




New proximities during and after the Covid 19 pandemic

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ABSTRACT

Various proximities played a central role in the Covid-19 crisis, whether they promoted the spread of the pandemic, reduced human and social interactions, or allowed for exchange and contact at a distance. But they were also profoundly affected by the pandemic. Geographical proximity became dangerous and deadly, while distance-organized proximity increasingly developed through the use of ICTs. Both were associated with a dramatic rise in social and spatial inequalities. The object of this article is the analysis of how the pandemic reveals and modify both the functioning and the impact of proximities on our lives, from the examination of notions such as social distancing, lockdown or teleworking, and the use of proxemics. We conclude on the difficulty for a society to live at a distance.

1. Introduction

The Covid-19 pandemic has impacted our Societies by surprise. Now is the time to take stock of its economic and social impacts, particularly at the spatial level. Indeed, the pandemic has had a significant and more or less lasting effect on proximities, sometimes modifying or reversing their perception. Mainly unprepared for the arrival of an epidemic from a health, economic and psychological point of view, lacking a response in terms of medical treatment or vaccine, the public authorities reacted with more or less extended measures of isolation. Many countries have chosen to lock-down populations widely, for varying periods of time, or to introduce curfews to avoid the risk of an even greater spread of the virus. Others have abolished face-to-face events or reduced their size, from cultural and sporting events to schools, high schools and universities courses. All imposed or strongly recommended wearing the mask, tried to limit meetings, reduced the number of people in the shops or imposed social distancing. (JORT, 2023; JPE, 2021; OECD, 2021)

These risk-adverse behaviors and the subsequent societal choices have had a great impact on proximities, in spatial and social terms. They drastically reduced a large part of face-to-face exchanges between people, and significantly impacted social interactions. And the end of the lockdown or curfew induced a new phase of modification of interpersonal relationships, with the generalization of barrier gestures (the term is significant), quotas of attendants or wearing masks, even for vaccinated persons. If the introduction of isolation or barriers clearly constituted an obstacle to productive and commercial activity, it also has had a strong impact on our lifestyles, challenged many personal and professional habits and practices, and raised many questions about life

in society and relationships between people. As economic and social concern for the future grows, the fact of living with masks, to avoid gatherings and to keep distances indoors questions about our model of life in society and of the possibility to maintain geographical proximities or to replace them by more distant relationships.

In this new situation, the issue of proximity has been brutally imposed everywhere, and has largely endured after the peak of the pandemic. We are all concerned with proximities, whether they are considered as a right, a need to be satisfied or a danger and a risk to be avoided. The Covid pandemics was global. But it was also characterized by major differences in spatial terms (Labour and Industry, 2022; Sun et al., 2020), between countries, which were unequally impacted (Kapitsinis, 2020), and between regions and territories (Bailey et al., 2020), affecting urban agglomerations more intensively than rural or peripheral areas (Pikner et al., 2023), modifying the geography of global supply chains (Panwar et al., 2022), and the economic position of SMEs (Belitski et al., 2022).

This paper proposes to examine the essential role that proximities played in the Covid 19 crisis, whether they promoted the spread of the pandemic, reduced human and social interactions, or allowed for exchange and contact at a distance. The objective is to understand and measure the extent to which this event has changed the ways in which proximities are understood and their place in economic and social relations. With the help of proximity and proxemics analytical tools, we show that this change is part of an overall dynamic, which is that of new proximities and their renewed role in economic and social exchanges, and the modalities of organization of spaces and places.

In the text, we show that proximities occupied a central place in the

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development or fight against the pandemic (I), but also that their perception is now changing, and sometimes reversed under the influence of economic and social developments caused by the spread of the virus (II).

2. The increasing role of proximities during the pandemic

The various categories of proximity are at the forefront of the current transformations and they played a crucial role during the Covid 19 pandemic. Indeed, they promoted the spread of the pandemic and played a strong role in reducing human and social interactions. At the same time, they also allowed individuals and organizations as well as companies to continue to exchange and keep in touch, including from a distance. Their role, previously sometimes discreet or hidden, is now strongly highlighted, and appears unavoidable.

2.1. Geographical proximity and the increase of security distances

Let us start with a first point, which is not questionable. The Covid crisis did not introduce completely new relationships or a complete rupture with previous periods. Above all, it has been a formidable accelerator in the long-underway process of distancing relationships and reducing interpersonal contacts. The continuous development of social networks and the Internet, as well as contact-free communication, is the best example of this, with the progressive dematerialization, in recent years, of written content and interpersonal exchanges. In the same spirit, the increase in telework is an unmistakable factor in most industrialized countries (Messenger, 2019). And there are even much older examples of contactless bartering, allowing the exchange to be mediated, as in the enlightening example of the Dayaks civilization for example (Sellato, 2002).

These various elements, which can be associated with the success of the GAFAM and their influence on daily life, reveal a constantly strengthened artificialization of our relations. An ever-increasing proportion of inter personal or organizational exchanges now takes place at a distance, and the role played by geographical proximity diminishes and is transformed in two ways. First of all, an increasing fraction of face-to-face or physical interactions is being replaced by long-distance relationships via communication technologies: telephone, of course, but especially computers and smartphones, through dedicated software or social networks (Torre, 2008). Much of the exchanges that called for the co-presence of participants is now taking place from afar. This is true in a professional setting, with collaborations between firms, researchers or laboratories that maintain cooperative relationships, for example. This is also the case for a large part of personal relationships, with the development of social networks, remote dating applications, or online shopping that reduce human contact...

At the same time, we are witnessing the development of large gatherings, like fairs or congresses, which are characterized by the meeting, in the same place and for a very short time, of many people wishing to meet, to interact and to intersect at the same time (Bathelt et al., 2017). Thus, a new dimension of geographical proximity, temporary, is developing, which also takes other forms with the movements of engineers or sales representatives, who regularly visit the companies with which they cooperate (Torre, 2011). This is also true for individuals with the development of theme parks or tourist factories like Benidorm or Ibiza for example. These places not only allow access to products or services located within the same area (the agricultural or automobile fairs, Disneyland or Le Puy du Fou), but also to people who go there to meet or engage in common activities such as weddings in some diasporas or business meetings for example (Wasko, 2020). This is also the case for events that come back on regular dates, such as the Olympic Games for example (Scandizzo and Pierleoni, 2018). The rest of the time, the exchanges are done remotely, so that the two modes of interaction develop in parallel, to the detriment of the more traditional forms of geographical proximity, which are more akin to co-location.

Today, and in response to the Covid 19 crisis, distance relationships based on information and communication techniques tend to substitute for face-to-face interactions. While they also remain embedded in social dimensions, they act on the separation of bodies and people through the development of the Internet and social networks. And they are undoubtedly an important turning point in the way much of the world's population, especially in the middle and upper classes, works. Indeed, thanks to the development of exchanges on the Internet, Skype or social networks, these virtual interactions make it possible to exchange knowledge and to work or collaborate by largely abolishing constraints of geographical proximity, and to develop ever more intense and sustained virtual relationships (Torre, 2014).

2.2. Geographical proximity and social distancing

During the pandemic, public authorities have implemented different distancing or separation policies to try to avoid or to limit contact between humans, or to solve problems of too intense and repeated face-to-face relations. A series of barrier actions aimed at minimizing contact, from the wearing of masks to safety distances and tracing of patients have been implemented and sometimes imposed in various places, in particular in big cities (Mistur et al., 2023). We have also been able to observe an unprecedented scale of international COVID-19 vaccination rollout and strategy, and about fifty-five countries have implemented at least one policy of mandatory vaccination (Cameron-Blake et al., 2023). These policies have also developed at a very physical level in cities, with the rise of tactical urbanism (Stevens and Dovey, 2023), which has made it possible to erect more or less temporary infrastructures of protection and isolation such as lanes or tracks dedicated to traffic, blocks preventing passage, barriers, etc. (Abdelkader et al., 2023). At times, a profound impact has remained, with the extension of these urban planning initiatives into the policies for the implementation of the 15 min-city (Fabris et al., 2023).

This is why, following the great epidemics of the 20th century, the setting of social distancing, which takes various forms and is based on more or less radical techniques, some of which have been familiar to us since the Middle Ages, was advocated: wearing masks, isolation of identified patients, quarantine, school closures, prohibition of cultural, sporting or religious gatherings, total lockdown of the population, restriction of movement, prohibition of leaving one's place of life, etc. So many gestures or measures that can be combined, and whose objective is to avoid suffering the deadly geographical proximity.

In 1918, during the Spanish flu pandemic, Doctor Max Starkloff defined and then implemented the principle of «social distancing». This method, which merely repeats and systematizes much older practices, prohibiting in particular the gatherings of more than twenty people, has been applied on several occasions in cases of epidemics. Studies conducted in the city of Sydney estimate that they have saved between 100,000 and 260,000 lives on this occasion, so that it is inferred that they play a major role in reducing the impact of the epidemic in terms of public health (Caley et al., 2007). Other research suggests that social distancing, however severe, is only effective in the face of not too virulent epidemics (Reluga, 2010), and that there is no substitute for vaccination effectiveness as soon as the spread factor becomes too high.

This social distancing has sometimes been pitted against physical distance, which would more accurately reflect the dangerousness of relationships and exchanges during a pandemic. However, favoring the term physical distance is a simplification that makes us forget that human relationships are hidden behind physical interactions or technical exchanges. It is true that the term distance or social distancing is ambiguous and could be considered an oxymoron. However, this ambivalence is fundamental. It has the merit of illustrating the relationships between social animals that are human beings and is much richer for reflection than mere physical or geographical distance.

Social distance or distancing, expression throws confusion, but its ambivalence has the merit of highlighting the complexity of the human

relationship and its link to space. Indeed, the distance from human beings thus prescribed takes both a spatial form with the separation and the distance advocated in relation to others, but also a social form since it prevents interactions and isolates us from our loved ones. The notion of social distancing is therefore appropriate, since it reflects both the need for physical distancing, and the need for social contact hampered by different types of barrier measures, but also the fact that socialization is dangerous, as evidenced by family reunions or restaurant meals. Like other concepts (clusters, urban agglomerations, places of leisure, etc.), its understanding requires both the mobilization of notions of geographical proximity – which analyzes the neighborhood, the distance – and organized proximity – which deals with human interaction, rules, and the role of institutions.

“Proximity tracing” or “contact tracing” applications were often used during the pandemic. They are intended to identify positive test subjects and report them to people in their immediate geographical proximity, thanks to Bluetooth for example. The development of these techniques, based or not on the volunteers of infected people, obviously raises legal questions and massive individual freedoms, as well as issues of artificial intelligence, big data or machine learning. Fraser and his team simulated the use of proximity tracing in a fictitious city of one million (Ferretti et al., 2020) and estimated that the use of this application, based on geographical proximity, could lead to a massive reduction in the spread of the coronavirus, especially given the emphasized role played by aerosols (Azimi et al., 2021). Further applications in Singapore, however, show that the social component plays an essential role not anticipated by the latter, with the refusal of many people to download the application, which becomes effective only if more than 60 % of the population makes use of it, and the obligation that was further made to the population, largely against its will (Jalabneh et al., 2021).

The impact of the pandemic was evident even in public facilities that promote social distancing, as shown by the rise of strategic or tactical urbanism, which has now a permanent impact on many urban centers. In order to restrict contacts, reduce the extent of the car lanes or partially reassign them to bicycle lanes, the traffic directions may be changed, but also points or beacons may be installed to isolate and separate pedestrian lines, using construction equipment, for example (Honey et al., 2020). A new development of space is emerging, in a post-COVID world with certain characteristics that appear to become perennial thanks to this changes (mostly) urban infrastructures. However, policy makers should be aware of the impact of these policies on the mental and physical health of populations (Cartaud et al., 2020).

2.3. The rapid development of teleworking putting spatial and social inequalities under strain

Once the crisis was over, some habits formed during the lockdowns proved to be powerful and lasting. This is the case with the increase in remote work and online consumption, two phenomena that predate the health crisis, but whose recent development is massive and largely irreversible. E-commerce has thus experienced an explosion, which is not denied. Distance buying and selling practices have developed very quickly (Nanda et al., 2021), with a clear increase in the turnover of these activities, but also an acceleration in the digitalization of businesses, such as local shops, producers or restaurateurs, which are increasingly playing on the complementarity of physical and digital commerce (Galhotra and Dewan, 2020), causing many bankruptcies of well-known brands that have not withstood this wave of restructuring (Amankwah-Amoah et al., 2021).

Nowadays, many health and physical dimensions seem to favor remote working or forms of “smart working” involving an important share of teleworking time and reduced-dose of face-to-face work. A survey in China has put the stress on the Workplace Policies and its impact on Health-Related Quality of Life during the pandemic (Wong, 2022). Another survey of Italian social security enterprises (INPS) (Biasi et al., 2021) shows that the distance between the place of residence and

the place of work plays an important role and that remote working is particularly appreciated by those who live far away, as it helps to reduce the monetary and non-monetary costs of travel. It also makes it possible, according to the employees, to organize the working day better, to balance the time devoted to family and professional activity, or even to increase the productivity of the tasks performed. However, there is a significant difference in satisfaction across categories of individuals or households. People living alone tend to feel too isolated (Bourdeau-Lepage and Kostosz, 2021), and above all there is a significant difference between men and women, to the detriment of the latter. Staying at home, women assume more domestic obligations and care, so that poor collaboration within the household has an asymmetrical effect on the perception of the benefits of this form of work (Fisher and Ryan, 2021).

Telework is growing strongly (Dingel and Neiman, 2020), especially in cities (Crowley and Doran, 2020), based on the use of information and communication technologies (ICT), in parallel with other modes of remote interaction such as teaching. Zoom or Skype meetings multiply (Alsartawi et al., 2022). But the telework solution is not applicable to all professions, and this difference discriminates between blue- and white-collar workers (see the study of Braesemann et al. (2022), on various North American, European, and South Asian remote platforms of tele-workers). Deadly geographical proximity was primarily suffered by employees or workers of large cities, in developed countries. Continuing to work on the front lines as caregivers, cashiers, garbage collectors... constrained to promiscuity in rarefied public transport, they were exposed to the risk of disease, even though in many places they often did not have the simplest tools of social distancing (Hatayama et al., 2020). At the same time, white-collar workers and managers are experiencing a change in working conditions that gives a much more important role to organized distant proximities (Mongey and Weinberg, 2020).

By their tendency to amplify inequalities and by their renewed relationship to digital exchanges proximities become a relentless indicator of social and spatial divides. As regards geographical proximity, the size of the apartment or the house, the number of rooms and of persons occupying them, the arrangement of a garden or terrace, the access to areas with parks, refers to opportunities for social distancing and community living that are more or less significant based on income (Andrade et al., 2022). Given the central role played by aerosols, it is far more dangerous to impose lock-down for large families to be confined inside small dwellings than to well-off households with large dwellings (Ewers and Kangmennaang, 2023), and better for them to move away in the open air which is likely to be safer, in particular when masks are worn (Li and Wei, 2023).

Beyond the epidemiological risk, the small size of the dwelling for a large family or group home also makes lockdown difficult for two reasons: social relationships became more complex, even bumped (Mark et al., 2020), and confinement has led to a deterioration in mental health and well-being in many countries (Bourdeau-Lepage and Kostosz, 2021). The proximities are exacerbated and the space that each person has is drastically reduced. The increase in household and domestic violence becomes the price to pay in the event of an exit ban, and logically affects the most disadvantaged neighborhoods (Ryan and Nanda, 2022), where the number of people is much higher per square meter. The pain is thus twofold, just like the contrasting character of social distancing: to physical infection is added social misery. Distance is difficult to maintain, especially for emerging economies, where a large part of the income is based informal activities, which require daily contact, and where the population does not have sufficient savings to be able to stop any activity even for a relatively short period. Conversely, the renewed interest in rural areas, and the mention of a possible “urban exodus”, motivated by the desire to find themselves in a “healthier” space, is above all a question of income. Each lock-down was marked, in the developed countries, by a massive displacement of the richest urban people, who went to the countryside or to small towns, to their second homes or to rentals, in order to get away from the large agglomerations

(Breuillé et al., 2022; Crowley and Doran, 2020).

3. The new perception of proximities

The proximities are not only at the forefront of the new relationships driven by the pandemic. Their very nature is greatly affected by the development of the Covid crisis, as well as its contemporary consequences. These changes, which affect both geographical and organized proximities, have to be seriously considered. This is particularly the case at the urban level, where the dangers are concentrated, but geographical and organised proximity are both profoundly affected in every situation, and their perceptions change significantly (Taylor et al., 2020).

3.1. Dangerous urban proximities

The city is the archetypal place of interaction and causalities between proximities (Bourdeau-Lepage and Torre, 2020). By definition, it offers a permanent geographical proximity, that of the more or less close neighbourhood, which facilitates complex interactions, as well as frequent and repeated face-to-face contact between a wide variety of individuals. Today, it is the 15-minute city project (Moreno, 2024), which promises rich and extensive interactions, an urban organization allowing any inhabitant to access his or her essential living needs in 15 minutes of walking or cycling from home, and thus offers to satisfy his or her essential social functions (living, working, eating, healing, educating oneself, having fun) in a minimum of time and space. Geographical proximity provides the opportunity for regular and repeated face-to-face meetings between locals or visitors, while reducing their cost of transportation or contact tracing.

The city thus increases the possibility to interact with neighbours, and above all to have a large number of partners with whom to exchange or work (Glaeser, 2010). It offers many opportunities for business relationships, but also for friendships or romantic encounters. All these possibilities are above all made possible by geographical proximity. But they are also the result of organized proximity. Indeed, there are groups of people in the city who share common tastes, whether it is simply the greater statistical possibility than in a sparsely populated area to meet partners corresponding to particular expectations, or the existence of groups or clubs dedicated to sports, intellectual, recreational, sexual activities, etc. It should also be noted that the city is a vector of anonymization of individuals in the crowd. And so, in a way it contributes to reducing various proximities outside of established social spaces (clubs, businesses, etc.) and to increase the level of loneliness of urban dwellers (Burlina and Rodríguez-Pose, 2023).

The city is also home to the terminals of major infrastructure networks (train stations, airports, ports, etc.), which are subject to significant economies of scale. By reducing the costs of long-distance travel, it offers geographical proximity allowing for distant, temporary and infrequent face-to-face interactions. In a lot of European countries, where the public rail network has been considerably reduced, devoted to fast speed trains and tightened around a few large cities, the latter are the place to meet and stay easily. Thus, the city, as the focal point of the phenomenon of urban agglomeration, with its diversity and complexity, is the crossroads of all proximities, because it involves, in a small space, different types of actors and possibilities of interaction.

The perception of proximity in terms of location in cities is generally nuanced and subject to discussion, taking also into account inconvenient like congestion or urban violence, but one clear observation can be easily drawn. It is the massive shift towards urban agglomerations in recent decades, and finally the "vote by the feet" in favor of the cities and their peripheries, to the detriment of peripheral areas and the countryside. This position was brutally undermined as soon as the COVID pandemic became aware of the dangerousness of the COVID pandemic (Testa et al., 2022). In this context, and from the first days, it appeared that cities were particularly dangerous and conducive to the transmission of the disease, a finding confirmed by statistics. As shown by the

Financial Times' analysis tool (Coronavirus Tracker, online from the beginning of the pandemic until late 2022: <https://www.ft.com/content/a2901ce8-5eb7-4633-b89c-cbdf5b386938>), all the capitals – as well as the major cities – of the world have experienced massive exposure to the disease and a much higher rate of contamination, then mortality, than other territories. These rates have largely been maintained, even after the general spread of Covid, suggesting other determinants than the mere proximity of airports or train stations vectors of ultra-rapid transmission. Cities, and more particularly large cities, quickly appeared as "dangerous places", where it was important to protect oneself, or even from which it was necessary to move away quickly.

The introduction of social distancing rules, and in particular the most extreme, total lock-in, distancing from others, thus recommended, or even imposed, have often led, in response, and for those who could afford it, to a limited and occasional residential migration (Åberg and Tondelli, 2021). Sometimes wrongly described as an "urban exodus", it consisted of a brief massive displacement, during the lockdowns, in a few countries, of the wealthiest urban categories to the countryside or smaller cities, in second homes or temporary rentals (Pikner et al., 2023). For a moment, it was thought that this move would prove to be permanent, and that the possibility of living in the countryside, far from neighbours, would be strong enough to provoke a significant number of new rural people from urban areas. But in fact, the allure of cities soon proved strong enough to hinder permanent migration again and led to residents remaining urbanites.

During this period, proximities have proven to be a ruthless revelation of social and spatial divides, by amplifying inequalities and their renewed relationship to digital exchanges. The size of the home, the number of rooms and the people who occupy them, the layout of a garden or terrace, access to parks, refer to more or less opportunities for social distancing and living together depending on income. This is especially true for large and poor families living in small areas. Lock down is more dangerous inside small homes for large families. The cramped size of the home or a collective home also made lock down difficult and social relationships complex, even bumpy in these periods (Gurney, 2023; Ryan and Nada, 2022).

The deadly geographical proximity was also suffered in the first place by employees or workers in large cities. Continuing to carry out their activity as caregivers, cashiers, garbage collectors on the front line... They were forced to live in close public transport, which was scarce, at the risk of illness. At the same time, white-collar workers and managers were experiencing a change in working conditions, giving a much more important role to organized proximities experienced at a distance (Holst et al., 2020). This inequality also impacted emerging economies, where distance is difficult to maintain because a large part of the population lives from informal activities requiring daily contact, and does not have sufficient savings to be able to stop working. Not to mention the inhabitants of slums or favelas, where forced confinement became the norm of all dangers, social, economic and health (Djankov and Panizza, 2020).

3.2. The inversion of the perceptions of geographical proximity

The crisis leads to an inversion of the perceptions of geographical proximity, of which an immense literature praised the favorable effects. It is the search for geographical proximity by human beings wishing to meet together and benefit from their local amenities and labor markets (Fujita and Thisse, 2013) that explains the birth and growth of cities and metropolises, especially when it is associated with the search for contact and social interactions, which fall under another type of proximity, organized one (Bourdeau-Lepage et al., 2022). Their combination gives rise to agglomeration economies, which are positive externalities enjoyed by all inhabitants and to which they aspire by locating themselves in densely populated areas, at the cost of certain disadvantages, such as the remoteness of nature, and of loved ones, family or friends, who often live in other cities, villages, or countries.

A similar finding is made in the field of production or innovation activities, which largely benefit from the small distance between firms, sometimes competing. Clusters (Porter, 1998) are the best example of this search for geographical proximity, which leads to the spatial concentration of firms in a small territory, in order to benefit from spillovers of knowledge and exchanges favorable to innovative activity (Balland et al., 2016), as well as to shorten distances with suppliers or sub-contractors. In this situation, organized proximity is also essential, with the sharing of cognitive, emotional, cultural and organizational resources. The combination of these two variables – geographical proximity and organized proximity – is the basis for positive interactions. To resume the joke of Alfred Marshall (1890), their secret is not in the air but in the social bonds.

But Covid has shaken everything up. Indeed, in times of pandemic this classic causality is reversed, because the risk of diffusion is much greater in the heart of cities or agglomerations. Geographical proximity, hitherto sought for its benefits, becomes a major source of inconvenience, at the risk of disease and death, because it makes it possible to spread the virus or to be contaminated, due to the short distance between people and the spatial concentration in streets, confined spaces, work spaces and public transport. Group meetings are dangerous. A strong geographical proximity visibly promoted the spread of Coronavirus and the infestation of people, by direct physical contact (coughing, sneezing, snorting, etc.) and indirect (touching a contaminated surface), or by airborne transmission, and the hazard might persist for several days due to the permanence of the virus on certain surfaces (Vespignani et al., 2020).

We went from a situation of sought for geographical proximity to a situation of unwanted geographical proximity, which is based in particular on two dimensions: contiguity, which imposes promiscuity, and neighborhood, which makes fear of the presence of residents, even without their immediate presence. The disadvantages of geographical proximity are well known, in particular the superposition processes, the promiscuity or the unwanted neighborhood, which give rise to oppositions and sometimes more or less long and violent conflicts between neighbors (Magsi and Torre, 2014). This is generally the case in situations of pollution of water or air, or even the creation of large infrastructures or facilities that cause nuisance. But in times of pandemic, geographical proximity becomes at any time risky, even dangerous, and especially in the most densely populated areas or in the open spaces once praised for their friendliness or ease of contact.

Approaches to proxemics (Hall, 1966; Hall et al., 1968; see Annex) allow us a fine understanding of geographical micro-proximity, with the highlighting of different spheres around the individual, linked to intimate, personal, social and public distances, which can only be crossed under certain conditions. These contact areas around an individual were strongly influenced both by technical gestures and the fear of contact (intimate and personal distances) caused by the undeniable spatial dimension of the spread of the pandemic. Thus, co-working in open spaces became dangerous and prohibited, even as face-to-face interactions, recommended for the co-creation of knowledge, ideas or the dissemination of innovations, are cut off or made impossible. Many of the benefits of co-locating innovators or engineers were thus being wiped out and workplace interiors need to be rethought. The same was obviously true of invention laboratories such as living labs or fab labs, which are based on the grouping of people in the same place, face-to-face exchange, the common manipulation of technical objects and joint interventions on the same process... Or third places, which mix technicians and lay users in the development of shared projects (social and public distances).

The spatial impact was huge. Since the beginning of the pandemic, many urban dwellers had become accustomed to going to work only rarely, or remained locked up in their homes for longer or shorter periods of time, on their own initiative or on the encouragement of companies and public authorities. Many expressed their preference for less populated spaces, and would prefer to live in the countryside, or in

remote suburbs, at least during the time of the epidemic. Peri-urban areas, which were often criticized because they require long journeys to reach and are not virtuous in terms of land consumption, were now praised for their advantages in terms of isolation and distance, as well as for the size of houses, which allow teleworking. It would be preferable, as far as possible, to move, at least temporarily, to less densely populated rural or peripheral areas, who experience the disadvantages of geographical proximity more lightly because of their lower concentration. Beyond the epidemiological risk, the small size of the dwelling for a large family or group home also makes lockdown difficult and social relationships complex, even bumped (Ryan and Nanda, 2022; Mark et al., 2020). The proximities are exacerbated and the space that each person has is drastically reduced. The increase in household and domestic violence becomes the price to pay in the event of an exit ban (Ryan and Nanda, 2022), and logically affects the most disadvantaged neighborhoods, where the number of people is much higher per square meter (see classical studies on this topic by Miles-Doan (1998) or Beyer et al. (2013)).

3.3. The irresistible development of remote organized proximities

The increase of remote relationships is not limited to teleworking activities. It affects all economic and social activities, for example the development of telemedicine, and even more exchanges with friends or family through the screens of tablets or computers. These relationships extend by capillarity to the different strata of society, which get used to more distant communication, and modify our social vision and our daily life. In these situations, it is the organized proximity, of relational and not geographical essence, which is first of all solicited, because it allows the maintenance of the link at a distance and the feeling of being close to the people we love without touching them or meeting them.

Researches on proxemics can again bring some explanations on this topic, in terms of fine understanding of organized micro-proximity this time. Recent works in this field examined the development of information and communication technologies related to human behaviors in the context of virtual exchanges. They have shown that the physical positioning of players in remote games can be understood and, above all, envisaged according to the laws of proxemics. An example of this is the way in which players position themselves in front of and not far from the console when playing games such as Nintendo Wii, Microsoft Kinect, or Sony Move (Greenberg et al., 2011). Some authors go further and consider that the wireless zones defined by Wi-Fi, Bluetooth or NFC radio waves have similar characteristics to those defined by traditional proxemics analysis, with an invisible proximity field, a center and area of influence affected by contacts, so that they can be described as wireless proxemics zones (Mueller et al., 2014).

But the question is the quality of these non-contact interactions. Here again, the functioning of the two private and professional spheres is problematic. From the point of view of interpersonal relations, we can question the capacity of the media to allow us to show ourselves correctly and to expose the facets of our personality at a distance. If we take Goffman's approach to the presentation of the face (Goffman, 1959), we may think that the presentation of oneself remains incomplete at a distance. In particular the facade exposed to others and the dramatic realization remain imperfect and often unfinished, letting pass a truncated and sometimes misleading message: how many meetings Zoom mixing tie and suit or shorts and pajamas?

Obviously, this situation is also found in the professional sphere, where the relations between colleagues and associates are limited by the exchanges at a distance, but there is another issue, linked to the very nature of knowledge. We now know that it is difficult, if not impossible, to pass on all technical or intellectual knowledge through ICT. Their total transmission requires geographical proximity, and cannot be satisfied with distant communication (Feldman, 1994). Simple techniques can be transmitted, but if we talk about more complex know-how, contextualization becomes essential (Amin and Wilkinson,

1999); hence the need for learning for example. To overcome these limitations, solutions are found, both personally and professionally: speed dating appointments or business trips are good examples of palliative techniques to the insufficiency of presentation of oneself at a distance.

Will the return of a more normal situation mark a return to past practices? The answer to this question is still unclear today and the predictions are mixed (Industrial relations, 2023). Some researchers think that a large part of the exchanges and work relationships in the sphere of intellectual services and services will now continue to take place remotely, virtual interaction becoming the rule. Geographical proximities, always essential, will become rarer and more temporary, reserved for intense and essential moments of interaction, such as the development of common protocols, the first stages of knowledge or the resolution of conflicts (Torre, 2011), confirming the trend already established in recent years in industrial cooperation relations (Wong et al., 2022). Other researchers consider that some previous modes of operation could be reactivated (Gibson et al., 2023), based on recent examples of ending teleworking in X or Microsoft laboratories for example and the negative impact on worker's health (Nemțeanu and Dabija, 2023). Future evolutions are rather uncertain regarding these situations and could cause a hybridization of remote exchanges and new forms of co-presence, mostly chosen.

4. Conclusion: how to maintain social relations at a distance?

The objective of this article was to take stock of the impact of Covid 19 on local relationships, and to question the possible consequences of this pandemic on the organization of proximities. We were able to show that the impact was profound, particularly with regard to geographical proximity, the effects of which sometimes became detrimental. The proxemic approach allowed us to understand why social distancing had been so important and to analyze the reversal of perspective regarding geographical proximity. We have also been able to show that the development of long-distance relationships is largely based on the importance of organized proximity relationships, in their logics of belonging and similarity. Today, New Proximities are emerging, and their layout and combination are impacted by the development of distance communications as well as policies for distancing and protecting people or developing geographically close relations in a restricted framework (15 min-city).

Whereas geographical proximity was supposed to become contingent in the early 21st century, and its decline associated to the death of distance (Cairncross, 1997), nowadays it makes a brutal reappearance, and poses formidable questions. It can become so dangerous that human contact must be avoided or minimized. In times of pandemics people are forced to make rapid contacts that expose them to the dangers of geographical proximity, and, like many animal species have to distance themselves from their sick congeners (Ripperger et al., 2020). And the masks hinder the movements, and prevent from properly assessing the attitudes and expressions of the interlocutors. In case of lock-down or barriers gestures, many complain of the lack of social contact, of no longer being able to speak with others, of no longer exchanging, or of only doing so remotely, and therefore of seeing restrictions to proximity.

This situation raises major concerns. Is it sustainable? Can we abdicate the advantages of geographical proximity and keep a careful distance, with the exception of the most urgent activities? Will we support this life from a psychic and physiological point of view? The development of psychological syndromes and diseases in time of lock-down is a cause for concern. Is it possible to exchange only via social networks? Can society be divided between those who go out to work at the risk of their lives and those who remain locked up in teleworking from their homes? And above all, are we still in society by being close at a distance, at the end of social networks, terminals, masks or barrier gestures? These questions refer to fundamental stakes in terms of public policies, especially health policies or territorial planning, and open new

ways of reflections concerning urban planning or the rural-urban link. They also pose problems in terms of the organization of our societies, and of a possible future either based on distant or geographical proximity relations. We can clearly see two extreme visions emerging and clashing here, that of the 15-minute city, which refers to an intense and permanent geographical proximity between neighbours, and that of social networks and teleworking, which keeps human contact at a distance.

Thanks to telecommunication it is possible to rely on the resources of organized proximity to operate remotely and survive in times of pandemic, even for quite a long time. But we are social animals, who also need to feel, touch and embrace, and at some point, we need to recreate geographical proximity, even temporarily. Proximity approaches and proxemics have taught us that the distancing of people leads to a decrease in exchanges and a loss of benchmarks. An important part of human interactions involves physical attitudes, facial expressions, pheromones, human contact, kissing, shaking hands, drinking and eating together, and can only reproduce imperfectly from a distance (Torre, 2008). This distant exchange and its limitations are well known to sociologists (Urry, 2002). In such situations, geographical proximity is not the only important variable; and organized proximity becomes essential. But can it remain the only crucial variable and abolish us from a geographical proximity becoming ever more uncertain?

5. Proximities: what are we talking about?

We make reference here to the two main categories of proximity defined by the French School of proximity (Torre and Rallet, 2005; Torre, 2008), namely geographical and organized proximities.

Geographical proximity reflects the distance between two entities (individuals, organizations, cities...), weighted by the time and monetary cost of crossing it. It is doubly relative. Firstly, the geographical distance is relative to the means of transport and the topology of the places. The mileage distance is weighted by the time and/or cost of transportation. Secondly, it is the ultimate outcome of a judgment by individuals or groups on the nature of the geographical distance between them. This perception varies according to age, social group, sex, occupation.

Sought for geographical proximity refers to the quest, by some actors, for geographical proximity to other economic or social actors, to natural or artificial resources, to places or technical objects. Unwanted geographical proximity corresponds to cases of actors finding themselves in situations of non-desired geographical proximity to people, activities, technical objects or places. The constraint can be due to three types of interference: superposition (contestation about a piece of land), contiguity (individuals or groups of individuals located side by side) and neighborhood (undesirable effects of certain activities diffused by air, water or gravity)

Geographical proximity can be permanent: it corresponds to co-location. It is temporary in the case of occasional meetings between actors, for example the time of a trade fair, a Congress, or a business trip. Temporary geographical proximity thus corresponds to the possibility of satisfying, for a limited time, the need for face-to-face contacts thanks to the mobility of actors between different locations.

Organized proximity is not geographic but relational, and corresponds to the ability of the members an organization to interact. The organization facilitates internal interactions, in any case making them a priori easier than with external units. These relationships make it possible to exchange knowledge and work remotely, largely eliminating the constraints of geographical proximity, and thus distance, in particular through the development of information and communication technologies such as the Internet, or social networks. There are two main reasons for this possibility of interaction. On the one hand, belonging to an organization results in the existence of interactions between its members, within the same relationship graph, or even the same network: this is the logic of belonging. On the other hand, the members

of an organization can share the same system of representations, or set of beliefs, and the same knowledge: this is the logic of similarity.

Proximities	Indicators	Meaning
Geographical	Sought for	Permanent
		Temporary
	Unwanted	Permanent
		Temporary
Organized	Logic of belonging	
	Logic of similarity	

6. Proxemics: an anthropological reading of human relations

The approach of Proxemics, developed by the social anthropologist Edward T. Hall (1966), allows us to understand the suffering caused by the lack of physical and social contact and to grasp the notion of social distancing and comfort zone around the individual. According to this approach each person has a surface around him/her, a kind of bubble that constitutes an emotionally strong zone or an individual security perimeter. Its size varies from regarding cultural differences, but intersects four areas of increasing magnitude:

- 1) The intimate distance, which is accompanied by a great physical involvement and a high sensory exchange, is used to embrace, touch; it is that of love;
- 2) Personal distance, which refers to specific conversations and interactions between friends or family members;
- 3) Social distance, which concerns interactions with friends and colleagues, is particularly applicable in the context of work;
- 4) Finally, public distance is required when speaking to groups.

Proxemics claim that individuals allow for more or less physical closeness, and touch each other more or less, depending on whether they are Anglo-Saxon, Latin American or North African. The size of the famous bubbles varies greatly according to people’s origin (Shuter, 1976). It can be quite large in Western countries and almost non-existent in Arab countries, for example. For Hall et al. (1968), however, this is merely a social adaptation of immutable biological rules, i.e., of proxemics rules, and of the various kinds of distances that exist between people living in society. It results in the existence of individual territories, which are defined according to the type of interactions and the relationships that human being practice, and correspond to the territory of this social animal. This is even true for all animal societies, and some vegetal species go so far as to practice the «shyness» of trees, which implies a gap between their tops (Fish et al., 2006).

CRedit authorship contribution statement

André Torre: Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization.

Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

Andre Torre reports administrative support was provided by French National Institute for Agricultural Research INRAE. Andre Torre reports a relationship with French National Institute for Agricultural Research INRAE that includes: employment. Andre Torre has patent pending to lk! mlk!mkln. kn!lknaed If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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