitions exclusive hence tied in with clear and distinct confines of particular dimensions what prevents our proposition against any overlaps between and among different dimensions of proximity. As shown in prior literature [37, 41, 44], a high level of overlaps hampers both development and applicability of proximity concept in business reality. It is so, as the current understanding is blurry and confusing—the different labels are used for the same facets of proximity (e.g., personal, social, and relational proximity or cognitive and technological proximity); the same labels are used for different facets of proximity (e.g., technological and cognitive proximities; personal and social proximities); the borderline between different proximities are blurred (e.g., cultural aspects may be considered under social, organizational, and institutional proximities).

Second, the developed framework assumes that the level of proximity (no matter which dimension is considered) is perceived as relative feature of particular organization assessed in relation to other organization (or whole network of organizations). It means that proximity dimensions cannot be assessed in isolation from external entities what make it in particular importance for considerations undertaken within relational view adopted in strategic management research.

Third, the proposed framework argues to assess proximity simultaneously on different levels of analysis, namely: micro-people/individuals, meso-organization/inter-organizational aspects, and macro-institutional environment. It is so, as the overall proximity is determined simultaneously by personal factors (micro-level), organizational factors (meso-level), and factors regarding institutional environments (macro-level). The application of multi-level perspective should be seen as methodological contribution as the prior typologies have omitted the issues of multi-levelness, hence the application of multi-level approach is recommended and desired, especially in case of further studies within the relational view and inter-organizational cooperation in particular [3]. Furthermore, the proposed multi-level approach supports prior

claims highlighting that the dimensions of proximity do differ from the perspective of the reasoned level of analysis (e.g., [84]). In particular, the proposed framework remains consistent with exploration run in the Dutch nanotechnology industry showing that for research on inter-organizational cooperation the levels of proximity ranges from micro, through meso- to macro ones [84].

One should bear in mind, however, that the above-mentioned division is not complete (in terms of adequacy condition imposed in the formal logic), thus it is a topology as opposed to classification [55]. Furthermore, the current stock of knowledge regarding inter-organizational proximity does not allow us to unambiguously confirm that all of the above-listed dimensions make up a full picture of proximity. We are aware that there could be dimensions of proximity, which have not been revealed or identified so far, and thus defined, thereby included in the proposed typology of proximity.

To sum up, in authors' opinion, the originality of the paper is based on the fact that the proposed typology of proximity: (1) synthesizes the earlier conceptualizations and definitions of the particular dimensions of proximity, (2) integrates and develops prior considerations concerning the dimensions and typology of proximity, and (3) points out the importance of proximity from the strategic management—namely cooperation and networking—perspective. Nevertheless, the authors are aware that presented findings are not free from certain limitations stemming mainly from limitations of the systematic literature review [72] being a source of data for our considerations, explorations, and exemplifications. Among the most important limitations resulting from the methodological approach adopted hereby is the limited range of the literature base and the authors' subjectivism.

In conclusion, some fruitful lines for further research should be outlined. Literature review proves that little research on proximity has been done from perspective of strategic management. The need to complete and verify current scientific accomplishments regarding proximity is the fundamental driver for further research both exploratory (e.g., dynamics of proximity, relationships between particular dimensions of proximity, holistic approach to proximity from perspective of different dimensions) and explanatory (e.g., research verifying hypotheses stated in literature about importance of proximity, identification of other, not revealed so far, dimensions of proximity). All in all, as the proximity hypothesis gains dynamically growing interest, while the vast majority of prior works is rather theoretical or conceptual, we do believe that there are many unexplored, interesting and very much topical research direction within the proximity concept.

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