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Original Paper

Co-existing with COVID-19. Design for Resistance

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** The document in its entirety is the result of the three authors' common work. However, the Introduction are to be credited to Professor Alberto De Capua, paragraph 2.1 to Dr. Lidia Errante and paragraph 2.2 to Dr. Valentina Palco, while paragraphs 3 and 4 were written together

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Abstract

The paper investigates urban and domestic living and how these have been modified by the new needs, concerns and fears connected to the most recent global pandemic. The contribution highlights how urban and domestic dimensions are key elements of our existence and resistance. The topic is articulated in a twofold dimension:

- *the urban scale of the city, which is continuing to function even during the emergency, allowing us to believe that the tools in our hands are capable of being used in a more flexible way, both from a political-based and a design-based perspective;*
- *the domestic sphere, whose connotations make the house versatile and flexible in the context of the progress and technological advancement that is now happening in the community and for this reason the space must meet the requirements of adaptability to operate perfectly even as a workplace.*

Eventually, the contribution defines the requirements for a resistant living, and the tools that will enable us to design resistant urban and domestic space.

Keywords

urban living, urban space, housing, dwellings, domestic space, design requirements.

1. Introduction

According to the Italian *Treccani* Encyclopedia, “fear” is described as “an emotional state consisting of a feeling of insecurity, of bewilderment and anxiety due to a real or imaginary danger, or to a fact that is (or is believed to be) dangerous: its intensity varies depending on people and circumstances, which is characterized by a strong and sudden upset and physical reactions”. This definition perfectly suits the emotional condition of the global population in the past two months. In an era of “technological enthusiasm”, in which we are convinced that technology, for better or for worse, can defeat any human problem, our vulnerability lays in front of the fear of contagion. All the media and the press have been dealing with Covid-19 for weeks on a daily basis, and provide us with constant updates on contagions and casualties, guidelines for preventions and best practices for safety. Experts discuss with each other; politicians announce measures to be adopted and practices to hinder the virus’ effects; hospitals are rearranged according to the emergency; the Civil Protection is setting strategies to face the effects of the pandemic. In the first phases of the epidemic, the Italian population has learnt what it means to be refused: it had to reconsider its notion of frontier, coming to realize that Europe is very different from what our fathers wanted it to be. This first moment of the emergency, characterized by empty roads, harbors and airports, seems to lead to a glacial era of mobility. Italy, as well as Europe and the rest of the world, has suddenly come to be perceived as unsafe: some Countries recommend to postpone travels; dynamic cities such as Milan now gloomily empty; photographs of once-lively, crowded and colorful squares, today only show the empty face of fear.

In the light of the global pandemic of Covid-19, this spread feeling of fear and the reactions that follow are conditioned by other factors as well, which refer to the effects of the necessary isolation imposed by the circumstances of contagion. The closing of public spaces and services, the blockage of the greatest part of everyday activities and production that were considered “unnecessary”, has transformed our lifestyle, inside and outside of our homes. The fear of being contaminated by the virus deeply influences the daily behavior of individuals, negatively influencing their psycho-physical condition, connoted by anxiety and stress. At a more or less conscious level, the fear of Covid-19 and of pandemic in general shows the limits of the globalized world from which, up to the present day, the wealthier population of the Western world had benefitted. Human contact and the contact between different people are now questioned at all levels: from social interactions to the conditions of mobility from one State to the other.

Also, a massive use of social networks has been recorded, not only as a means of communication, but also of information, especially regarding the communication of Governmental provisions to prevent the diffusion of the virus, such as the closing of schools, of places of aggregation, of culture and entertainment, such as cinemas, museums, theatres, bars and pubs. This condition emphasizes the perception of danger and generates a diffused disorientation in people who feel overwhelmed by the news found on the web, whether it’s true or fake. Consequently fear travels at a higher speed, amplified

by virtual time-space frames. These circumstances, whatever the ordinance, instinctively lead us to find shelter in our safe space: home.

In light of a mature and advanced debate on the matter, the present context pushes us to deepen the discussion entering the domestic spaces of dwelling, by asking new questions. How to improve the housing condition of families who live in small apartments that are a few square meters? How to administer services for the weaker fringes of the population, such as lone elders? How to support children and youths with an educational and relational support, so that they can face the physical closing of schools? What can architecture do? In light of these considerations, two scenarios appear. On the one hand 2020 will always be remembered for this quarantine, for the forced reclusion, but also for the emerging—and consolidation—of smart working and, more generally, for the remote management of work, services, sports and entertainment. On the other hand, the urban experience is also changing, and individuals move in a desert, ghostly city, as in architectural illustrations, in which buildings and landscapes are not disturbed by the human presence, and remain unchanged from their original conception.

The transformation in the way we live our domestic spaces has more complex implications from a functional and social point of view. Smart working has called for a hasty reframing of a space to serve as an office, as a classroom, with a desk and a blackboard. In one way or another, the workplace, which is also made of human relationships, today is filtered by a screen and this modifies our way of living domestic spaces more than anything, questioning our attitude towards dwelling. Adults or children, minimalists or eccentrics, meticulous or chaotic, whether in the living room or in the bedroom, today every individual faces improvisation, and attempts to personalize a working station that could stimulate focus and productivity.

For someone this was already the routine, while others had to face such change with a mix of apprehension and curiosity, perceiving the inadequacy of their households, in terms of both spaces and technological equipment. This pandemic has unmistakably revealed, and in some cases worsened, the gap between rich and poor, whereas poverty is not only meant as economic well-being, but also and more importantly as opportunity. Even though the virus has affected the population in a transversal way, the housing conditions in times of quarantine are entirely different—and far from being democratic: huge differences can be perceived between those who live in a big apartment with a garden and a pool, and those who share a three-room flat in the tenement building in suburbs. Besides the frailty of the globalized world, what becomes clear is the height of the walls that are erected within cities by and for a capitalist society.

These considerations are not alien to architects, who cannot but account for the social injustice which appears everyday in the most diverse urban dynamics, and which in fact, prevent the transition towards a more sustainable and resilient city. In a way, architects have the chance—if not the moral obligation—to shift towards resistance through formulating, experimenting and promoting tools which

transform housing, residential and urban projects into means to pursue objectives of democracy, equality and accessibility.

Certainly, by the end of this sanitary emergency, re-thinking relational spaces which will allow for the identification of the society as a community will be crucial. While waiting for normality to be restored, we must prevent collective segregation from generating new social barriers, using technology to support the idea that the recovery—or phase 2—will allow us to improve our way of dwelling the world as well as our own home.

In light of what has just been said, the paper aims at investigating the topic of living and of how it has inevitably been modified as a result of new needs and, more importantly, new concerns; as a consequence, the paper examines how the house relates to the urban space in virtue of these fears, and how these both constitute a fundamental part of our existence and resistance. The topic is articulated in a twofold dimension:

- 1) The urban scale of the city, which is continuing to function even during the emergency, allowing us to believe that the tools in our hands are capable of being used in a more flexible way, both from a political-based and design-based perspective.
- 2) The domestic sphere, whose connotations make the house versatile and flexible in the context of the progress and technological advancement that is now happening in the community and for this reason the space must meet the requirements of adaptability in order to operate perfectly even as a workplace.

The final goal is to define the requirements for a resistant living, and above all determine the tools we are going to provide for the design of resistant urban and domestic space.

2. Method

2.1 A City That Resists

The present historical moment is certainly difficult to analyze and interpret in a unified way, although the pandemic phenomenon is global. The contradictions, limits, fears and hopes that define such moment, also animate the contemporary cultural and scientific debate, leading us to focus our interest on specific aspects related to the disease and the contagion. Even on the difficult level of living and quality of life, the attention seems to be focused solely on the drastic change that each individual is experiencing within the domestic sphere. At the same time, in the attempt to build an overall image that brings together different perspectives that involve the city in various ways, a very complex picture emerges, both on a physical and social level. Although this paragraph will focus more specifically on the physical sphere of urban spaces, it is important to mention socio-political, cultural and psychological implications that social distance measures have within the urban environment, in order to give equal importance to both cities and citizens.

In a recent radio interview on Zapping (Radio 1), the philosopher and academic Giorgio Agamben asks “how could it happen that an entire country, without realizing it, collapsed politically and ethically in

the face of an illness? [...] Why were people so terrified that they were induced to accept things that are normally considered unacceptable?” Agamben highlights two key aspects, on the one hand, wondering whether these drastic social distancing measures are in fact a pretext to dump on citizens what he calls the “dismantling of the healthcare system” carried out by decades of government cuts to public affairs; on the other, pointing out how this unusual condition “perpetual state of necessity” can constitute “the way in which Democracies slide towards totalitarianism”. No economic crisis, no war or fascism, no fear of terrorism, have ever caused the need for a social distancing that would last for so long, leading to two important outcomes: the first related to the political power of the community, now rarefied in the impossibility of a social life; the second related to the measures of control and tracking of the movements of each and every one, which fear to be the only way to restore a facade of normality to our daily life. In the near future Agamben envisages “the end of a livable life” in which sociality is abolished in the name of a biological danger and the structure of society itself is based on doctors’ and virologists’ indications, thus asserting that “a society based on social distancing is no longer society”.

In light of this radical reflection, the question remains whether a city without sociality can still be defined as such. We are witnessing a general reduction of borders, both physical and administrative, now real frontiers, leading us to review the meaning and significance of these. We are subjected to the effects of the contraction of spaces and running of everyday life, a centripetal force that pushes everyone towards their own home and towards an inevitable and overall rethinking of the domestic environment. However, the reason why the majority of the wealthy western population has experienced this epochal change in habits with a great attitude to adapt, is because the city structure has never stopped functioning. There is in fact a city that resists, made up of small neighborhood commerce, market places that reopen regularly, shops, bakeries, fisheries, butchers, a network of goods providers that, in addition to ensuring an essential service, keep a fundamental framework of social relations alive.

Given these considerations, this paragraph will attempt to reflect on the conditions that make the city more or less livable, a starting point to rethinking urban living.

2.1.1 Virus Transmission and Urban Quality: A Correlation

The correlation between urban quality and quality of life is not new to the contemporary cultural debate, nor is it secondary to the wider discussion on public health. Livable, walkable cities with public spaces for sport and outdoor recreation are a fundamental factor in preventing the spread of diseases linked to hypertension, diabetes, heart and cardiovascular conditions. More recently, in the attempt to identify the causes and drivers of the pandemic spread of Covid-19, these conditions have been considered to be amongst the main risk factors. Other studies have shown that there is a significant incidence between exposure to air pollution and increased susceptibility of individuals to the virus. In particular, it has been documented that there is a correlation between long-term exposure to air pollutants such as nitrogen dioxide (NO₂) and mortality (Ogen, 2020). Nitrogen dioxide is a toxic component that enters the atmosphere mainly as a result of the combustion of fossil fuels and has been associated with the

high incidence of numerous risk factors such as hypertension, cardiovascular disease, lung and respiratory failure and obstruction in children and adults, with serious effects also on diabetes and the immune system (Ibid.). According to the WHO (World Health Organization, 2003) the health risks from NO₂ and its derivatives are real and the world population should be protected from exposure to these pollutants. Mapping the presence of these pollutants has also shown that there is a spatial coincidence with the outbreaks of Covid-19, particularly around the Po Valley and the regions of Lombardy, Emilia-Romagna, Piedmont and Veneto (Ogen, 2020).

Another line of research is investigating the correlation between the spread of the virus and long-term exposure to particulate matter. By the beginning of April, the Department of Biostatistics of Harvard, Boston, had already detected an increase in mortality rate related to the presence of particulate matter (Wu et al., 2020). This data is confirmed by the analysis conducted by the Italian Society of Environmental Medicine (SIMA) which found traces of coronavirus RNA on the particulate matter, enabling it to partially transport it. Air quality in the urban environment has always raised concerns among politicians, environmentalists and citizens for the consequences on public health. The current context prompts us to reflect further on urban ecology and to indicate drastic measures in order to combat air pollution, encouraging the identification of “clean air” areas within urban areas, the reduction of car use, the plantation of grasslands—capable of trapping particulate matter—along the densely crowded roads, and to encourage a healthier lifestyle, also in relation to daily activities and commuting.

2.1.2 A New Paradigm for Sustainable Urban Mobility

Also as a result of what has already been said, another much debated but unresolved issue during this pandemic is the sustainability of public and private urban transport. Above all, the forced isolation of the majority of the population, combined with the shut-down of numerous production activities, has led to significantly lower levels of pollutant emissions into the atmosphere. While it is certain that productive and manufacturing activities will resume at their usual pace, this will not necessarily be the case for traffic and urban commuting. Firstly, as already mentioned, it would be desirable to reduce the levels of particulate matter in the atmosphere by discouraging the use of fossil-fuelled forms of mobility, be it private cars or public transport. Secondly, we can assume that access to urban public transport, whether by metro, tram or bus, will no longer be the same, given the circumstances of the contagion and the precautionary measures that aim to avoid gatherings in confined spaces. Is a third way of transport possible? If so, are our cities ready to incorporate a rapid urban change in their mobility systems? Indeed, the answer is given to us by the citizens themselves, who have revived the use of bicycles for their short-term commuting.

Recognizing all the benefits and multiple positive implications, cities like Milan have introduced a plan to extend the bicycle and pedestrian network, widen the sidewalk section and use Zone 30 to limit the speed of cars. The plan, called Open Roads, will extend for 35 km and will be launched during the summer, to transform the urban environment initially through temporary and low-cost projects. The

Milan plan was judged by Janette Sadik-Khan, former New York's Transport Commissioner, to be "a viable model" to look at in order to deal with the mobility problem in the post-emergency coronavirus, and is also useful to review the urban fabric of our cities to improve health and safety. Similarly, several German municipalities have adopted the "Bogotá model" addressing sustainable mobility thanks to pop-up bicycle lanes during the Covid-19 emergency. The program aims to reduce air pollution, linked to higher coronavirus death rates, as an argument for redrawing infrastructure across the country in terms of health and physical safety. Also, in New York urban planner Meli Harvey developed a map of the city that shows the width of sidewalks in order to highlight public areas where social distancing can be maintained. The map uses the datasets provided by the City of New York, identifying the narrowness of sidewalks in different colors. These initiatives are moving towards a scenario of active mobility or micromobility, taking into account the possibility that social distancing and traffic and public transportation restrictions may persist. On the other hand, it is of great strategic importance, for the present and the future, to take advantage of this opportunity to stimulate the use, awareness, production and market of e-bikes, bike sharing services and in general the adoption of means of transport that use clean energy from renewable sources - and that require pleasant and healthy exercise.

2.1.3 City or Country? That Is the Dilemma

The shutdown of unnecessary production and commercial activities has questioned our way of life in many ways. What is not necessary and what instead is essential has become clear as never before, through an exercise of sacrifice and patience, and not necessarily linked to our capability or aptitude for deprivation. Of course, the majority of the population has the possibility of accessing home delivery services for all sorts of goods, somehow managing to satisfy their desires without breaking any restrictions. Also, at the end of this quarantine period we will no longer take for granted the need to get in touch with nature and the outside world: a walk by the sea or a run in the park cannot be replaced by the best of flowery balconies, panoramic terraces or modern treadmills.

In this situation a thought has crossed our minds at least once in this quarantine: "if only I had a house in the country or by the sea, that's where I would spend my isolation". A few people, especially in Italy, have tried in these past weeks to move to their summer residences or second homes, to spend their time in a more pleasant way. Those who live on the edge of the consolidated city, in hybrid urban contexts or in the open countryside, have probably lived this historical moment better, perhaps without suffering too much from the expansion of time, with the advantage of having clean air, being able to find a space of contemplation outside the home environment, or devoting their free time to a manual activity, in direct contact with nature. Far from being a pastoral eulogy, these considerations invite us to reflect on the possibility of commonly integrating public and semi-public spaces, parks, urban community gardens and educational farms, where it is still possible to be in touch with nature, enjoy its benefits also on a psychological level. This reflection is emphasized if we think about the purpose public parks were created for, that is to improve the health of cities during the second industrialization.

2.1.4 The Social Vulnerability of the City: Services, Accessibility, Proximity, Solidarity

The emergence of Covid-19 has revealed the widespread—and in some ways underestimated—social fragility that characterizes our cities, in close correlation with the ability of public services to be accessible to the weakest sections of the population. The circumstances of the pandemic affect, from a strictly social point of view, the elderly, the poor and the homeless in particular. These are victims of numerous disadvantage factors, ranging from the technological and economic gap to citizenship status, as for the case of irregular immigrants, making it difficult or impossible for them to access services, even basic ones. In the Italian reality, where government aid is not expected or has not yet arrived, a more or less structured network of solidarity has been fundamental in creating the social resistance that has literally kept the city alive, providing goods and assistance at home or distributing hot meals. Another aspect related to the provision of services, including basic necessities and therefore excluded from mandatory shut-down, concerns their proximity in relation to the urban unity of the neighborhood. In fact, a lack of proximity of services in many neighborhoods emerges. Whether it is, for example, City Life in Milan or any neighborhood on the outskirts of Rome, a progressive reduction of small shops, butchers, bakeries, newspaper kiosks and small markets can be recorded on a national scale. Without wanting to sound critical here against the capitalist system and how it has changed habits and methods of distribution, it seems unthinkable that, in order to avoid gatherings of people in the same place, large slices of the population could flow into single big distribution centers, also considering the closure of shopping centers. These considerations, needing yet more research, lead us to reflect on the importance of reconfiguring the neighborhood from a physical, social and economic point of view, encouraging small and medium-sized businesses that can also restore a stable network of solidarity, and strengthen the sense of community and neighborhood cooperation.

2.1.5 Towards a Concept of a City of Small Networks, Starting from the Neighborhood

After a first investigation, it might seem that the main focus for the analysis and interpretation of the change that is currently underway should be solely on the domestic sphere, which certainly needs overall rethinking aimed at improving the building organism and which will be introduced in the following paragraphs. On the other hand, the suggestions and reflections discussed in this paragraph constitute a chain-linked framework of urban living domains that were weak long before the pandemic, and that can no longer be ignored today. The urban image that emerges, also in light of the first promoted interventions by many cities, underlies a renewed idea of urban quality in which the concept of quality itself refers to the positive effects, material and immaterial, on the well-being of citizens. In this context, the quality of the environment and air, services and transport can be thought of in an interrelated way, based on the principles of physical and social accessibility, given by the sum of their diffusion and proximity on the territory and the level of cooperation and solidarity of a community. Thus, it is not conceivable that, grey areas marked by a total lack of basic services exist throughout the city: in the analysis of the urban environment, this will have to be a crucial requirement to assess areas and priorities for intervention.

The circumstances of recent months invite us to reflect on how to react in the near future to what could become the new normality. It is not unreasonable to think that the urban unity of the neighborhood could be the privileged place in which to experiment forms of micro-mobility and micro-economics, to strengthen, or create, an excellent network based on sharing and commoning. The urban dimension of the neighborhood is also suitable for experimenting with pilot projects involving, in different ways, the direct participation of residents, supporting the creation or strengthening a deep-rooted sense of community. Nevertheless, at this scale the outcomes of a project can be analyzed, monitored and possibly corrected before being adopted elsewhere. The tools for such an urban revolution exist, we know its theory and practice, and these are accessible to the public administration. For example, think of the activation of urban commons, urban acupuncture actions, pedestrianization, renaturalization, smart and sharing mobility projects, which have been animating the debate on urban transformation for decades. As a matter of fact, the real revolution would be to be able to combine these tools to improve the quality of urban living, multiplying the opportunities for citizens, allowing them to live in a healthy environment where they can reach their potential. The resistance—and resilience—shown by cities and communities, with particular reference to the Italian reality, shows us how this change is not only possible, but is already happening.

2.2 New Forms of Inhabiting

The word *abitare*, from latin *habitare* (to have), takes on the meaning “to continue to have” or “to have habit of a place”; a place which, precisely for its continuity in the individual experience, becomes by definition the dwelling, the residence, the house (Vitta, 2008). In the course of time, the man has adapted his living space to his own and personal needs. The dwelling is in fact, historically, one of the founding elements, if not the main one, of the human species, and has become a shared necessity, an elementary and primordial need: the shelter par excellence (Filighera & Micalizzi, 2018). The home can be considered as a mere “consumer thing” that contains experiential, identifying and collective functions and represents the cultural-evolutionary goal of each individual. Going through the historical evolution of living the anthropic space, it emerges that the house, considered as a “safe place” (guardian of intimacy and psycho-physical well-being of the human being) and the public space next to it, have had to adapt to multiple cultural, economic-political and climatic changes, but also to the needs of individuals and family groups. The image of living derives from the set of transformations that each individual carries out. The buildings designed for the social community, today look immutable as if they were outside the world, not made in nature and for a part of nature as man is. The settlement experienced by the inhabitants is, on the contrary, as we are noticing in times of pandemic, in constant evolution, in a continuous adaptation of space to changing needs (Paolella, 2003).

The change not only concerns the construction process or the technologies used to create spaces that are people-oriented, which are certainly progressively closer to very high-performance standards and able to reduce environmental impacts as much as possible. The determining factor for the development of the concept of living has always been the relationship between home and family structure. As of

today we will need to add the aspect of isolation and health safety to these indicators. According to Paul-Henry Chombart da Lawe, the relationship between home and family structure is so strong that we can speak of a correspondence between spatial unit and social unit (Ceci, 1996). The multiplicity of family patterns and statuses introduced by modernity necessarily goes beyond the functionalist vision of the home as a pure “living machine” (Le Corbusier, 1923), i.e., the “home” with minimum standards that guarantee a decent quality of life for the occupants. However, ways of living are being rethought, by introducing new paradigms based on the anthropocentric dimension of housing, today in particular if we talk about new forms of living at the time of the Covid-19 emergency.

2.2.1 Domestic Space 4.0

The measures to contain the virus force us to stay locked up in our homes and never, as in this period, has the claim of our own spaces become crucial. Coexistence suggests that we should not bother each other; separations that seemed to have lost importance for the benefit of functional and spatial intermingling, become fundamental again. The proximity and the distance between people are clearly expressed in the domestic activities: you share the kitchen, the dining table and the sofa in the living room, but not the bedroom, where you carve out the few moments of privacy (my music, reading my books, chatting with my mobile phone) and work (my desk). The apartment varies according to the functions of those who live it. Traditional space diagrams used are rethought, and adapt to different times of the day. The corridor, from distribution space, becomes gym. The doors, sometimes open, sometimes closed, are the precious tools that manage privacy and sharing: that is, interpersonal relationships and, ultimately, the use and meaning of space. The balconies are used to expand some activities outdoors, the condominium terraces, invisible as far as a few days ago now appear and are used in different ways: outdoor gym, solar deck, places of worship for the community, curtains for musical performances, a surrogate of public space. A semi-public space that is being rediscovered and needs the attention of architects and technicians.

The (post-pandemic) accommodation thus takes on connotations that make it versatile and flexible and certainly will not lack essential elements for the actions of living. 1) IoT (Internet of Things) devices that guarantee access to the network through wireless connections. Dwelling, in this perspective, takes on an increasingly “intelligent and sustainable” connotation of interactive design, that is, of continuous interrelation between human action and technology, through increasingly digitized performances with the sole purpose of considerably increasing the quality of life of the occupants. What makes the space (inhabited) intelligent is the IoT, a system that allows the elements of the physical world to be connected online through sensors (Ashton, 2009). The Internet of Things (IoT), by restricting it to smart living, can be described as the connection of domestic objects or extending it to the building’s envelope or structural material, in particular electronic and electrical devices and sensors and actuators, to hardware and software platforms that deliver information of any kind for monitoring, well-being and control of occupants and building performance. 2) Buffer spaces, essential filter zones between the interior and exterior of the accommodation and useful especially for reduction of winter heat loss and

related energy needs. 3) Use of natural ventilation to improve IAQ (indoor air quality). According to the virologic study of the National Institute of Health published in The New England Journal of Medicine, in a room with a temperature of 21-23°C and 40% relative humidity, the COVID-19 resists 3 hours suspended in the air and up to 3 days on all polypropylene items, on stainless steel it survives 2-3 days, on cardboard 1 day. The use of natural ventilation is therefore essential. 4) Mobile partitions that allow a real change to the internal configuration of the accommodation in relation to uses and functions. Hence the use of dry modules and prefabricated lightweight low-cost technologies, to make the internal space flexible in case of need. The partition is no longer designed with “heavy” technologies (in wet work) but “light” (dry work) and functional, whether these are system containers or additional panels that configure ad hoc micro spaces for Smart working. 5) Basic kit for home care in case of health emergency, providing an oxygen connection for each dwelling and basic protection equipment. (IoT) 6) Redesign the common condominium spaces (terraces) at the service of the occupants, preparing it for the most varied uses.

The fourth industrial revolution, protagonist of our times, is the most advanced technology at the service of the human being. The design of the built space now necessarily sees the IoT as one of the involved parties. Starting from the assumption that the culture of the project is now confronted with a renewed relationship between technology and the environment, and that the “digital revolution” is generating important changes in the reading of the project, we intend to intervene by applying intelligent devices that read and monitor the performance of the building and the built space, aimed to achieve conditions of well-being and safety in relation to the types and technologies of construction. The only way forward is the one wished for by many parties, using appropriate solutions for the recovery of buildings (fragile and vulnerable in many aspects) using safe and more efficient technologies that require little energy to ensure comfort. The Internet of Things (IoT), in particular, can offer efficient and low-cost solutions to manage exceptional situations or even to prevent them, digital technologies that increase the resiliency of fragile territories, and anthropological actions following pandemic phases in which we will increasingly be protagonists. The scientific debate argues, today more than ever, on the need to intervene with “internet-addicted” solutions on the built heritage and infrastructures. The question to be asked in the near future is whether this period of emergency that forcibly makes us occupy and use space in a different way, allows us today to understand how important it is to live in a well-organized and well formalized space. To be ready to design a space, whether domestic or urban, to be perceived in a different way.

3. Results. Requirements for a Resistant Living

The very concept of “home” can no longer be traced back to the traditional model, synonymous of permanence and stability. The contemporary home is increasingly becoming a “temporary” home, representing the mobility that characterizes our era. Today the design of living space also becomes the design of precariousness; demanding the recognition of the multiplicity of living and the consequent different interactions that space is able to establish with the elements with which it relates to.

In all spheres of living, the interconnected and side issues are always both social and physical. For example, dwellings that may be intended for particular social or working categories that are sometimes unstable or nomadic (immigrants, commuters, students); for people with particular economic and social conditions (elderly or young couples); or finally, so-called emergency dwellings that are immediately provided in response to the occurrence of natural or man-made disasters (floods, earthquakes, war events, etc.). It's worth mentioning, for example, the debate on Public Residential Buildings of the last 60 years—in Italy currently under structural examination because of the severe material degradation—mainly destined for the working class, which today represent a failure for the new generations in terms of lifestyle, at a personal and social level.

The extent of the emergency, now amplified due to the containment of the spread of Covid-19, has often fueled the debate on the responsibilities and causes that have determined the current state of our living: alongside social, cultural and economic factors, it must be noted how often the professionals and the academics in the field of architecture have pursued abstract principles in the urban and housing forms adopted to address the emergency. This tendency has contributed to weaken the sense of belonging of the inhabitants and, actually increase the aversion towards their own dwelling, negatively affecting the longevity and the durability of the whole building.

In keeping with that, the present contribution wants to highlight a set of strategies and principles to discuss the basis for a new approach to design, both for the new construction and for the renovation of the existing built environment. In order to pursue this, our conclusion suggests the adoption of a multidisciplinary approach and the need to challenge the current tools that are used to control the project.

- 1) Identity is the first element to consider, at the very beginning of the design process, in order to preserve:
 - the elements of the place where a community identifies itself;
 - the relational condition and the common belonging of the community;
 - the historical features representing the roots of the community.

These characteristics are often missing in many contemporary urban structures and infrastructures. Fortunately, we are not faced with a situation of complete homologation, but rather we live in a world where many differences still remain. Indeed, we need to pay attention to the causes that push for homologation, in order to control the production of “non-places”.

- 2) Public housing, more than any other issue, is facing the complexity of a building product; it must constantly change, not only because it refers to a variety of users that, from a quantitative and qualitative point of view, is constantly evolving, but also because the contemporary socio-economic situation is far from stable. And because of the complexity of the subject, a multidisciplinary approach is needed, ensuring a joint approach between very different disciplines, such as Sociology, Urban Planning, Architecture, Aesthetics and Technology.
- 3) A third principle is identified in the continuous evolution of demographic composition and lifestyles, generally the needs of end users, which is affected by the period in which we live in, and determines a residential demand. In the first instance, such demand imposes on the market the requirement of flexibility for the adaptability of living spaces: the number of single income households with one child rises; the number of working women and single people, occasionally with dependent children increases, as does the average age of the population, while the number of births decreases; young people take time to leave home and when they find employment they do not achieve adequate economic self-sufficiency; the foreign resident population also grows out of proportion, with the related problems of social and economic integration; precarious employment is institutionalized and, finally, mobility is imposed as an alternative to dismissal. Flexibility, as a principle that should guide the project, can also be related to the variability of uses. Renzo Piano (Piano, 2020) architect is very clear on this principle:

«(...) The visibility of technology has always been a dominant theme in Renzo Piano's work, who considers it part of a larger vision of architecture based on lightness, efficiency, transparency and flexibility. "Before I started working with Richard (Rogers) I thought flexibility was a technical problem, but then I realized it was a question of ethics," he says. Flexibility, therefore, is not only the ability to change and adapt, but also provides a distinction between the building's fundamental building elements and what could be seen as functional elements. The contrast between the elements that work for the building and those that work for the program is not only a planning and process tool, but also a device that gives great visual clarity to the architecture. In this way, the concept of flexibility embraces both the idea of change and architectural expression».

- 4) To the social issues that have emerged, we must inevitably add the new cultural positions and design attitudes that arise from the further assumption of the principles of sustainable development, which, as a consequence, sees, the emerging of new needs with regard to the design and construction of living spaces:
 - The need to contain the consumption of material and energy resources, introducing the concepts of useful life cycle, recycling and reuse.
 - The need to conceive buildings with a high level of energy efficiency and with a strong predisposition to system integration.

- The reduction of energy consumption from non-renewable sources through the supply of alternative energy sources (solar, wind, geothermal, etc.).
- The evolution of construction processes towards advanced systems that are able to give concrete answers to the need to reduce consumption and impacts.

The aim of a new scenario for sustainability is not the need to control all the variables involved, but to reflect on the main indicators which the achievement of sustainable quality may depend on, within the more traditional building processes. Then, it is crucial to investigate new thematic areas, integrate the existing design requirements with new ones, and relate the new indicators with specific areas of application and the different levels of the project.

This approach can realize its effects in the construction phase of the intervention programs and in the monitoring of quality in architecture, in order to develop a whole series of collaborative aspects—according to common and shared methodological and operational lines—between structures that operate with very different technical skills. Above all, all these principles can advise the designers on ways to not only improve the environmental efficiency and performance of the building and use “clean” technologies, but to completely review it by considering both the environmental variants and the physical invariants that guarantee the final product.

Of course, the problem remains open. The feasibility of this purpose depends on our capacity to experiment different quality policies, to pursue quality control under actual operating conditions and supporting adequate technical information.

Something complex that, among other things, requires:

- to redesign local regulations—as many regions are already doing—that not only need to be understandable but also need to be updated and effective in a non-formal way; expressed in a requirement form and structured in a performance-oriented way, so that it can no longer be ignored that technologies change and that quality, health and environmental protection are not preserved through the application of obsolete building practices and standards;
- the evolution of the normative philosophy itself, based on the experiences carried out and those in progress, but also on a series of more general guidelines linked to the “philosophy of law”; in particular, the progressive importance of the norm as a recommendation, seen as an opportunity for operators to grow technically and culturally; without, however, eliminating the obligatory norm, still applicable to the few mandatory aspects that can be recognized and defined.
- the congruity of local regulations with national and community requirements, in order not to block at source the flexibility required in return for real control of substantial quality.

4. Discussion

Today, due to the COVID-19 emergency, we have a great opportunity to challenge the project. Our homes are inadequate for the new needs, which are not economic but of the people—the elderly, immigrants, young mothers, students, off-site workers—green standards that have ever been met and parking spaces that have been transformed into something different shortly following the certificate of habitability.

Today, more than ever, we are in a time of reduction of resources, where we are facing the transition from man and the concept of habitability and typology, to that of the energy efficient house, shifting our attention from the man to the envelope.

We think it is necessary to proceed through Variants and Invariants, which guarantee a rigorous design approach in the characteristics considered fundamental (*Invariants*) for the public residential project, but at the same time flexible (*Variants*) that can connote the project and differentiate it in its qualitative aspects.

The requirements of the environmental and technological building system, which are characterized by temporariness and adaptability are partly known and tested and partly are the recent consequence of the evolution of the complex of needs defined earlier. We highlight the most significant ones related to the project and to the social and temporary architectural construction:

- *Contextuality*
- *Adaptability*
- *Flexibility*
- *Reversibility*
- *Technical Equipment Integration*
- *Energy Efficiency*
- *Durability*

These requirements emphasize the need for a progressive affirmation of the principle that the time variable should play a major role in the definition of project performance standards. In other words, facing the need for a more flexible use of the available space, adapting to the circumstances and to the problems of longevity of the building, means trying to govern, control and reduce, necessarily through interdisciplinary approaches, the existing gap between the culture of preservation and that of making, between sustainability and innovation.

Designing and building under such paradigms means comparing the need for balance between resources and environmental impact. A response to the concept of transitory architecture, considering the architectural work as an “evolutionary” construction: the building is an element that can transform and adapt organically according to the change of the users and their needs.

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