

TeMA

This Special Issue of TeMA - Journal of Land Use, Mobility and Environment, collects twenty-seven contributes of international researchers and technicians in form of scenarios, insights, reasoning and research on the relations between the City and the impacts of Covid-19 pandemic, questioning about the development of a new vision and a general rethinking of the structure and urban organization.

Journal of
Land Use, Mobility and Environment

TeMA Journal offers papers with a unified approach to planning, mobility and environmental sustainability. With ANVUR resolution of April 2020, TeMA journal and the articles published from 2016 are included in the A category of scientific journals. From 2015, the articles published on TeMA are included in the Core Collection of Web of Science. It is included in Sparc Europe Seal of Open Access Journals, and the Directory of Open Access Journals.

Special Issue

Covid-19 vs City -20

scenarios, insights, reasoning and research

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TeMA

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Special Issue

COVID-19 vs CITY-20

SCENARIOS, INSIGHTS, REASONING AND RESEARCH

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The cover image is a photo collage of some cities during the Covid-19 pandemic quarantine (March 2020)

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Special Issue

COVID-19 vs CITY-20

SCENARIOS, INSIGHTS, REASONING AND RESEARCH

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Health emergency and economic and territorial implications

First considerations

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Abstract

The Covid-19 epidemic has caused a lot of economic and social damages and has generated territorial imbalances that are not yet quantifiable. Many research groups are currently committed to deepen their understanding of the impact of the crisis using different disciplinary methodologies and focusing on different aspects of the phenomenon.

These researches reveal causal links between the variables involved that have not been explored up until now and raise relevant questions for the economic and social future of our Country.

This paper wants to provide an overview of the territorial and economic implications related to the epidemic event on the basis of a set of economic, settlement and environmental indicators applied to the two territorial dimensions of the Italian Regions and Provinces. For each of them, the connection with primary epidemic data (number of cases and number of deaths) was analysed to verify the possible presence and consistency of the correlation indices.

Aim of the article is to highlight some territorial characteristics that may have facilitated the spread of the epidemic by identifying, at the same time, some actions that will positively affect them, in an evolutionary perspective.

Keywords

Urban planning; Economy; Geographical data analysis; Post-Covid actions.

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1. Aims and data

Some data can provide a real idea of the present and future dynamics of the processes underway, their consequences and impacts on the development scenarios of the crisis both on the economic and social systems, from a temporal and territorial point of view. In particular, some empirical observations can lead to understand collective and individual behaviours that have affected the different spread of the epidemic at the regional and even provincial level.

It is evident, in fact, that the pandemic did not cross all the territories with the same virulence (Figure 1). The data on the number of provincial cases on 13 May 2020 report a significant difference between minimum values (57 cases in the Province of Isernia) and maximum values (21,731 cases in the Metropolitan city of Milan) (DPC, 2020), a gap that cannot be exclusively coincidental and that raises many questions.

Two of these questions are particularly relevant and interesting to analyse.

The first has to do with the very nature of these differences. What are the causes? What factors determined them? Are they due to behavioural models or institutional differences?

The second is related to the future consequences. Are there active policies that can increase the resilience of a territory? How will the economic and productive structure of the Country and of the individual regions be influenced? Will the fault line separating the North from the South widen further?

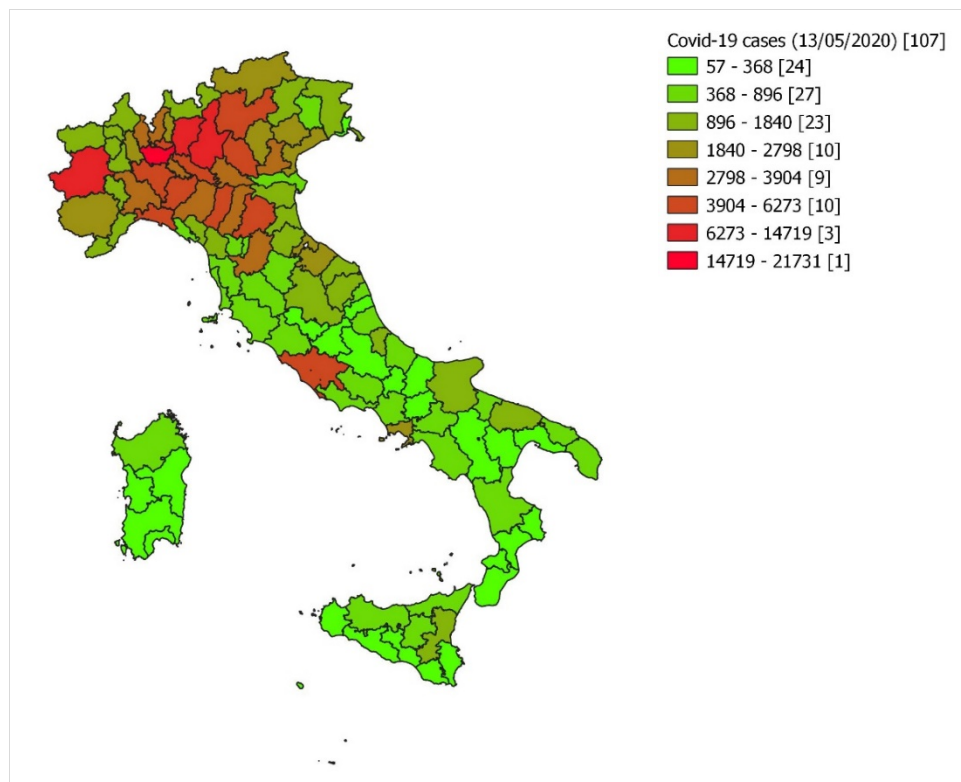


Fig.1 Provincial distribution of the cases of Covid-19 at 13 May 2020. Source: Authors on data DPC (2020)

This second set of questions also opens up a methodological and perspective question. The pandemic has questioned the same methods of actions on the territories, to the point that it seems increasingly evident to most that it is appropriate to redesign policies and interventions to recovery the Country.

Many analyses are based on the assumption that this awareness is an acquired fact and that we are moving towards a new renaissance in the relationship between man and territory. This hypothesis is certainly fascinating but highly unlikely. Much more likely, instead, is the repetition of deeply rooted and difficult to modify models.

Significant is the note of Yascha Mounk (2020) about the tendency of man to “chronocentricity”, a term coined by the sociologist Jib Fowles (1974) showing the belief of the contemporary man that own age is prominent compared to the others, hence the tendency to believe the latest disastrous event as the cornerstone of an epochal revolution that, in real life, does not occur, except for small adjustments of route.

In our view, it is more useful to follow an objective and pragmatic approach, and to understand, through quantifiable and measurable indicators, the differences in land use, economic processes and social relationships that may have affected the spread of the pandemic.

For this purpose, we focused on the following 7 indicators: mortality rate, gross domestic product, population density, percentage of the elderly population out of total, land consumption, air pollution. The first couple of indicators are measured at the regional level, the last five at the provincial level. They are supposedly related, although to a different extent, to the spatial distribution of the epidemic. This set of indicators, although not exhaustive, can well describe the table of content of the co-factors that guided the spread of the virus.

The epidemic data used in the following analysis date back to 13 May 2020 and can be found on the website of the Department of Civil Protection (DPC, 2020).

Mortality (Regional datum)

The regional mortality rate clearly expresses the territorial differences that have arisen between the various regions. It is also strongly correlated by construction with the spread indicator of the virus.

This index is enough to clearly describe the high variability of the incidence of mortality in the different areas. At the date of 13 May 2020, the total number of deaths in Italy was 31,106, with 222,104 cases. Figure 2 shows specifically the mortality rate of each Region at that date. The national ratio is of 14.01%, while the regional data fluctuate from a maximum value of 18.23% of Lombardy to a minimum of 5.07% of Umbria. The median value is between 10.34 (Autonomous Province of Trento) and 10.01 (Friuli-Venezia Giulia). By comparison, world value at the same date is 6.87%.

One of the reasons given to explain the high mortality rate occurring in Italy is the average age of the population. This interpretation is partially confirmed by the data of other European countries, but it falls when we look at non-European countries with a high percentage of elderly people (see Japan, 4.17%). The lack of a specific correlation between the old age of the population and the mortality from Covid-19 is better highlighted by the subsequent provincial data.

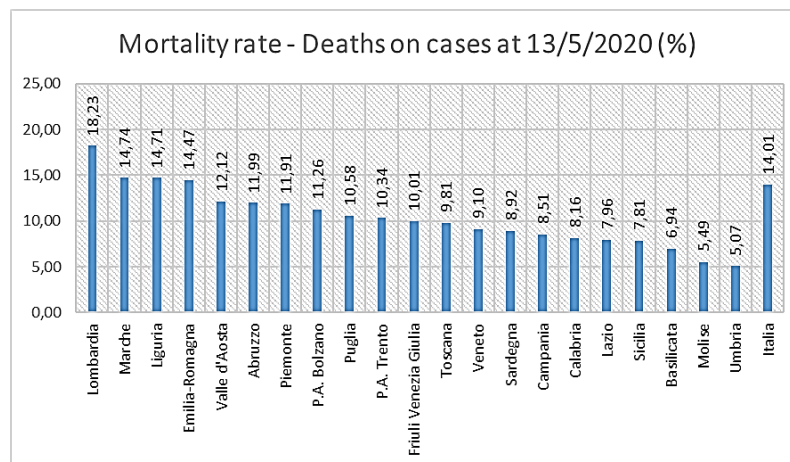


Fig.2 Regional mortality rate at 13 May 2020. Source: Authors on data DPC (2020)

GDP (Regional datum)

The following diagrams compare the number of cases (Figure 3) and the number of deaths (Figure 4) for Covid-19 with the regional gross domestic product (GDP) per capita in 2017, last available data (ISTAT, 2018). The regional GDP is a statement of the degree of development of the economy and it is correlated with the health costs determined on a regional basis.

The correlation coefficient of the relation between number of cases and GDP is 0.4425, while the same coefficient for the relation between number of deaths and GSP is 0.4125. The correlation is inflated by the highest incidence of the epidemic being recorded in the Northern regions, and in particular in Lombardy, which are also the highest-income regions.

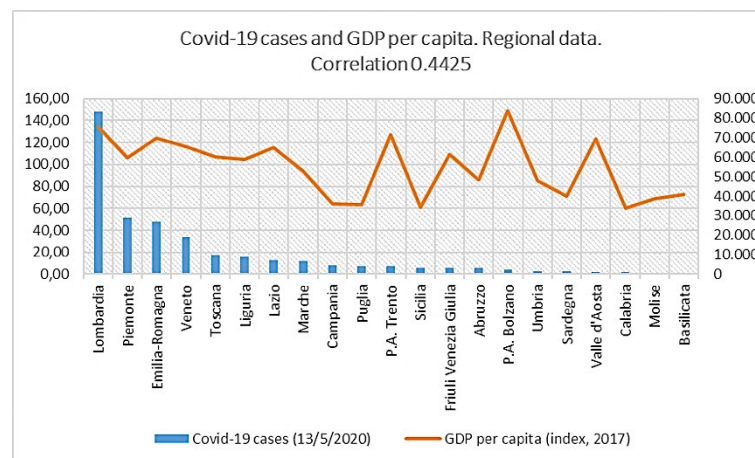


Fig.3 Covid-19 cases and GDP per capita. Source: Authors on data DPC (2020) and ISTAT (2018)

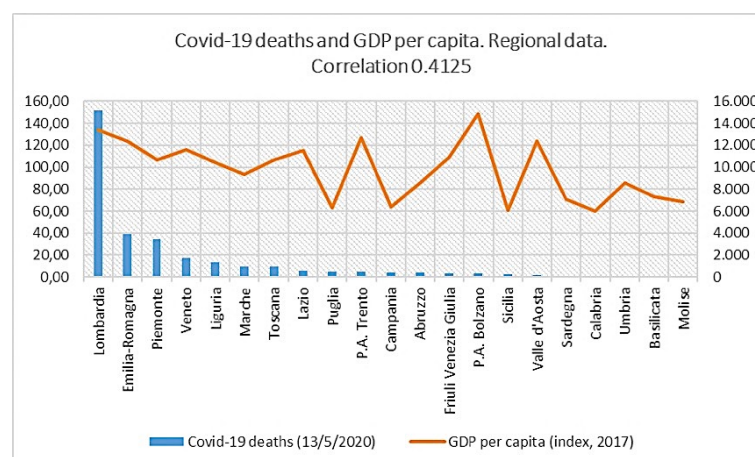


Fig.4 Covid-19 deaths and GDP per capita. Source: Authors on data DPC (2020) and ISTAT (2018)

Population density (Provincial datum)

Figure 5 shows a map with the distribution of the population density in the 107 Italian Provinces. It shows that there is a very uneven distribution of density ranging from a minimum of 37 inhab./Sq.Km in the Province of Nuoro, to a maximum of 2,617 inhab./Sq.Km in the Metropolitan city of Naples. The largest number of provinces (68 out of 107) is positioned in the narrow range of density from 89 to 331 inhab./Sq. Km.

Figure 6 shows the relation between number of cases of Covid-19 (always at the date of 13 May 202) and population density at provincial level. The correlation coefficient is 0.4402. It is clear that housing density and

population density positively influence social proximity and consequently the speed of circulation of the virus and the number of infections.

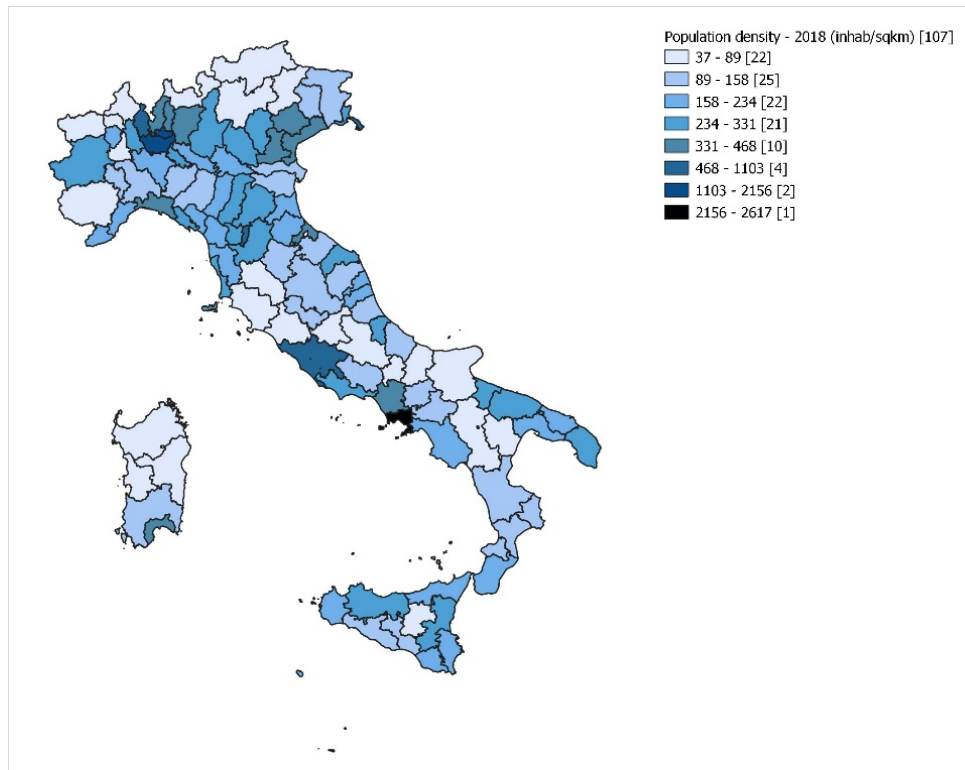


Fig.5 Density of population (inhab./Sq.Km). Provincial data. Source: Authors on data ISTAT (2020)

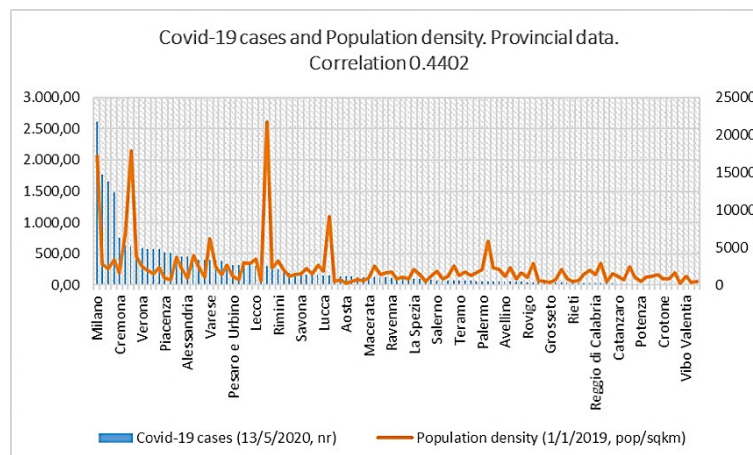


Fig.6 Covid-19 cases and density of population (inhab./Sq.Km). Source: Authors on data DPC (2020) and ISTAT (2020)

Number of senior citizens (Provincial datum)

Italy is one of the countries with the highest average age of the population. The country's demographic dynamics are expected to further accentuate this aging phenomenon in the future. In our country, the percentage of the senior citizens, with an age of 65 and over, ranges from a minimum of 17.5% in the Province of Caserta to a maximum of 28.9% in the Province of Biella. As stated, all national, regional and provincial data regarding this percentage are growing, as evidence of the progressive aging of the population.

It is noteworthy that the correlation coefficient between the number of cases of Covid-19 and the elder population (population with 65 and more years old) seems to be the less significant among all the coefficients calculated (Figure 7). The value of -0.0849 shows almost no relationship, so the two variables appear to be

perfectly independent. This evidence downsizes the idea that the virus has penalized the areas with the higher average age of the population.

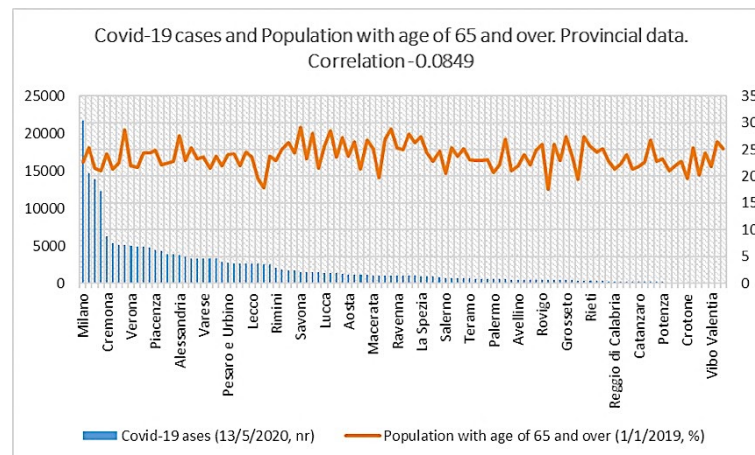


Fig.7 Covid-19 cases and population with age of 65 and over. Source: Authors on data DPC (2020) and ISTAT (2020)

Land consumption (Provincial datum)

Figure 8 shows the relations between land consumed and number of cases. The data are referred to the Italian provinces and comes from ISPRA (Munafò, 2019). The correlation index between land consumed and number of Covid-19 cases is very significant (0.5806).

Land consumption is considered one of the critical index in this epidemical crisis. For a number of scholars, a high level of land consumption decreases the ability of the territory to create an effective response to growing environmental risks and, consequently, also to the ability to respond to health crises.

It is evident, in fact, that land consumption is in turn correlated with variables that influence the spread of the disease and its containment: the degree of urbanization, the management of common resources, the degree of economic backwardness, the pollution rate.

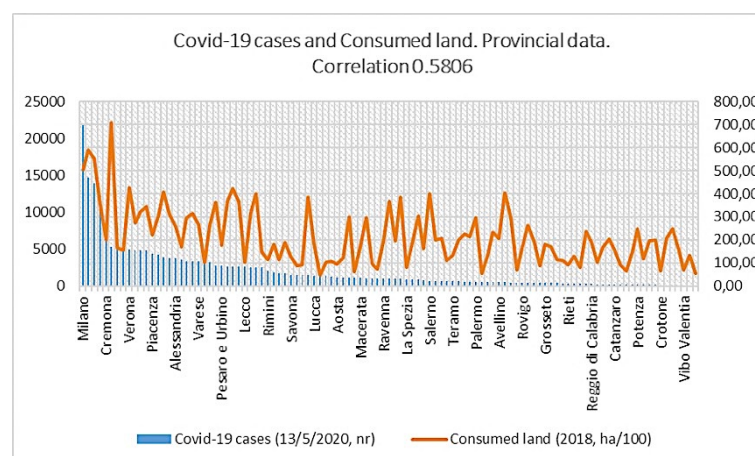


Fig.8 Covid-19 cases and consumed land. Source: Authors on data DPC (2020) and Munafò (2019)

Air pollution (Provincial data)

We base the analysis of atmospheric pollution on two measures which are considered to be among the most significant: the concentration of PM10 and of NO₂ (ISPRA, 2020).

Figure 8 shows the relation between the number of Covid-19 cases at the date of 13 May 2020 and the number of cases of deviation from the daily average of PM10 logged into 2017 and 2018. The limit value of the PM10 particle is 50 $\mu\text{g}/\text{m}^3$. The two series of data have a correlation index of 0.5732.

Note that the data are recorded in the provincial capital and are reported in the ISTAT environmental data base (dati.istat.it), section "Environment and Energy", while the data about the number of cases of Covid-9 are related to the whole provincial territory.

Figure 9 shows an ISPRA source map with the distribution of the areas in which the allowed concentrations of PM10 are regularly exceeded. The fact that the whole Po Valley is classified as an excessively polluted area is highly significant.

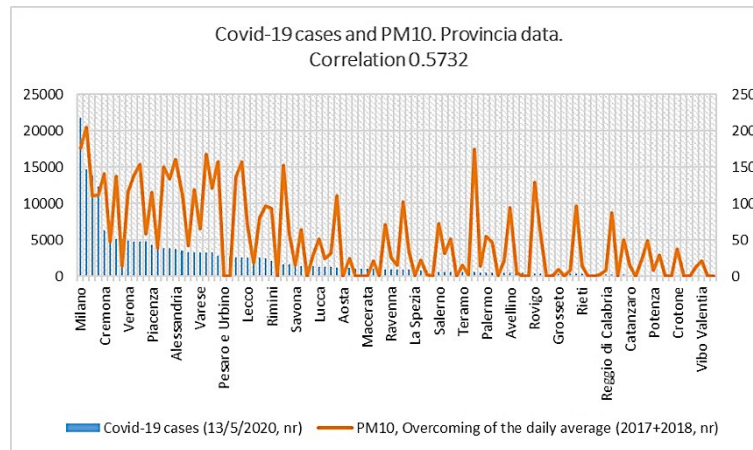


Fig.9 Covid-19 cases and PM10 concentration. Source: Authors on data DPC (2020) and ISPRA (2020)

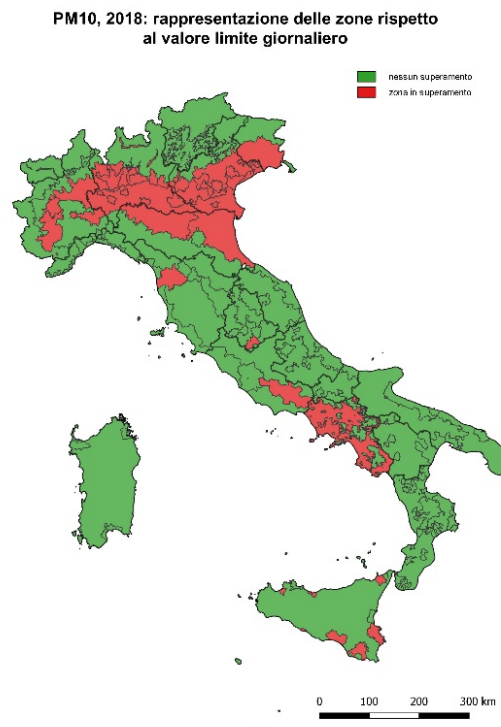


Fig.10 Distribution of the area with overcoming of the limits of PM10. Source: ISPRA (2020)

Lastly, Figure 11 shows the relationships between the NO₂ concentration and the number of Covid-19 cases, with the epidemic data that date back to 13 May 2020. The correlation coefficient between the number of Covid-19 cases and the NO₂ concentration is very high and it is equal to 0.5347. This evidence supports the idea that the virus “travels” on fine particles and that air pollution contributes to the spread of the disease (Martelletti & Martelletti, 2020; Setti et al., 2020).

It is important to emphasize that the Istituto Superiore di Sanità (ISS) has developed a specific page dedicated to the connection between air pollution and the spread of the SARS-CoV-2 virus

According to the ISS, “the hypotheses suggesting correlations between the areas with greater air pollution and the spread of the virus responsible for Covid-19 have prompted the request for opinions from the Istituto Superiore di Sanità and have stimulated many groups of scholars to cooperate to examine the issue and possible associations. However, the uncertainty that still affects many aspects of this epidemic requires some caution and a deepening of the understanding of any cause-effect relationships” (ISS, 2020).

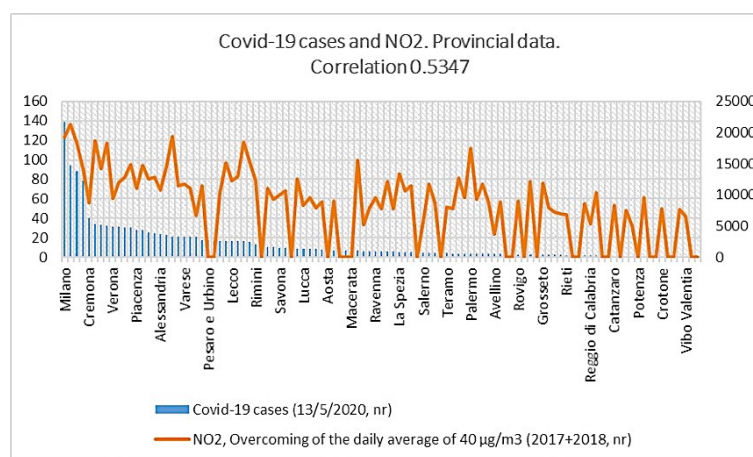


Fig.11 Covid-19 cases and NO₂ concentration. Source: Authors on data DPC (2020) and ISPRA (2020)

2. Discussion

The data presented in the previous chapter testify of an Italian territorial system with varied and differentiated characteristics. They also show the possibility that some phenomena may have influenced and favoured the spread of the epidemic.

As already said, this does not mean that there is a direct connection between territorial phenomenon and event. It only means that there is the need to deepen the analyses to reach a better knowledge of the phenomena and to be able to apply results and models to the construction of forecast scenarios useful for the management of the phenomena that will occur in the future.

Table 1 summarizes the outcomes of the analyses carried out particularly in relation to the correlation coefficients and their meanings. Two of them are related to Regional data, five to Provincial data. The analysis shows for three cases a correlation with high significance, for three a correlation with medium-high significance, for one a correlation with very low significance.

From the previous analyses, a first difference emerges in relation to the type of data. In particular, even with the aforementioned attention, a greater degree of significance can be highlighted between epidemiological and environmental data, while a relation between socio-economic data and epidemiological data is present but can be shown to be less significant.

No association seems to be present between epidemiological data and structure of the population.

Data	Territorial level	Correlation coefficient	Significance
Covid-19 deaths / GDP per capita	Regional	0.4125	Medium-high
Covid-19 cases / GDP per capita	Regional	0.4425	Medium-high
Covid-19 cases / Population density	Provincial	0.4402	Medium-high
Covid-19 cases / Age of 65 and over	Provincial	-0.0849	Very low
Covid-19 cases / Land consumed	Provincial	0.5806	High
Covid-19 cases / PM10	Provincial	0.5732	High
Covid-19 cases / NO2	Provincial	0.5347	High

Tab.1 Summary of the correlation analyses. Source: Authors

The correlation between data, of course, does not imply causation but only a significant similarity in the trend of the two matrices of values. This, in accordance with the ISS as to the environmental data, does not translate into a specific cause and effect relationship between air pollution and spread of the pandemic. Having clarified this issue, the association between environmental quality aspects and the spread of the epidemic is one area in which the studies of scholars working in the social, economic and environmental field are being focused on.

The assumption is that there is some level of correlation between the two processes and that the diffusion enhanced both by the reduced quality of some environmental factors and by the concentration of some processes in restricted territories. For example, the concentration of toxic substances in the air reduces the body's defences, while higher income levels would have an impact on the amount of interpersonal relationships for work or other purposes and, therefore, on the probability of getting in touch with subject carrying of pathologies.

Obviously, the correlations built in this study are to be better investigated with time with the increasing availability of data.

Without going into the merits of the quality and completeness of the epidemiological data, it is necessary to underline the fact that, since the event is ongoing, the values change day by day. Since the rate of change tends to decrease, the latest data are much more stable than those collected, for example, in late March.

It appears to be untimely, then, to affirm that: "We observed similarities in the conditions of Wuhan area in Hubei Province, with those in the Po Valley metropolis, particularly related to the geographical and climatic conditions – presence of water bodies, flat lands, limited air circulation, similar climate zones –, socioeconomic ones – industrial production, transport infrastructure and mobility, population distribution and density –, as well as similarities in terms of presence, concentration and persistence of pollutants in the atmosphere" (Murgante et al., 2020, p.31).

The fact remains that the improvement of the qualitative factors of the territory represents a necessary target, independently from the need to face this immediate emergency. This is because man's use of space has become unsustainable due to a growing series of factors. Just think of agricultural production or climate change as examples of the environmental alterations that man continues to indiscriminately carry out.

3. Economic answers

The pandemic will leave behind a long wake of victims and an enormous cost in terms of human lives; yet, even the economic and social cost will be significant, and will have effects not only in the short term but also and above all in the long term (Capasso & Chiarini, 2020). Unlike other, the Covid-19 crisis has a characteristic that makes it more damaging: it is a truly global crisis.

The lockdown of production activities and of international trade has involved practically all over the world with disruptive effects in all sectors. The forecasts of the International Monetary Fund (2020) and the OECD (2020) indicate that the fall in production will be significant in all advanced countries, but emerging economies and poorer countries will suffer more.

The destruction of product and income is not so worrying for the direct consequence of the suspension of activities, but for the long-term effects on the alteration of the value chain and on the structural dynamics of the economy. Some sectors, such as tourism and air transport, have suffered considerable damages and will be profoundly transformed; similarly, many companies will leave the market, others will modify the production structure by relocating or shortening the production cycle to reduce the risks associated with the supply of raw materials and semi-finished products.

The impact in Italy will be particularly hard because the country's economy is structurally weak (Banca d'Italia, 2020). The growth rate of Italy's gross domestic product in the last 20 years is among the lowest in the world. Therefore, the crisis linked to the pandemic may have particularly negative effects on an already weak and uncompetitive economic system. The last decades have seen a notable technological transition, of which the last phase is the 5G technology, from which Italy has remained substantially out. This, along with other factors, has curbed productivity growth and undermined the country's growth rate. The pandemic and the following crisis have accelerated a technological transition already underway that requires massive investments in at least three types of infrastructures: technological infrastructures, organizational and management infrastructures, legal and regulatory infrastructures.

Technological infrastructures include not only the connection network between databases, but the management of the data itself. These infrastructures are necessary for new production processes which return to be directed towards non-standardized but specific productions for individual needs. The platforms that manage the data are functional to this type of production. In this sense, production itself implies knowledge and know-how and increases the added value of the product.

Organizational infrastructures are necessary to manage new production processes that tend to be increasingly outsourced to the final product markets. Paradoxically, the new globalization will contribute to making production and marketing activities increasingly local. Territorial policies and the enhancement of local contexts are therefore necessary to guide the technological leap and the transformation of production and marketing systems.

Like any change, this too must be accompanied by a radical shift in the regulatory and legal system. It is known that the Italian legal system is cumbersome and does not help the development of new business initiatives by representing a high cost of "doing business". This cost will be even higher in a more articulated and complex economic system because it is enriched by a great territorial diversification.

4. Planning answers

Starting from the analysis carried out and from the interpretation associated with the data, it is necessary to take into consideration another non-secondary aspect, namely the effects in terms of innovation of the planning and its role.

The territorial strategies to be implemented can only be long-term strategies. The time investment necessary to modify consolidated actions and behaviours requires, in turn, a stable political and social scenario.

What happened between March and May 2020 will be difficult to replicate, because the quickness with which social and economic processes have slowed down and, in some cases, stopped is not sustainable, even in the event of an epidemic upsurge.

The general quarantine was the best tool to stop the epidemic but it had a strong impact on the social and economic situation. This meant that, as soon as the situation started to show signs of improvement, the health risks seemed to have been put in the background, overtaken by the attention to economic damage. We can say that the territorial system affected by the epidemic seems to have behaved in a less than resilient way since the universal response was the lockdown (Mazzeo, 2020).

A first line of territorial action, therefore, goes in the direction of increasing the system resilience level, so that it can respond flexibly without losing efficiency.

Given that resilience is the ability of an object to absorb aggressive phenomena while maintaining a reasonable level of functionality that does not lead to collapse (Holling, 1996), the response to disastrous events must be as effective as possible, so that the subsequent phase of recovery may start from a more solid base.

Also given that each disastrous event contains in itself the power to influence the future organization, on the basis of a better and more efficient growth model, it is possible to build different response scenarios after a shock. In some cases, the model may collapse into a non-resilient behaviour, or it may resume the path previously followed, in others it can improve by focusing on innovation and on the construction of a more advanced territorial structure (Figure 12).

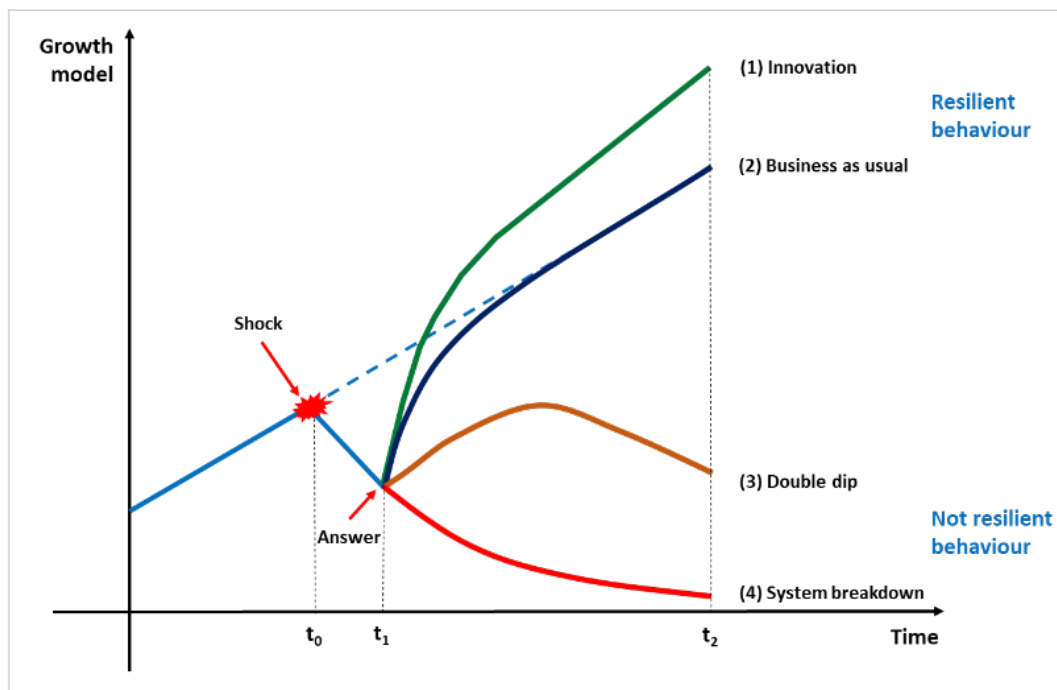


Fig.12 Potential evolutions of the growth model. Source: Mazzeo (2016)

Planning can help to re-enforce the strengths of urban and territorial systems, in connection with other research sectors.

For example, it appears to be possible that some land use manners, in particular those that led to a greater density of activities and functions, have represented a potential multiplier of the impacting power of the virus, which instead did not happen in the areas with lower density. Areas in which the epidemic is widespread, in fact, are also areas in which there has been a greater exploitation of the capacity of the territorial resources, in particular in regards to their use for production purposes.

The same system of services, showcased as strong point of some areas, has turned into a weak point and has made them vulnerable to the spread of the epidemic.

From this comes the need to investigate the difference between theoretical and effective response of the territorial systems. In some Regions this gap has been large enough to fuel more doubts about the capacity of local administrations in the construction of efficient structures and evolutionary scenarios.

In his current discussion, urban and regional planning has often highlighted the presence of a series of critical issues in the spatial processes developed in recent decades and which have been characterized by a tendency to limitlessly and indiscriminately extend of the possibilities of individual choice, both locally and globally. These processes have been widely analysed by national and international literature.

In particular:

- the constant increase in the world population and the percentage and absolute increase in the urbanized population;
- the uncontrolled expansion of urban systems, with the consequent assault to natural soil and the explosion of local and metropolitan mobility (Mazzeo & Russo, 2016);
- the growth of international mobility due to work and tourism;
- the increase in territorial risk factors and the impacts on climate change on the quality of air, soil and water;
- the processes of impoverishment of agricultural soils and homogenization of crops, affecting the quality of food products;
- the aging of the population, which varies from country to country, with repercussions on the public services system and on urban systems.

All the previous critical issues have to do with a scarcely sustainable use of the resources and are easily interrelated with parallel aspects belonging to other sectors, such as economics, sociology and public health (Matthew & McDonald, 2006; Sloane, 2020; Celata, 2020).

In particular, it is necessary to give back meaning to people's places of life, overcoming the assumption of "geographical neutrality" (Arribas et al., 2011) inherent in the current action of land use, in order to analyse and understand the innate diversity present in different territories and the impact they have on living conditions.

This action is also linked to the development of a coordinated and multidisciplinary approach to eliminate or, at the very least, reduce social disparities, which translate into other kinds of disparities, including the right to health. These inequalities tend to increase for reasons related to income, skin colour, level of education, as well as in relation to the physical position of the communities, and therefore to the conditions of housing, transport, social services. In summary, we could say that disparities are a function of the overall level of social capital. The higher the social capital, the more effective the access to services and the true availability of citizenship rights. Finally, it is appropriate to restore dignity to the quality of information and the effective implementation of participatory democracy.

The territory and the tools of its planning can address the critical points mentioned. The possible solutions can be applied to the physical space so that they can affect specific aspects such as the organization of the settlements and the places of life and work of the population, the environmental conditions of the settlements, the repercussions on the demographic structure, with the aim of growing the resistance of the overall characteristics of the population.

The Covid-19 epidemic has highlighted once again the critical issues associated with the processes of building of the local territorial space (the city as a place of opportunities and safeties) and the global one (economic expansion and access to all places by the use of communications). A possible answer passes, as mentioned, through the adaptation of practices and deepening of connections with other sectors. Territorial processes, in fact, are spatially and functionally through interrelationships that go beyond national and continental borders, and therefore need an answer that is no longer simply sectoral.

Notes

The paper is the result of the common reflections, research and work of the authors involved. However, Abstract, Section 1 and Section 2 are in common. Section 3 can be attributed to Salvatore Capasso. Section 4 can be attributed to Giuseppe Mazzeo.

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Image Sources

Figg. 1 to 9 and 11 to 12: Authors

Fig.10: ISPRA (2020).

Author's profile

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He was awarded PhD in Economics and Finance from the University of Manchester (UK) and PhD in Economics from the University of Naples Parthenope. Since 2013 he has been full professor of Economic Policy at the University of Naples Parthenope and from 1 June 2015 to 31 May 2019 he was Director of the ISSM which, following his project submitted to the CNR, became part of the present ISMed. His research interests are focused on the economics of Development and Economic Growth and on monetary and financial economics. In specific, he has in recent years dealt with the relationship between the black economy and financial development and the relationship between corruption and economic growth. He is the author of numerous publications and articles in national and international journals.

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