THE GEOGRAPHY OF INNER AREAS IN 2020. TERRITORIES BETWEEN POTENTIAL AND WEAKNESSES

A preponderant part of the Italian territory is characterised by a spatial organisation based on 'minor centres', often small in size, which, in many cases, are only able to guarantee residents limited accessibility to essential services. The specificities of this territory can be summarised using the expression 'Inner Areas'.

The Map of Inner Areas is a tool that looks at the entire Italian territory in its articulation at municipal level and identifies municipalities with a joint offer of three types of service - health, education and mobility - called Service provision centres (one or more Municipality). It also represents all the other municipalities on the basis of their distance from these Service provision centres (in terms of actual average road travel time), classifying them into four bands of increasing relative distance - Outlying areas, Intermediate, Peripheral, Ultra-peripheral - and, therefore, with a potentially greater inconvenience in the use of services. The municipalities classified as Intermediate, Peripheral and Ultra-peripheral represent all the Inner Areas of our country.

The 2014 Map of Inner Areas, a reference for the National Strategy of Inner Areas (SNAI) and included in the 2014-2020 Partnership Agreement (PA), was produced in a methodological process that also involved ISTAT, the Bank of Italy and the Regions.

For the 2021-2027 programming cycle, Istat has produced an update of the Map[1] that gives an account of the presence of services at the end of 2019. Among the new features of this update - which also confirmed the role of the SNAI both in the proposal of the new Partnership Agreement and in the National Recovery and Resilience Plan, PNRR[2] - is the introduction of more advanced and precise distance calculation techniques, while the methodological aspects have remained more or less unchanged.

The work also benefited from a technical verification phase with the regions, which made it possible to correct some basic data (concerning the location of services) and improve the quality of the information.

Both mappings - 2014-2020 and 2021-2027 - are available among the geographies 'for policy purposes' in the Istat application 'Statistical Atlas of Municipalities' (ASC, http://asc.istat.it).

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1 The technical activities for updating the Map were carried out by Istat in the framework of the Project "Territorial and Sectoral Statistical Information for Cohesion Policies 2014-2020" under the NOP Governance and Institutional Capacity 2014-2020, in close collaboration with NUVAP (Department for Cohesion Policies of the Presidency of the Council of Ministers) and NUVEC (Agency for Territorial Cohesion).

2 Mission No. 5 'Inclusion and Cohesion' of the National Recovery and Resilience Plan (NRP), Component 3: 'Special Interventions for Territorial Cohesion' - Investment 1: 'National Strategy for Inner Areas' - Intervention Line 1.1.1 'Strengthening of services and community social infrastructure' funded by the European Union - NextGenerationEU. A total of EUR 500 million is currently earmarked for this purpose.

Almost half of the Italian municipalities in the country's Inner Areas

The new mapping of Inner Areas showed the following classification of Italian municipalities:

- 241 municipalities are classified as a Service provision centres, one (182) or more (59) Municipalities, as they jointly offer the three essential services considered;

- 3,828 municipalities (48.4%) are located at relatively small distances (below the median of the distribution of distances) from a Service provision centre and constitute the set of municipalities defined as Outlying areas; this set represents the largest cluster;

- 1,928 Intermediate Municipalities (24.4%) representing the first cluster of Inner Areas (distance to the nearest Service provision centre between the median and the 3rd quartile);

- 1,524 municipalities (19.3%) classified as Peripheral, i.e. municipalities whose distance from the nearest Service provision centre is between the 3rd quartile and the 95th percentile;

- 382 municipalities (4.8%) classified as Ultra-peripheral, i.e. having a distance from the nearest Service provision centre greater than the 95th percentile.

The set of the first three clusters (two types of Service provision centres – one or more Municipalities - and Outlying areas), which identifies the Central Areas of the country, is made up of just over half of the Italian municipalities (4,069, or 51.5% of the total). The last three clusters (Intermediate, Peripheral and Ultra-peripheral), on the other hand, identify the Inner Areas of the country and consist of just under half of the Italian municipalities (3,834, or 48.5% of the total).

The Inner Areas are present above all in the regions of Southern Italy: a total of 1,718 (67.4%) municipalities belong to them, with significant incidences in Basilicata, Sicily, Molise and Sardinia (all above 70%). The Inner Areas of Southern Italy represent 44.8% of the national total.

In Central Italy, the relative weight of these areas is much lower, reaching 54.8% of the total with 532 municipalities. The regional distribution appears much more balanced than in the other divisions and ranges from 46.3% in Marche to 60.1% in Tuscany. The contribution of this geographical breakdown to the mapping is quite small, just under 14%.

In the North-West and North-East, the share of municipalities falling within the Inner Areas decreases even further, 33.7% and 41.4% respectively, although in absolute terms this is an impressive 1,584 municipalities. It follows that on a national basis, this type of municipality contributes an overall share of 41.3% of the total.

The distribution of municipalities belonging to the most disadvantaged category (Ultra-peripheral) also appears unbalanced over the territory: 229 municipalities (59.9%) out of a total of 382 are located in the South.

The incidences of Ultra-peripheral municipalities in Sardinia (13.5%), Basilicata (33.6%) and Abruzzo (10.8%) are significant, while in the Centre-North the Autonomous Province of *Bolzano/Bozen* stands out with 28 out of 116 Ultra-peripheral municipalities (24.1%).

An analysis of the physical characteristics of the municipalities belonging to the Inner Areas reveals a profile consistent with expectations. In fact, these are mainly mountainous areas (1,874 municipalities, equal to 48.9% of the total), concentrated mainly in the Alpine arc, in the Tuscan-Emilian Apennines, and in some central areas of Sicily and Sardinia. The region with the highest number of municipalities in Inner Areas is Lombardy (346) followed by Piedmont (196) and Abruzzo (122); Campania and Calabria also have a significant number of mountain municipalities in Inner Areas, 105 and 106 respectively.

On the other hand, there are 1,625 municipalities in the hilly areas (42.4%), with significant presences in Sardinia (218 municipalities), Sicily (198 municipalities) and Campania (173); those located in the plains are just 335 (8.7%), concentrated mainly in Lombardy (98) and Apulia (92).

The distribution of municipalities according to other physical characteristics confirms the picture just described: 84.5% of the municipalities are located far from the sea (non-coastal municipality), 79.9% are municipalities defined as 'rural' according to the European classification of the degree of urbanisation.

FIGURE 1. MUNICIPALITIES BELONGING TO THE INNER AREAS ACCORDING TO CERTAIN SPATIAL CHARACTERISTICS
Year 2020. Percentage values
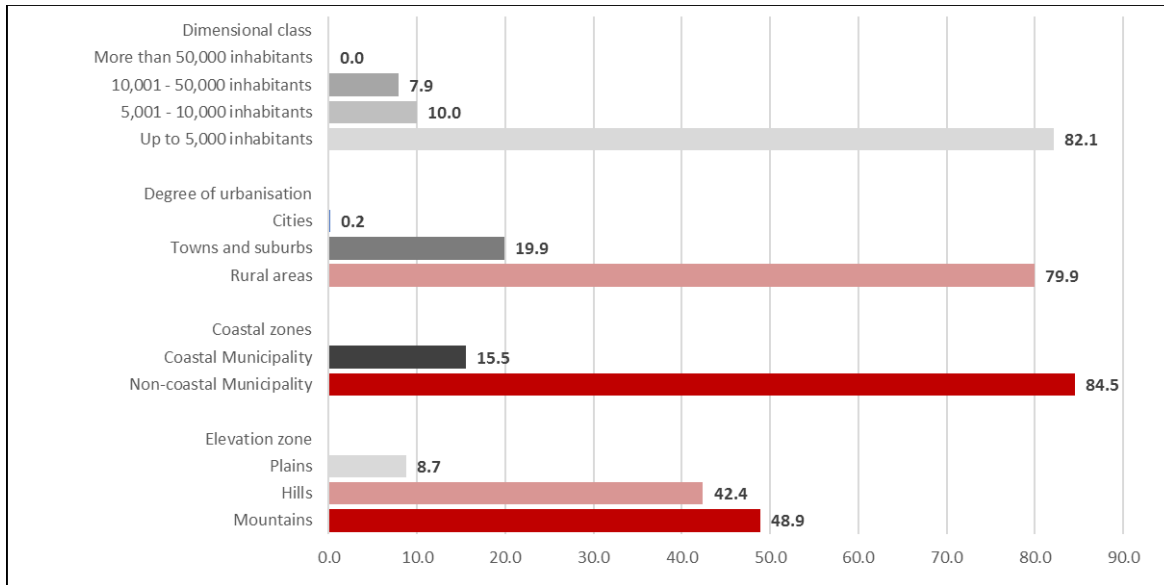
The Inner Areas of Southern Italy on the rise

A comparison between the 2014 and 2020 mappings provides important indications on how our territory has changed in terms of accessibility to essential services. The most evident result is that the majority of municipalities (5,336, or 67.5% of the national total) have maintained the same classification: 77.1% continue to fall into the Service provision centres or Outlying areas classes, and 57.3% preserve the connotation of Inner Area.

Between 2014 and 2020, 16.4 per cent of municipalities (a total of 1,265) improved their position by moving to a higher class; a similar proportion moved to a lower class (16.1 per cent, 1,272 municipalities). In both cases, the greatest number of shifts are recorded in contiguous Outlying areas-Intermediate and Intermediate-Peripheral classes. On the other hand, the municipalities that have kept their classification unchanged present a rather uneven territorial distribution: they are more concentrated in Northern Italy (77.4% in the North-West and 67.4% in the North-East), less so in the Centre (59.2%) and the South (59.1%).

On a regional basis, the highest shares of municipalities that maintained the same classification were recorded in Lombardy (83.1%) and in the Autonomous Province of Trento (74.1%); on the other hand, the lowest values were recorded in Sardinia (35.3%) and Molise (33.8%). Downgrades were most numerous in the Autonomous Province of *Bolzano/Bozen* (59.5%) and Tuscany (40.3%).

Rather than changes in travel time to service delivery centres, these changes are due to the decrease in the number of Service provision centres municipalities, which fell from 339 to 241 (-28.9%) over a period of about six years. The decrease is largely attributable to the significant contraction of hospital facilities with at least a Level I DEA.

TABLE 1 . DISTRIBUTION OF MUNICIPALITIES ACCORDING TO THE CLASSIFICATION OF INNER AREAS.
Years 2014 and 2020. Absolute values and percentages

Inner Areas Municipalities 2014	Inner Areas Municipalities 2020						
	A – Service provision centre (one Municipality)	B - Service provision centre (more Municipalities)	C - Outlying areas	D - Intermediate	E - Peripheral	F - Ultra-peripheral	Total
Absolute values							
A - Service provision centre (one Municipality)	161	4	19	20	12	1	217
B - Service provision centre (more Municipalities)	4	42	45	23	8		122
C - Outlying areas	8	10	2,936	445	100	10	3,509
D - Intermediate	6	1	762	1,102	388	29	2,288
E - Peripheral	2	2	59	323	921	168	1,475
F - Ultra-peripheral	1		7	15	95	174	292
Total	182	59	3,828	1,928	1,524	382	7,903
% Values							
A - Service provision centre (one Municipality)	2.0	0.1	0.2	0.3	0.2	0.0	2.7
B - Service provision centre (more Municipalities)	0.1	0.5	0.6	0.3	0.1	0.0	1.5
C - Outlying areas	0.1	0.1	37.2	5.6	1.3	0.1	44.4
D - Intermediate	0.1	0.0	9.6	13.9	4.9	0.4	29.0
E - Peripheral	0.0	0.0	0.7	4.1	11.7	2.1	18.7
F - Ultra-peripheral	0.0	0.0	0.1	0.2	1.2	2.2	3.7
Total	2.3	0.7	48.4	24.4	19.3	4.8	100.0
Improve classification compared to 2014	1,295	16.4					
Confirm the 2014 classification	5,336	67.5					
Worse classification than in 2014	1,272	16.1					
Total	**7,903**	**100.0**					

Among the Inner Areas also some municipalities

In the Inner Areas, which cover a total surface area of more than 177,000 km^2 (almost 59% of that of the entire country), just over 13 million people reside, i.e. less than 23% of the Italian population, with a population density of 75.7 inhabitants per km^2. In particular:

– Municipalities classified as Intermediate represent a little more than a quarter of the national territory and 13.6 per cent of the population (about 8 million inhabitants) reside there;

– municipalities considered as peripheral constitute 7.9% of the national population (about 4.6 million residents), covering more than a quarter of the national territory (26.3%, over 79 thousand km^2);

– the Ultra-peripheral Municipalities (the most disadvantaged category) represent just 1.2% of the population and 7.4% of the national territory.

The population density in the three categories of Inner Areas decreases significantly according to the distance from the centres offering essential services: 106.3 inhabitants per km^2 in the Intermediate Municipalities, 58.6 inhabitants per km^2 in the Peripheral Municipalities and only 32.3 inhabitants per km^2 in the Ultra-peripheral Municipalities.

Comparing the size of the Inner Areas with that of the Centres (4,069 municipalities fall into this category, of which 241 are Service provision centres, while the remainder are Outlying areas municipalities), some important differences are immediately apparent: the municipalities classified as Centres extend over a total surface area of just over 124 thousand km^2 (41.2% of the surface area of our Peninsula) but have a population of over 45

million residents, i.e. more than 77% of the Italian population. Population density is also very high at 367.8 inhabitants per km^2.

However, there is no shortage of exceptions, i.e. municipalities classified as Inner Areas because they lack certain essential services despite having a large population. These are eight municipalities with more than 50,000 residents: the most obvious case is that of Gela in Sicily (more than 72,000 inhabitants), classified as Peripheral because it lacks a railway station at least of the Silver type. For the same reasons, the municipality of Altamura in Apulia is classified as Intermediate (almost 70 thousand inhabitants), while the municipality of Vittoria, which has just over 62 thousand residents, is classified as Intermediate due to the absence of hospitals with a Dea service and railway stations of at least Silver type.

Some municipalities are also classified as Inner Areas, such as Matera in Basilicata (almost 60,000 inhabitants), Nuoro in Sardinia and Enna in Sicily, due to the lack of a railway station of at least Silver type, and Isernia in Molise, due to the absence of a hospital with a Dea service.

PROSPECT 2. NUMBER OF MUNICIPALITIES, POPULATION, SURFACE AREA AND POPULATION DENSITY ACCORDING TO THE CLASSIFICATION OF INNER AREAS. Year 2020, absolute values, percentage values and km^2

Classifications of Inner Areas	Number of municipalities	Population 2020	% of population	Surface	% of surface	Population density
A - Service provision centre (one Municipality)	182	20,470,301	34.6	24,455,1	8.1	837.1
B - Service provision centre (more Municipalities)	59	1,576,586	2.7	3,727,5	1.2	423.0
C - Outlying areas	3,828	23,756,465	40.1	96,345,0	31.9	246.6
D - Intermediate	1,928	8,059,454	13.6	75,837,0	25.1	106.3
E - Peripheral	1,524	4,653,355	7.9	79,393,6	26.3	58.6
F - Ultra-peripheral	382	720,052	1.2	22,310,1	7.4	32.3
Total	7,903	59,236,213	100.0	302,068,3	100.0	196.1
Centres=A+B+C	4,069	45,803,352	77.3	124,528	41.2	367.8
Inner areas=D+E+F	3,834	13,432,861	22.7	177,540,7	58.8	75.7

Increased depopulation and population ageing in the Inner Areas

In the long run, the population dynamics in the Inner Areas, with its effects on the depopulation of the most marginal and isolated municipalities, is one of the elements that contributed to the launch of the National Strategy.

Against a positive demographic dynamic on a national basis between 2001 and 2020 (+3.9%), growth in the Central municipalities was even more pronounced (+5.6%) while the Inner Areas lost population overall (-1.4%) (Table 3). This decrease is particularly significant because it is precisely the most marginal municipalities in the Inner Areas (Peripheral and Ultra-peripheral) that suffered the greatest declines (-4.7% and -9.1%, respectively). On the other hand, the municipalities classified as Intermediate, i.e. the municipalities in the Inner Areas that are less distant from the places where essential services are present, show a growth in population, albeit slight (+1.3%). People therefore tend to leave the Inner Areas and move closer and closer to municipalities offering more services. In this context, policies to counter these phenomena, which affect such a large part of the Italian territory, are extremely necessary.

In some cases, the dynamics of depopulation take on an even more significant connotation. The top 100 municipalities in the Inner Areas with the largest population decline from 2001 to 2020 recorded a -40.9 %, from 90,188 to 53,314 inhabitants. Sixty-six per cent of these municipalities are located in the southern regions, particularly in Abruzzo (15 per cent) and Calabria (26 per cent). These are generally small municipalities, with an average population of under 1,000 residents. For some, the demographic decline has been particularly strong: for example, the Peripheral Municipality of Schiavi di Abruzzo (Chieti) went from 1,403 inhabitants in 2001 to 701 in 2020 (-50.0%), the Peripheral Municipality of Anzano di Puglia (Foggia) from 2,239 to 1,126 inhabitants (-49.7%).

Even municipalities that were already very small saw their population more than halve from 2001 to 2020, such as Civitacampomarano in Molise and Roccaforte del Greco in Calabria, whose population fell from 676 to 323 and from 802 to 387 residents, respectively.

The phenomena of depopulation do not only affect the Inner Areas of southern Italy but also some municipalities in the Inner Areas of central-northern Italy: for example, Zerba (Piacenza), where the population has gone from 140 to 70 inhabitants, or Drenchia (Friuli-Venezia Giulia), where the population has halved, from 197 to 99 inhabitants in the same period of time.

The 10-year population forecasts confirm these depopulation trends[3] : the population decrease, expected to be 2.2% in 2030, involves all six territorial typologies considered. A decrease of 1.6% is expected for Central municipalities (-1.9% in Outlying areas municipalities alone) and 4.2% for Inner Areas. The latter are also characterised by a marked progressiveness of the decrease according to distance from the areas where essential services are provided: -3.4% for Intermediate Municipalities, -5.2% for Peripheral Municipalities, and -6.1% for Ultra-peripheral Municipalities.

PROSPECT 3. RESIDENT POPULATION ACCORDING TO THE CLASSIFICATION OF INNER AREAS
Years 2001, 2020 and 2030. Absolute values and percentages

Classifications of municipalities	Resident population				
	Population 2001	Population 2020	Population forecast 2030 (*)	Percentage change 2020-2001	Percentage change 2030-2020
A - Service provision centre (one Municipality)	19,910,965	20,470,301	20,236,114	2.8	-1.1
B - Service provision centre (more Municipalities)	1,530,449	1,576,586	1,532,265	3.0	-2.8
C - Outlying areas	21,925,417	23,756,465	23,316,015	8.4	-1.9
D - Intermediate	7,955,510	8,059,454	7,783,513	1.3	-3.4
E - Peripheral	4,881,374	4,653,355	4,410,659	-4.7	-5.2
F - Ultra-peripheral	792,029	720,052	676,432	-9.1	-6.1
Total Italy	**56,995,744**	**59,236,213**	**57,954,998**	**3.9**	**-2.2**
Centres=A+B+C	43,366,831	45,803,352	45,084,394	5.6	-1.6
Inner Areas=D+E+F	13,628,913	13,432,861	12,870,604	-1.4	-4.2

* Istat, Municipal demographic forecasts 1 January 2020-2030, Experimental Statistics, 29 November 2021, Rome,
 https://www.istat.it/it/archivio/263355

The depopulation trend also stems from a long-standing negative natural population movement. The number of deaths exceeds the number of births almost everywhere and in all the years considered. In 2020, the first of the pandemic, the birth-death decrease in the population in Italy comes to 5.6% (-3.6 in 2019 and -3.2% in 2018).

The population decline is greatest in the Peripheral and Ultra-peripheral municipalities: respectively -6.8% and -7.4% in 2020, -5.3 and -5.7% in 2019 (Figure 2). On average, the municipalities in the Outlying areas class show less negative results, with a natural growth rate between -2.3% in 2018 and -2.6% in 2019 (-4.7% in 2020, in the Covid-19 period). In fact, it is within this category that positive rates prevail at the level of individual municipalities, with increases (positive natural balances) for 662 municipalities in 2019, two-thirds of all Italian municipalities for which the number of live births exceeds the number of deaths.

Another element that may contribute to depopulation is a negative migration balance, i.e. a higher number of cancellations due to transfers of residence from a municipality than registrations in the same municipality.

The processes of mobility, both internal and foreign, have strongly characterised the national territory in the past, with movements mainly linked to work issues (think of migrations to northern regions in the post-war period or expatriations). These phenomena are also present today, although to a lesser extent than in the past; immigration from abroad is probably more frequent.

In order to try to verify the attractiveness or expulsion power of the various territories, we consider the migration index (Figure 3), calculated as the ratio between the migration balance and the total number of enrolments and cancellations[4] for the various classes of inner areas The index values are on average rather low, denoting a substantial parity between the number of enrolments and cancellations.

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[3] Istat, Municipal demographic forecasts 1 January 2020-2030, Experimental Statistics, 29 November 2021, Rome, https://www.istat.it/it/archivio/263355.

[4] [I-E]/[I+E], where I are the registrations and E the emigrations due to transfers of residence or other reasons. The index varies between -1

Taking into account the anomaly characterising the 2020 figure, it can be deduced that there is a greater tendency to move away from one's place of residence the further one is from a service centre (index values are negative for inner areas) and that this tendency grows over time.

The municipalities with the most expulsion (index value greater than -0.5) number 187 in 2019 (of which seven with an index value greater than 0.9), most of them small and located in Inner Areas or at most Outlying areas. On the other hand, 43 are the most attractive municipalities (index above 0.5, of which 11 exceed 0.9). Also in this case there is no Service provision centre.

FIGURE 2. NATURAL GROWTH RATE OF THE RESIDENT POPULATION ACCORDING TO THE CLASSIFICATION OF INNER AREAS. Years 2018, 2019 and 2020. Percentage values
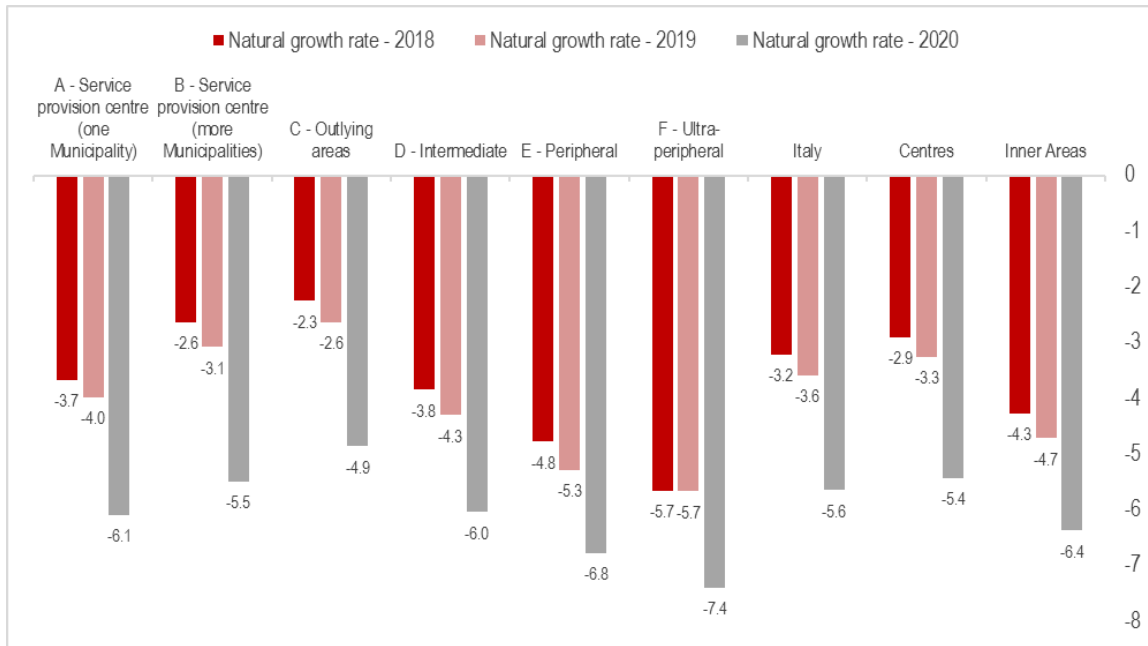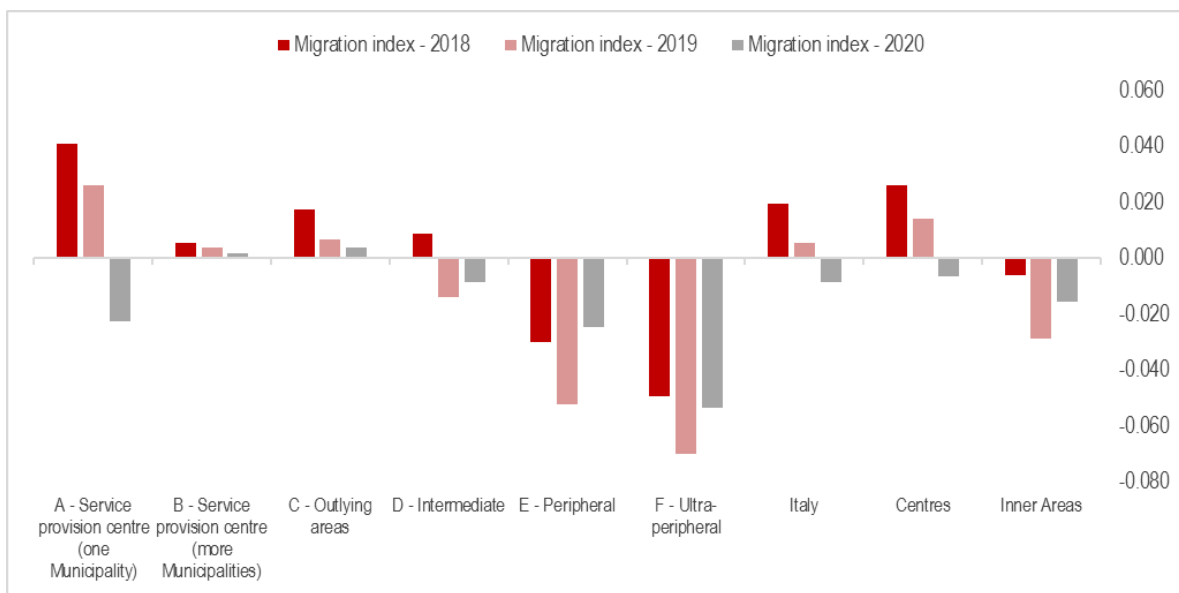

FIGURE 3. MIGRATION INDEX ACCORDING TO THE INNER AREAS CLASSIFICATION
Years 2018, 2019 and 2020. Percentage values

and 1: it will be -1 in the case where a municipality has only cancellations and no registrations, 1 in the opposite case (only registrations and no cancellations).

The ageing of the population is a further critical factor for the inner areas as it creates further obstacles to closing the gaps between territories. To measure this phenomenon, the old-age index was used, calculated as the ratio of the resident population aged 65 and over to that in the 0-14 age group.

Based on the results of this relationship and the proportions existing between these age groups, the structure of a population can be defined as progressive, i.e. with younger population greater than older population, stationary (equivalent proportion of population groups) or regressive, with older population greater than younger population. The different findings result in different impacts on the social system or on the employment and health system, to give just a few examples, as well as different development prospects for the areas.

Italy by now has a permanently regressive population structure, with a clear prevalence of the elderly population over the young: in 2020 Italy's old-age index is 182.6 and is markedly higher in the inner areas than in the Centres (196.1 vs. 178.8,). In the Peripheral and Ultra-peripheral municipalities the resident elderly population is more than double that of the young (206.8 and 223.4, respectively) while the lowest value is observed in the Outlying areas municipalities (166.5) (Table 4).

Also in terms of incidence on the total, the older population prevails over the younger one. The over-64s represent about a quarter of the national population: 23.3% in the Centres and 24.4% in the Inner Areas, with a peak of 25.7% in the Ultra-peripheral Municipalities.

Among the Centres it is the Polo municipalities that have the highest incidence of the elderly population (24.3%), probably also due to the greater presence of care services and residences for the elderly precisely in the urban centres compared to the more peripheral areas. There is similar evidence if one looks at the incidence of the over-80s subset.

On the other hand, the incidence of the younger population (15-29 years) varies between 14.8% in the Service provision centres with one single municipality to 15.4% in the Service provision centres with more than one Municipality. The presence of a - albeit slightly - smaller share of young people in the clusters may be attributable to the shift to smaller or more peripheral centres of part of the population of the large urban centres, the effect of both lower housing costs and fewer congestion problems, and the possible better quality of life.

The average values of the various groupings of municipalities conceal some internal heterogeneity: the lowest incidence of population under 30 years of age is found in the peripheral municipality of Poggiodomo in the province of Perugia (1.1%), the highest (23.7%) in the municipality of Lauregno in the province of *Bolzano/Bozen*, which is also peripheral.

PROSPECT 4. DEMOGRAPHIC INDICATORS ACCORDING TO THE CLASSIFICATION OF INNER AREAS
Year 2020. Percentage values

Classifications of municipalities	Population at 2020 census			
	Old-age index	Incidence of the population 15-29 years	Incidence of the population 65 years and over	Incidence of the population 80 years and over
A - Service provision centre (one Municipality)	194.1	14.8	24.3	8.2
B - Service provision centre (more Municipalities)	178.8	15.4	23.4	7.3
C - Outlying areas	166.5	15.1	22.4	6.9
D - Intermediate	188.1	15.0	23.9	7.7
E - Peripheral	206.8	15.1	25.0	8.2
F - Ultra-peripheral	223.4	14.9	25.7	8.8
Total Italy	**182.6**	**15.0**	**23.5**	**7.6**
Centres=A+B+C	178.8	14.9	23.3	7.5
Inner Areas=D+E+F	196.1	15.0	24.4	7.9

Inner Areas of the Country, Many Potentials for Development

The Inner Areas are considered crucial for the overall resilience of the territory in terms of hydrogeology, landscape and cultural identity. These factors are important levers on which to focus to foster the development

of these territories. The so-called place-based policy approach used within the SNAI aims at the direct involvement of local institutional actors and pushes towards organisational and associative forms in order to maximise the effectiveness of measures aimed, among other things, at

- make unused territorial capital productive through the valorisation of historical and artistic capital, the protection of the territory, the promotion of 'savoir-faire' and craftsmanship;

- limiting or eliminating the social costs that would become more substantial and pressing in the absence of intervention, by combating hydrogeological instability, protecting and enhancing the landscape and safeguarding biological diversity.

These local specificities are factors on which to focus to promote endogenous development capable of taking root and lasting over time, limiting depopulation and encouraging young people to return to these territories.

In order to analyse natural resources in the Inner Areas, the incidence of the area of *Natura 2000* areas and the incidence of the area designated as a protected natural area (EUAP) in the various groupings of municipalities was chosen, as these are long-established statistics.

The *Natura 2000* network is the main instrument of EU policy for the conservation of biodiversity, in particular for the long-term maintenance of threatened or rare natural habitats and species of flora and fauna[5] . These are not protected reserves from which human activities are excluded, but areas in which nature protection is also guaranteed "taking into account economic, social and cultural requirements as well as regional and local particularities" (Art. 2, Habitats Directive 92/43/EEC).

Protected Natural Areas are located in National Parks; although they are nature reserves, the richness of these places derives not only from the biodiversity that characterises them, but often also from the presence of archaeological and historical heritage, testifying to the often existing interconnection between natural and cultural heritage.

The overall incidence of protected natural areas is higher in the Inner Areas than in the Centres. In fact, as much as 23.8% of the total surface area of the Inner Areas falls in Natura 2000 areas, compared to 12.6% in the Centres. It is particularly in the Ultra-peripheral Municipalities that this characteristic is even more accentuated, with more than 40% of the surface area qualified as Natura 2000 area; in the Intermediate Municipalities the incidence is slightly below the national average (19.2%) while it amounts to 23.8% in the Peripheral Municipalities (Figure 4).

FIGURE 4. INCIDENCE OF THE AREA OF NATURA 2000 AREAS AND PROTECTED NATURAL AREAS (EUAPS) ACCORDING TO THE CLASSIFICATION OF INNER AREAS. Year 2020. Percentage values
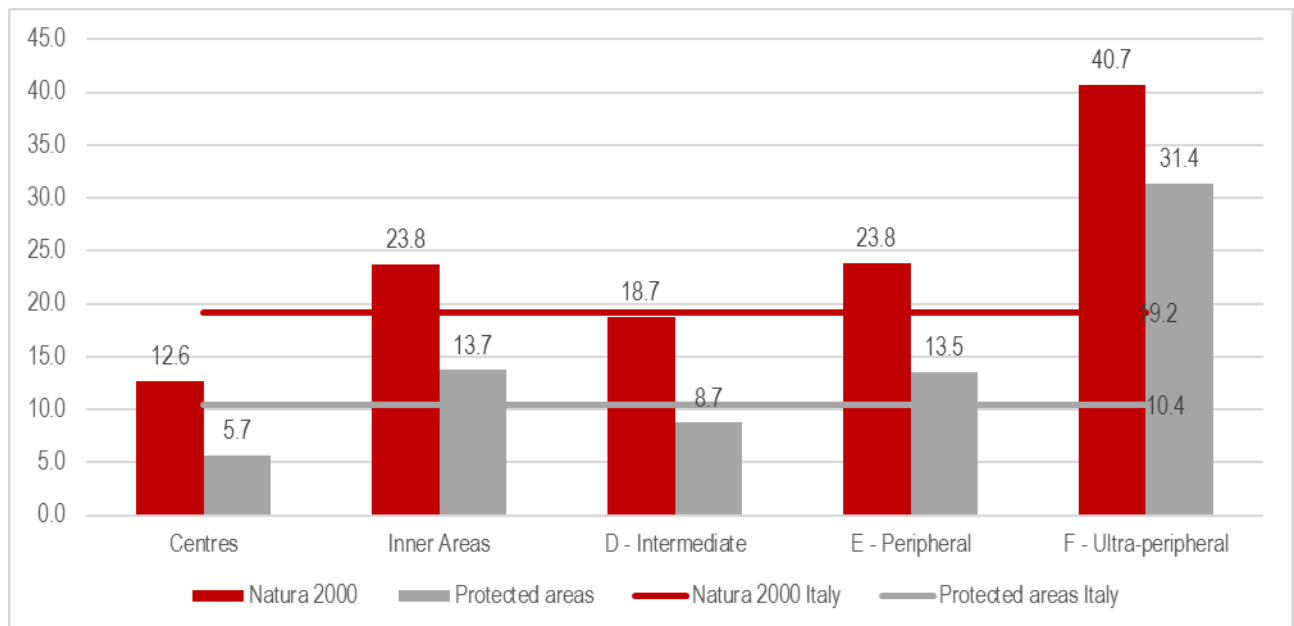
Source: Istat elaborations on MITE data

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[5] The Natura 2000 network consists of Sites of Community Interest (SCIs) and Special Protection Areas (SPAs) for the conservation of wild birds (https://www.mite.gov.it/pagina/rete-natura-2000).

Similarly, the territorial surface destined for protected natural areas (EUAPs) characterises to a greater extent the Inner Areas, with an average incidence of 13.7%, more than double that recorded for the Centres (5.7%). Also in this case, it is in the Ultra-peripheral Municipalities that the presence of these areas is most relevant, with an incidence of the surface area that reaches 31.4% while it stops at 13.5% in the Peripheral Municipalities and 8.7% in the Intermediate ones.

The Inner Areas of the Country: the lever of culture

Another factor to focus on in order to favour the start-up and consolidation of local development processes in the Inner Areas is certainly the cultural one. The cultural value of the territory is understood not only as artistic and landscape heritage, but also in terms of traditions and creativity, material and immaterial factors that contribute to building the image of places and strengthening their identity. Culture - museums, archaeological areas and sites, historical settlements, accompanied by the presence of libraries that contribute to the dissemination of local identities and traditions - can make places more attractive, stimulate tourism and, in this way, counteract depopulation and the closing of territorial gaps.

The availability of museums and libraries is higher in the Inner Areas than in the Centres: 1.4 per 10,000 inhabitants for museums and similar institutions and 1.9 for libraries; in the Centres the values are 0.6 and 1.1 respectively (Figure 5).

In the most peripheral areas, the ratio of facilities to population is 1.7 museums and 2.1 libraries per 10,000 inhabitants in the Peripheral municipalities and 2.8 museums and 3.5 libraries in the Ultra-peripheral Municipalities. These values, although influenced by the relative weight of these types of municipalities, undoubtedly bear witness to the existence of a potential to be encouraged and harnessed for the development of the Inner Areas and their repopulation.

FIGURE 5. LIBRARIES AND MUSEUMS AND SIMILAR INSTITUTIONS ACCORDING TO THE CLASSIFICATION OF INNER AREAS
Year 2020. Values per 10,000 inhabitants
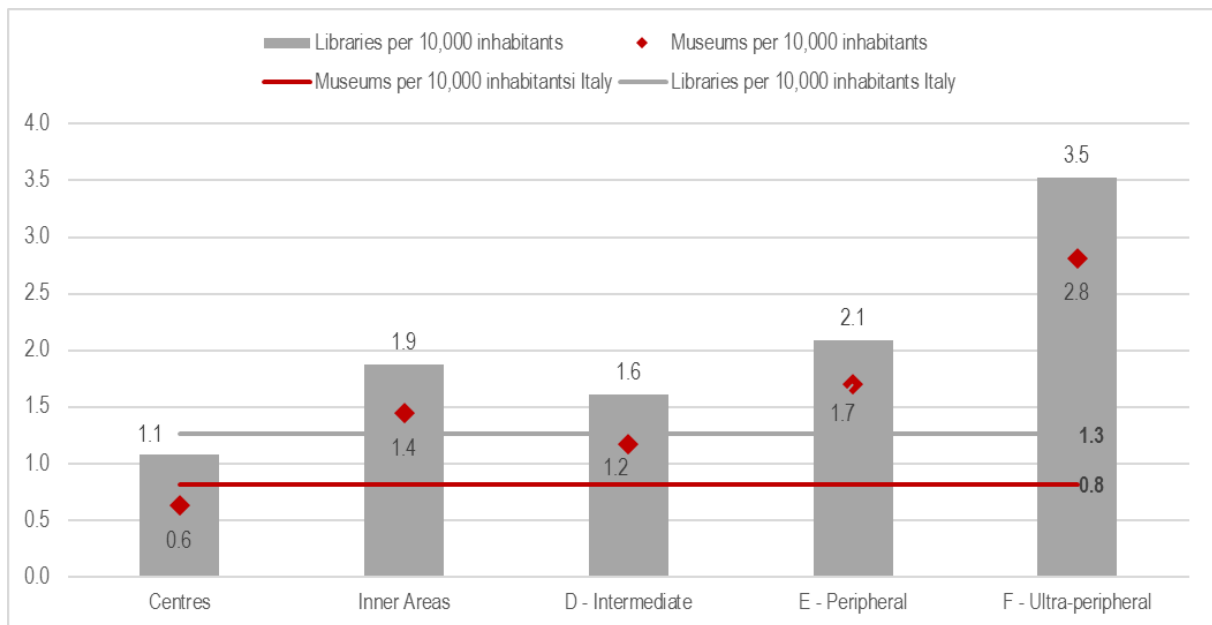
Greater maritime and mountain vocation in Inner Areas

Both the landscape/naturalistic aspect and the more strictly cultural aspect are important factors in attracting places and, therefore, levers that can favour tourist activities. Added to this are factors such as geographical location and geomorphologic conformations that qualify the Inner Areas as having a natural vocation for tourism.

The classification of Inner Areas according to the prevailing tourism category expresses the potential tourism vocation of the municipality, identified mainly on the basis of geographical (proximity to the sea, altitude, etc.)

and anthropic (large urban municipalities) criteria and refined by introducing minimum conditions concerning tourist presences[6] (Table 5).

Only 9.1% of the population resides in non-tourist Inner Areas, a higher share than in the Centres (5.3%), favoured by the presence of large cities with multidimensional tourism. About half of the population of the Inner Areas is instead resident in tourist municipalities that do not belong to a specific category. The higher incidence of population in intermediate municipalities, however, weighs on this result. The percentage is smaller in the more peripheral areas (a quarter in the Ultra-peripheral Municipalities).

A non-negligible share of the population of the Inner Areas (21.1%) is located in municipalities with a maritime vocation or with a maritime vocation to which is added a cultural, historical, artistic and landscape vocation. This share reaches 28.7% in the Ultra-peripheral Municipalities, where as much as one fifth of the population is located in coastal municipalities with a strong cultural connotation.

Municipalities with a mountain vocation are generally less populous: 8.5% of the relative population in the Inner Areas, only 0.7% in the Centres. Again, peripheral areas are the most represented in this category: 12.7% is the share of population residing in Peripheral Mountain Municipalities (with or without a prevalent cultural vocation), while it is 30.1% in Ultra-peripheral Mountain Municipalities.

PROSPECT 5. POPULATION BY PREVAILING TOURIST CATEGORY (*) AND CLASSIFICATION OF INNER AREAS
Year 2020. Percentage values

Prevailing tourism category	Centres	Inner areas	D - Intermediate	E - Peripheral	F - Ultra-peripheral
Large cities (with multidimensional tourism)	19.7	0.0	0.0	0.0	0.0
Municipalities with a cultural, historical, artistic and landscape vocation	13.6	7.8	7.6	8.8	3.4
Municipalities with a maritime vocation	5.8	12.9	11.9	15.3	7.8
Lake tourism municipalities	1.1	1.5	1.8	1.1	0.9
Municipalities with a mountain vocation	0.4	4.3	2.5	6.3	10.2
Spa tourism municipalities	0.6	0.6	0.6	0.7	0.0
Municipalities with a maritime vocation and with a cultural, historical, artistic and landscape vocation	10.1	8.2	7.7	7.2	20.9
Mountain municipalities with a cultural, historical, artistic and landscape vocation	0.3	4.2	1.6	6.4	19.9
Municipalities with a cultural, historical, artistic and landscape vocation and other vocations	2.4	2.8	2.2	3.8	2.0
Other tourist municipalities with two vocations	0.4	0.5	0.3	0.9	0.7
Tourist municipalities not belonging to a specific category	40.1	48.1	54.3	40.8	25.0
Non-tourist municipalities	5.3	9.1	9.3	8.8	9.1
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

* For further information on the classification by prevailing tourism category, see the following link: https://www.istat.it/it/archivio/247191

Tourism as a development factor for Inner Areas

To foster local development, the natural tourist vocation deriving from the geographical location of the municipalities must necessarily be accompanied by an adequate presence and efficient management of tourism-related services. The density of accommodation facilities is higher in the Centres than in the Inner Areas (1.1 per km^2 versus 0.5 on average) (Figure 6).

The capacity of beds in the facilities would, however, make it possible to attract tourist flows to a relatively greater extent in the Inner Areas than in the Centres: 16.9 per hundred inhabitants compared to 6.3 (Figure 6). The resulting increase in demand for places that receive these flows testifies to the relative importance that the tourism sector has or could have in these areas.

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[6] https://www.istat.it/it/archivio/247191

The indicators relating to the movement of tourists highlight the greater attractiveness of the central areas compared to the Inner areas: 929.9 per km^2 the density of nights spent and 275.7 km^2 the density of arrivals in the Centres compared to 521.9 and 120.4 km^2 in the municipalities furthest from the essential services. The density of tourist nights spent, however, is clearly higher (861 per km^2) in the Ultra-peripheral Municipalities, which are characterised by a generally more circumscribed territorial area (Figure 7).

The higher average stay in the Inner Areas probably denotes both a different type of tourism, more focused on relaxation and nature and therefore with longer stays, and the greater occurrence in the large centres of travel and overnight stays linked to work reasons and therefore shorter.

FIGURE 6. BEDS AND ACCOMMODATION DENSITY ACCORDING TO THE CLASSIFICATION OF INNER AREAS
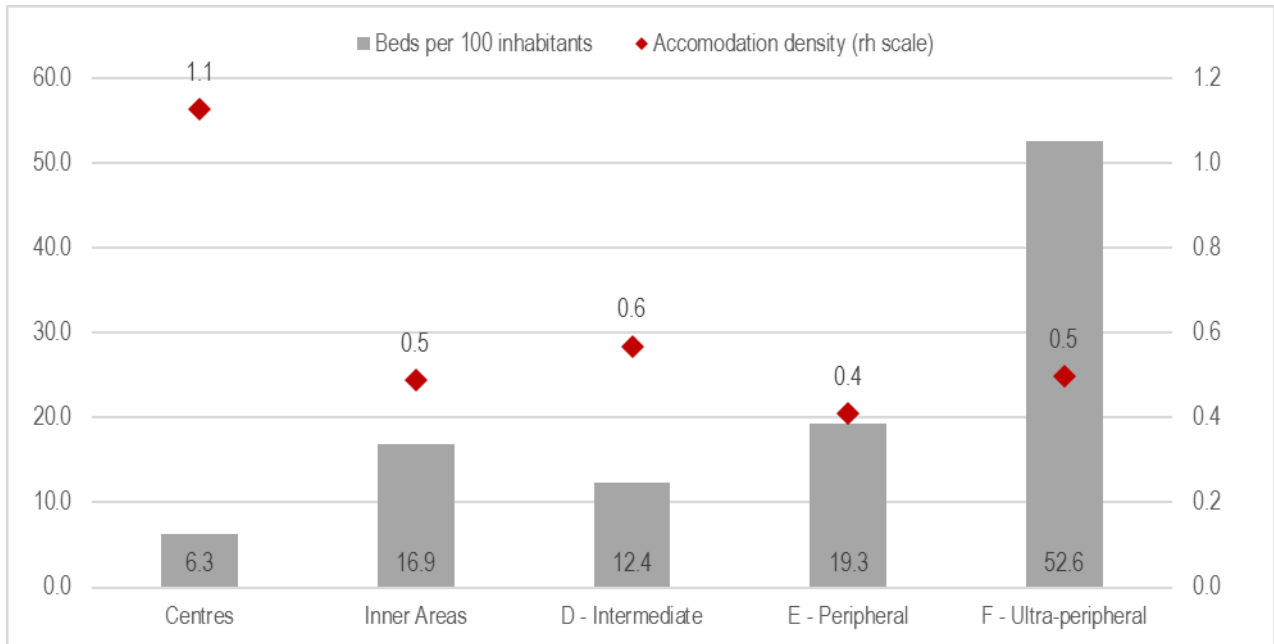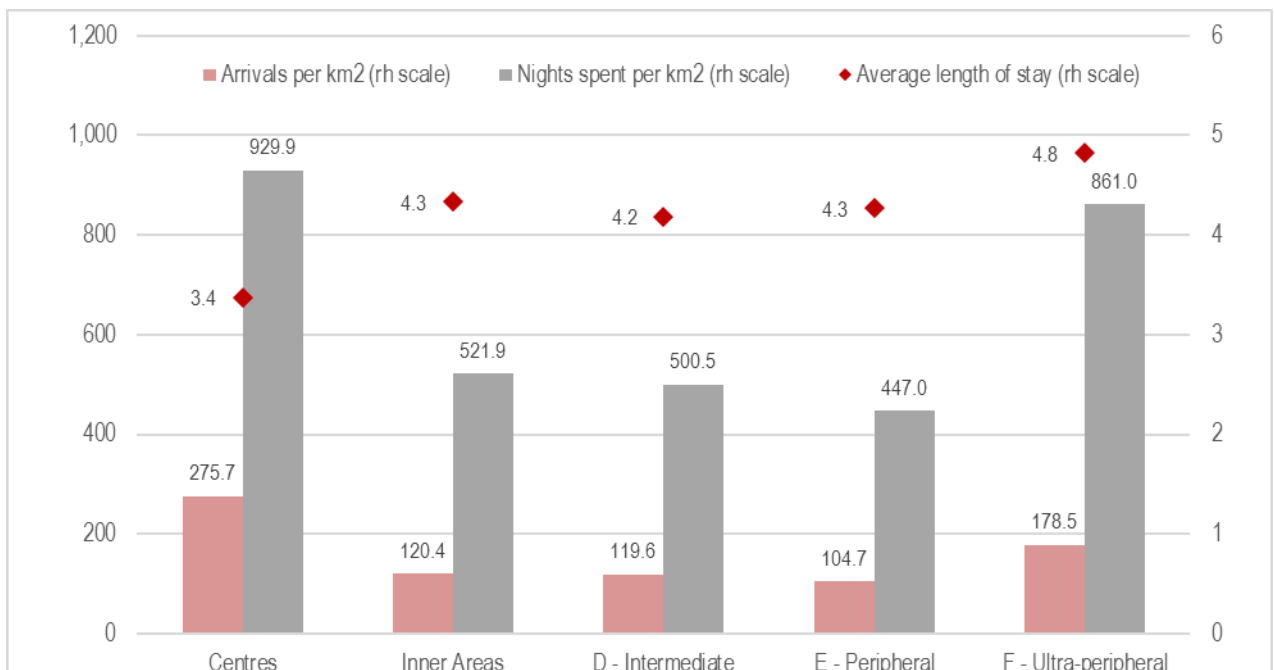Year 2020. Figures per 100 inhabitants and per km^2

FIGURE 7. DENSITY OF TOURIST ARRIVALS AND NIGHT SPENT, AVERAGE LENGTH OF STAY IN ACCOMMODATION FACILITIES ACCORDING TO THE CLASSIFICATION OF INNER AREAS. Year 2020. Average values and per km^2

The performance of the tourism sector in 2020 is unfortunately suffering from the negative effects of the pandemic. The clearly visible decline that emerges when comparing the figures for 2019 affected the entire country.

In this case, the Inner Areas showed greater resilience, registering smaller reductions in tourist presences and arrivals in accommodation establishments than the Centres: -57.6% and -62.7% in the Centres against -43.2% and -45.5% in the Inner Areas. In the Ultra-peripheral Municipalities, the contraction was even smaller, -33.4% for presences and -34.6% for arrivals (Figure 8).

FIGURE 8. TOURIST ARRIVALS AND NIGHTS SPENT ACCORDING TO THE CLASSIFICATION OF INNER AREAS
Years 2019 and 2020. Percentage changes
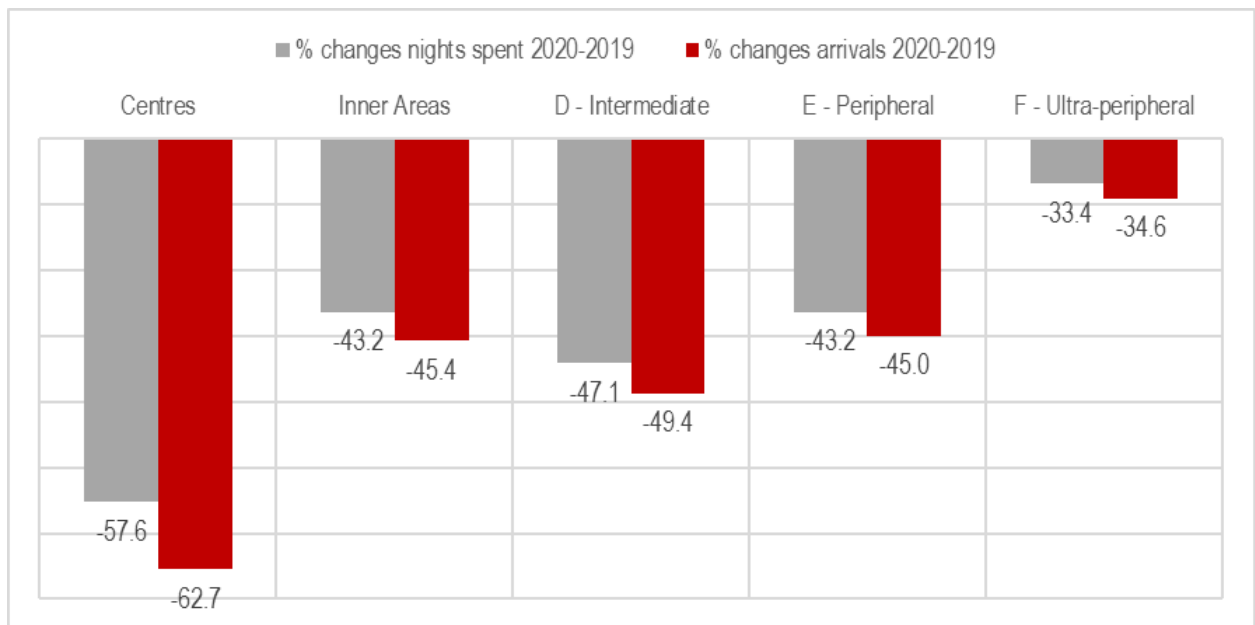
Entrepreneurship in the Inner Areas: focusing on local know-how?

A further possible local development factor for the Inner Areas is the more strictly economic one related to the entrepreneurial component. The revival of the Inner Areas as production areas - which guarantee sustainable characteristics, especially environmental sustainability - is in fact one of the policy objectives.

From the productive point of view, the Inner Areas confirm their marginal character compared to the rest of the country: in fact, they employ only 17% of the employees in the local units of industry and services, the remaining share is related to enterprises located in the urban centres and in the neighbouring Outlying areas areas (Figure 9). The gap is even more pronounced when referring to the share of turnover produced: as much as 86.8% comes from local units of enterprises located in the Centres and only 13.2% from the Inner Areas. The smallest contribution comes from the Ultra-peripheral Municipalities: only 0.9% in terms of employees and 0.6% in terms of turnover.

This result can be ascribed to several factors: the smaller size of areas and markets in the more peripheral areas, the lower availability of labour force as these areas are subject to depopulation and ageing of the population, the greater convenience for companies to make location choices that allow them to benefit from the economies of agglomeration and diversification, typical of central and urban areas. All these elements have contributed to the creation of a vicious circle that policies are trying to reverse.

However, the entrepreneurial dimension of the Inner Areas is relatively more oriented towards local know-how. The presence of local units of craft enterprises out of the total industry and services sector has a higher relevance in the production fabric of the Inner Areas: more than one fifth of the total employees carry out craft activities and produce 10% of the turnover (respectively 14.2% and 5.2% the shares in the Central Areas).

The prevalence of craftsmanship seems to be positively correlated with the degree of peripherality: just like tourism, craftsmanship in the Inner Areas can be a valuable development driver for these territories (Figure 10).

FIGURE 9. PERSONS EMPLOYED AND TURNOVER OF LOCAL UNITS OF INDUSTRY AND SERVICES ACCORDING TO THE CLASSIFICATION OF INNER AREAS. Year 2019. Percentage values
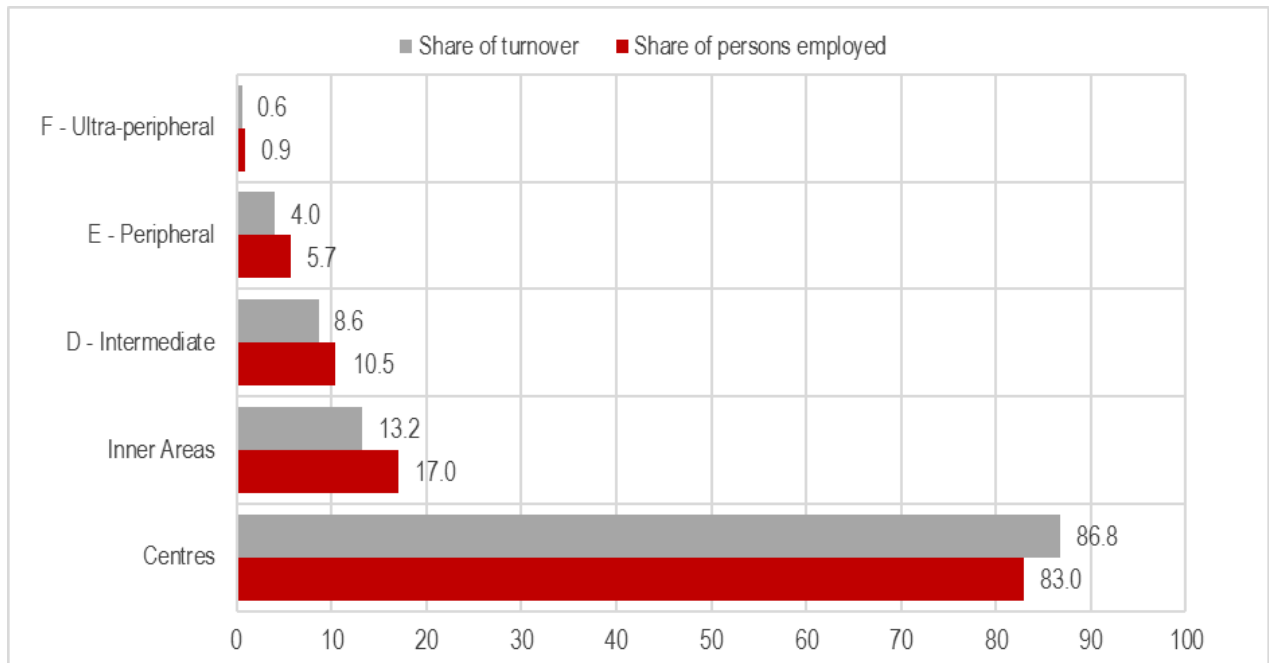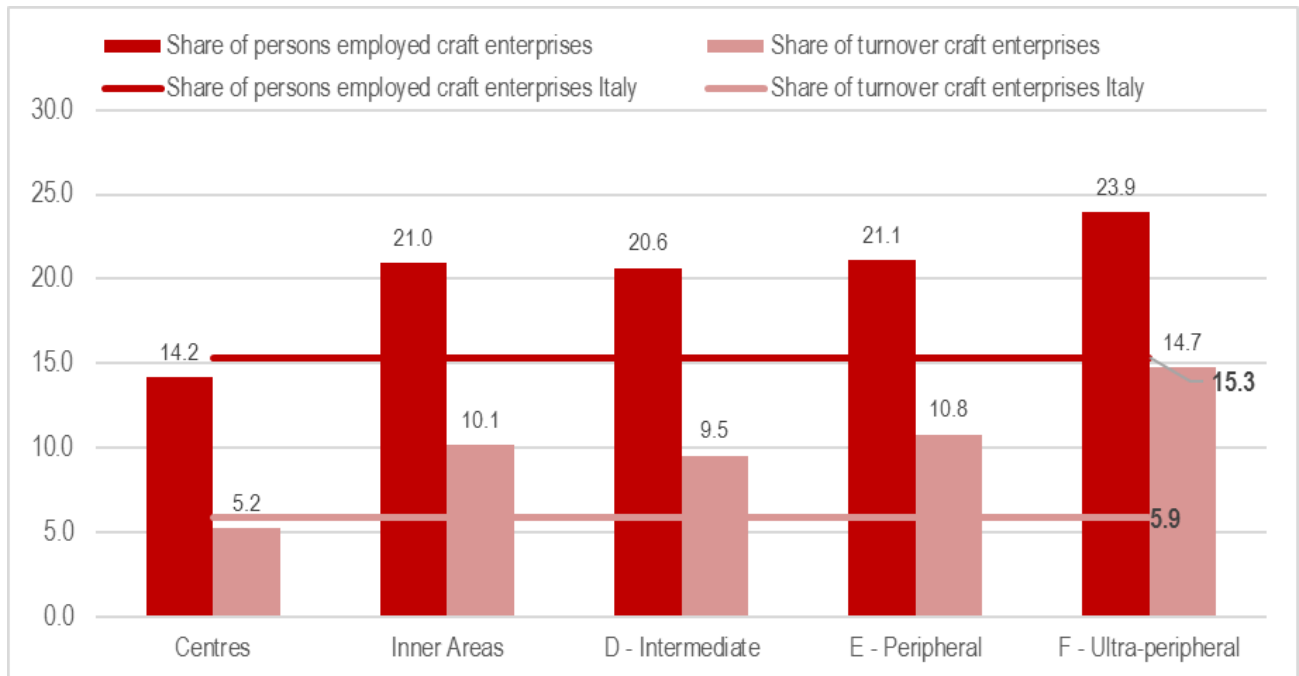

FIGURE 10. PERSONS EMPLOYED AND TURNOVER OF LOCAL UNITS IN CRAFT ENTERPRISES IN INDUSTRY AND SERVICES ACCORDING TO THE INNER AREAS CLASSIFICATION. Year 2019. Percentage values

Inner Areas: the territory's fragilities are strong

However, the Inner Areas are also distinguished by the high vulnerability of the territory on which they insist, influenced by their geomorphology. Italy is a country strongly exposed to natural hazards due both to exogenous events (weather and climate) and to endogenous events linked to earthquakes and volcanic eruptions. An overall

greater fragility of the territory, together with difficult accessibility often linked to the morphology of the territories, may also be some of the causes of the progressive abandonment of these territories.

The hazard of seismic events, linked to the presence of major tectonic features that influence the territory's predisposition to a seismic event, has an impact on those municipalities in the Inner Areas where peripherality is linked to the impervious and mountainous terrain in which they are located (Figure 11).[7]

The percentage of the Italian population exposed to high and very high seismic risk is higher in Inner Areas (49.6%) than in Centres (36.5%), with a national average below Inner Areas (39.5%). In the Peripheral Areas, more than half the population is exposed to high and very high seismic risk (56.8%).

Another element of strong fragility of the Italian territory is linked to hydrogeological risk, which can be divided into landslide risk and flood risk. For the former, the data of the areas deriving from the national *mosaicatura* of the IFFI (Inventory of Landslide Phenomena in Italy) project and falling in the P3 high and P4 very high landslide hazard classes were analysed.[8] For the flood risk, data deriving from the national mosaic of the PAI (Hydrogeological Structure Plans) falling in the Hydraulic Hazard Areas (Floods) with medium probability of occurrence P2[9] were analysed.

FIGURE 11. POPULATION IN MUNICIPALITIES OF HIGH AND VERY HIGH SEISMIC HAZARD CLASSES (1+2) ACCORDING TO THE CLASSIFICATION OF INNER AREAS. Year 2020. Percentage values
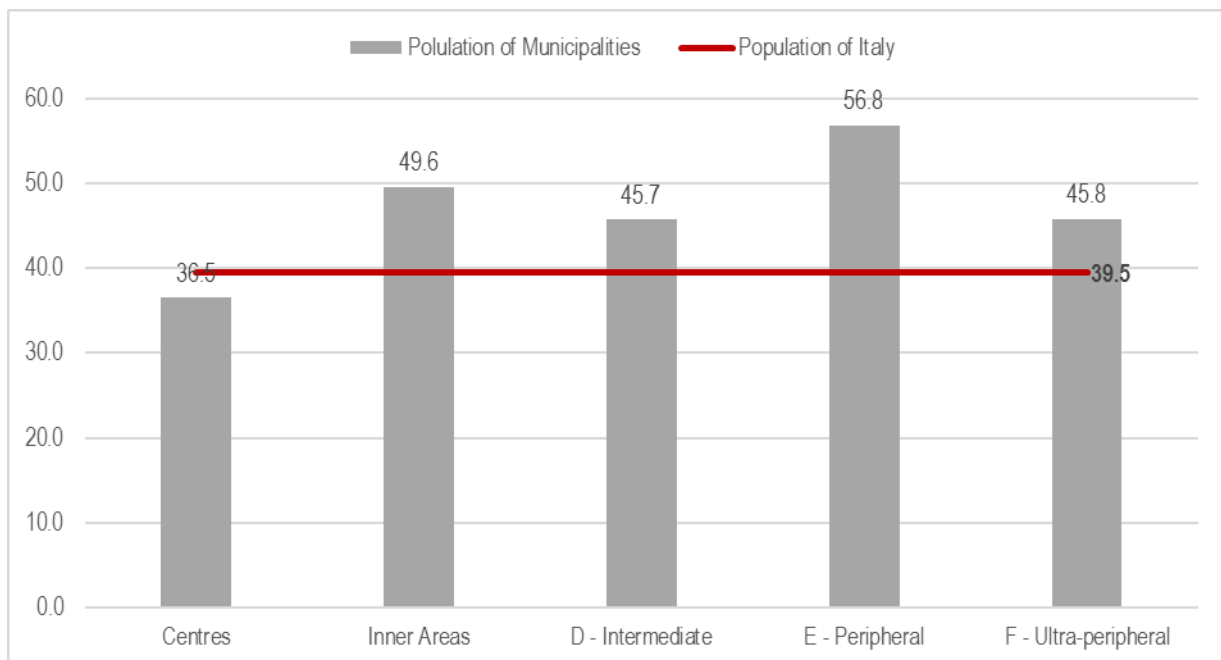
Source: Istat elaborations on data from the Civil Protection Department - Presidency of the Council of Ministers

The Inner Areas are more affected by landslides (10.9%) while the risk is relatively lower in the Centres (5.6%). The municipalities most exposed to the risk of landslides are the Peripheral (12.2%) and Ultra-peripheral (11.5%) areas, where the risk is more than double that of the Centres. These differences are linked to the geology and morphology of the territory: the most exposed areas are generally those falling in mountainous slopes or in the cliffs of coastal areas, where the orography is an important element (Figure 12).

For flood risk, the situation is the reverse: the exposed surface area of the Centres is 14.4% of the total surface area compared with 6.9% of the Inner Areas and 2.7% of the Ultra-peripheral Municipalities. The causes of the disadvantage of the Centres compared to the Inner Areas are to be found in the fact that, especially the large

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[7] Zone 1 - This is the most dangerous zone. The probability of a strong earthquake occurring is very high; Zone 2 - The probability of a strong earthquake occurring is high in this zone; Zone 3 - Strong earthquakes are less likely to occur in this zone than in zones 1 and 2; Zone 4 - This is the least dangerous zone: the probability of an earthquake occurring is very low.

[8] *Mosaicatura* of the landslide hazard areas was carried out using a harmonised legend in 5 classes for the entire national territory: very high hazard P4, high P3, medium P2, moderate P1 and attention areas AA.

[9] The national PAI mosaic divides the hydraulic hazard into three risk scenarios, where P2 represents the areas with medium probability of occurrence.

cities, may rise in flatter areas where the largest watercourses flow and where the catchment basins of the main Italian rivers are present.

FIGURE 12. MUNICIPALITIES AT HYDROGEOLOGICAL RISK (LANDSLIDES AND FLOODS) ACCORDING TO THE CLASSIFICATION OF INNER AREAS. Year 2020. Percentage values
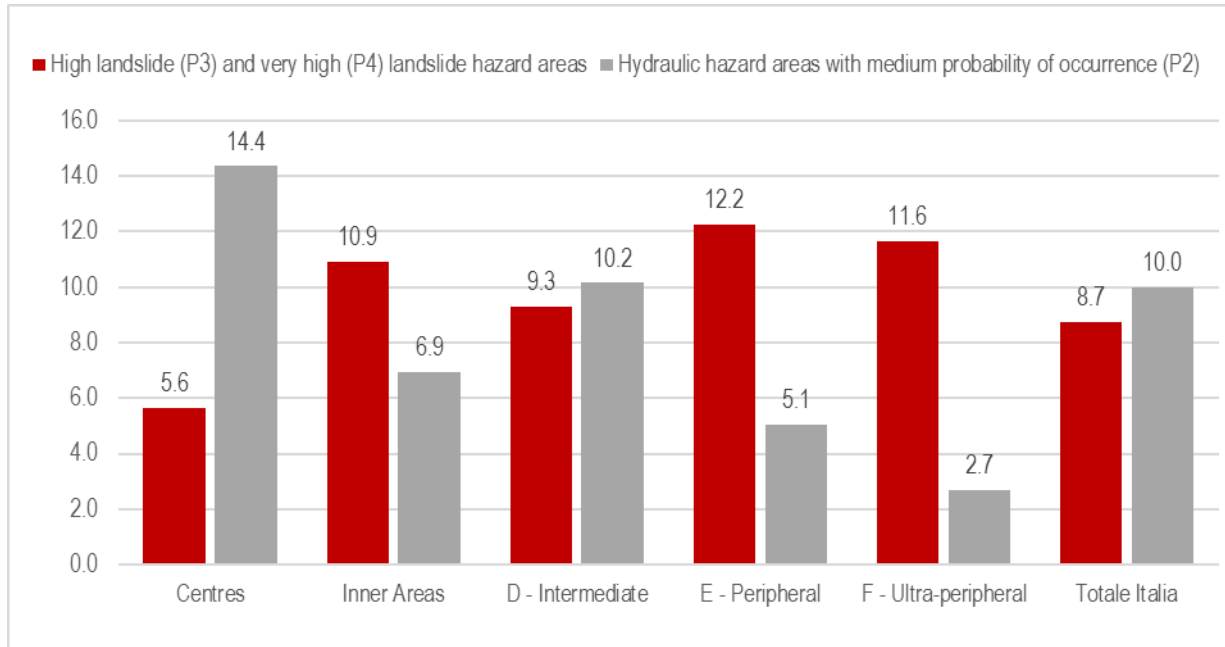
Source: Istat elaborations on ISPRA data

Glossary

Partnership Agreement: this is a document, prepared by each EU Member State and approved by the European Commission, which "sets out that Member State's strategy and priorities and how the EES funds can be used effectively and efficiently to pursue the Union's Strategy for smart, sustainable and inclusive growth". The European Commission Implementing Decision approving certain elements of the Partnership Agreement with Italy is dated 29 October 2014.

Employee: Person employed in a legal-economic unit, either as a self-employed person or as an employee calculated as an annual average of working positions.

***Place-based* approach**: in urban policy-making, this means involving local communities, using their knowledge, collaborating with all local actors and promoting inter-institutional cooperation.

Inner Areas: areas significantly distant from the centres of supply of essential services (of education, health and mobility), rich in important environmental and cultural resources and strongly diversified by nature and as a result of secular processes of anthropisation.

Protected Areas (EUAP): areas that meet the criteria described below, established by Resolution of the National Committee for Protected Natural Areas of 1.12.1993:

- **Entities entitled to apply for registration**. The entity entitled to submit an application for registration is the one that established the protected area, i.e. the managing entity with the appropriate delegation.
- **Existence of formal public or private establishment measure**. This may be: a law or an equivalent state or regional measure; a measure issued by another public body; a contractual act between the owner of the area and the body that manages it in which the purposes of environmental protection are specified.
- **Existence of perimeter**. There must be cartographic documentation proving the perimeter of the area.
- **Naturalistic values**. Presence of physical, geological, geomorphological, biological formations or groups of them of significant natural and environmental value (art. 1, subsection 2 of Law 394/91) and/or existence of naturalistic values, as provided for by art. 2 subsections 2 and 3 of the aforementioned law.
- **Consistency with the safeguard regulations provided for by Law 394/91**. This concerns, among other things, the existence of a ban on hunting activities in the area. This implies that, in the case of protected areas in part of which hunting is practised, only the part in which hunting is prohibited may be entered in the List.
- **Management of the area**. Management by entities, consortia or other legal entities must be ensured; or management may be entrusted by specific deed to a different public or private entity.
- **Existence of budget or financing measure**. The existence of financial management of the area must be proven, even if this is only passive.

Arrivals at accommodation establishments: the number of customers who checked in at accommodation establishments (hotel or non-hotel) in the period under consideration.

Prevalent tourist category: the potential tourist vocation of the municipality identified mainly on the basis of geographical (proximity to the sea, altitude, etc.) and anthropic (large urban municipalities) criteria.

Seismic classification: classification of the territory according to the intensity and frequency of earthquakes in the past, which entails the application of special standards for buildings in areas classified as seismic.

DEA, Department of Emergency and Admission: a particular classification of a hospital structure present in the territory that indicates its capacity to ensure the full response to complex needs of the patient citizen. The DEA are in turn classified into Level I and Level II according to their service capacity. Level II is higher and includes the services of Level I.

Official List of Protected Areas (EUAP): a list drawn up, and periodically updated, by the Ministry of Ecological Transition (MITE) - Directorate for Nature Protection, which brings together all officially recognised protected natural areas, both marine and terrestrial.

Volcanic eruption: a more or less explosive discharge of magma (once erupted, the magma is called lava) and other gaseous materials from the Earth's mantle or crust onto the Earth's surface.

Turnover (structural business statistics): amount invoiced by the observation unit during the reference period. It corresponds to the value of market sales of goods or services provided to third parties. Turnover includes:

- sales of manufactured products;

- sales of goods purchased for resale without processing;
- all other costs (transport, packaging, etc.) charged to customers, even if listed separately on the invoice;
- the provision of services;
- taxes and fees charged on goods or services invoiced by the unit (such as excise taxes).

Turnover excludes:

- VAT and similar deductible taxes directly related to turnover;
- rebates and discounts granted to customers, as well as the value of returned packaging;
- goods produced for own consumption or for investment purposes;
- other operating income;
- contributions received from public administrations or institutions of the European Union.

Geomorphology: branch of physical geography that studies the morphology of the earth's surface, i.e. the forms that make up the relief of the land, investigating their origin and evolution. In particular, it studies the correlations between the morphology of the land, its lithological characteristics and the agents that have shaped it.

***Degree of urbanisation* (**DEGURBA): a classification of the degree of urbanisation (DEGURBA) of municipalities provided for in Regulation (EU) 2017/2391 of the European Parliament and of the Council (Tercet, territorial typologies) and Implementing Regulation (EU) 2019/1130. The classification was updated in 2018 following the publication of the methodology by Eurostat and the revision of the FUAs.

The classification identifies three types of municipalities:

1) "Cities" or "densely populated areas";

2) 'Small towns and suburbs' or 'Areas of intermediate population density';

3) "Rural areas" or "Sparsely populated areas".

The methodology is based on the criterion of geographical contiguity and minimum population thresholds of the regular grid with 1km² cells (Geostat 2011 Population Grid). Each municipality is associated with one or more cells in this grid. On the basis of the population density in the grid, the cells are classified as 'urban centres' (if the density is not less than 1,500 inhabitants per square kilometre and the population in the contiguous cells not less than 50,000 inhabitants), urban agglomerations (contiguous cells with a density of not less than 300 inhabitants per square kilometre and the population in the contiguous cells not less than five thousand inhabitants) and rural cells (if they do not fall into the two previous cases). The class "Cities" includes municipalities for which more than 50% of the population falls in urban centres. The class 'Rural Areas' includes municipalities for which more than 50% of the population falls into rural cells. In the other cases, municipalities are classified as 'Small towns and suburbs'.

Ageing Index: ratio of the population aged 65 and over to the population aged 0-14, multiplied by 100.

Inventory of Landslide **Phenomena in Italy (IFFI**): a project carried out by ISPRA and the Autonomous Regions and Provinces that provides a detailed picture of the distribution of landslide phenomena on the Italian territory.

ISPRA mosaic of hydraulic hazard areas: these are areas perimeter by the District Basin Authorities according to the three scenarios of the D. Lgs. 49/2010 (transposition of the Floods Directive 2007/60/CE): high hazard (P3) with return times between 20 and 50 years (frequent floods), medium hazard (P2) with return times between 100 and 200 years (infrequent floods) and P1 hazard (low probability of floods or extreme event scenarios).

Seismic hazard: ground shaking expected at a site due to an earthquake. Since it is predominantly a probabilistic analysis, a certain shaking can only be defined associated with the probability of occurrence in the near future.

Average stay in **accommodation** establishments: average length of stay of customers in accommodation establishments. It is calculated as the ratio between the number of nights spent (presences) and the number of customers arriving at the accommodation establishment (arrivals).

Hydrogeological Structure Plans (PAI): it is configured as the territorial planning tool through which the Basin Authority aims to determine a territorial organisation that ensures conditions of balance and compatibility between hydrogeological dynamics and the growing anthropisation of the territory and to achieve the safety of existing settlements and infrastructures and the compatible development of future activities.

Service provision centre: single municipality or a group of contiguous municipalities that fulfil the criteria for the presence of essential services with regard to health, education and mobility (see Methodological Note).

NOP **Governance 2014-2020**: The National Operational Programme Governance and Institutional Capacity is one of the 2014-2020 cohesion policy instruments financed by the European Union through the European Structural and Investment Funds - EIS Funds.

Tourist nights spent: number of nights spent by customers in accommodation establishments during the period in question.

Natura 2000 network: an ecological network covering the entire territory of the Union, established under the Habitats Directive 92/43/EEC to ensure the long-term maintenance of threatened or rare natural habitats and species of flora and fauna at Community level.

Hydrogeological risk: this is defined as the product between the probability of a hydrogeological event such as a flood or landslide occurring, thus defined as 'adverse', and the potential environmental damage on population and infrastructure that may result from this event.

National Strategy for Inner Areas (SNAI): represents an innovative national development and territorial cohesion policy that aims to counter the marginalisation and demographic decline phenomena specific to the Inner areas of our country.

Railway station: a service location, delimited by protective signs, where train movement operations take place (priorities, diversions or crossings) and access to the railway network for passengers and goods.

Platinum railway station: includes facilities with very high frequentation (more than about 25,000 average frequenters/day) and high quality passenger services for long, medium and short distances. The presence of HS services, city-specific services and services for non-travellers is generally always guaranteed.

Gold railway station: includes medium/large installations, with high frequentation (more than about 10,000 average frequenters/day) and high quality passenger services for long, medium and short distances. There are generally always services for non-travellers and more occasionally for the city.

Silver railway station: medium/small stations/stops, with a large number of visitors (generally more than 2,500 average visitors/day approx.) and services for long, medium and short distances.

Bronze railway station: includes small stations/stops with low or very low footfall (generally greater than 500 average passengers/day), without a passenger building open to the public, not manned by RFI staff and with only regional/metro services.

Actual average travel time: average travel time calculated taking into account terrain or traffic impedances.

Local unit: physical place where a legal-economic unit (enterprise, public institution and non-profit institution) carries out one or more activities. The Local Unit corresponds to a legal-economic unit or a part thereof, located in a place topographically identified by an address and a house number. In that locality, or from that locality, there are economic activities for which one or more persons work (possibly part-time) on behalf of the same legal-economic unit. The local unit may be a school, a hospital, a factory, a workshop, a shop, an office, an agency, a warehouse, etc. in which the production of goods is carried out or the provision of services is performed or organised. For non-profit institutions, it should be noted that the local unit operates under the same tax code as the non-profit institution and therefore has no decision-making and/or budgetary autonomy.

Elevation zone: division of the national territory into homogeneous zones resulting from the aggregation of contiguous municipalities on the basis of altimetric threshold values. A distinction is made between mountain, hill and plain altimetric zones. In order to take into account the moderating action of the sea on the climate, the mountain and hill altimetric zones have been divided into inland mountain and inland hill and coastal mountain and coastal hill altimetric zones, respectively, including in the latter the territories, excluded from the plain zone, that are washed by the sea or close to it. For further details, see the ISTAT publication Statistical districts - methods and standards, Series C, No. 1, August 1958.

Coastal zones: municipalities located on the coast or having at least 50 per cent of their surface at a distance of less than 10 km from the sea. Enclaves (non-coastal municipalities surrounded by adjacent coastal municipalities) are added.

Methodological note

The Inner Areas are represented by the Italian municipalities that are most peripheral in terms of access to essential services (health, education, mobility) and therefore furthest away from the service provision centres. In order to identify which ones fall within the Inner areas, first of all the 'Service provision centre' municipalities are defined, i.e. the territorial realities that offer services at the same time (alone or together with their neighbours):

A. a comprehensive upper secondary school offer, i.e. at least one high school (classical or scientific) and at least one technical and vocational institute;[10]
B. at least one hospital with a Level I or Level II DEA service (see Glossary);
C. a railway station of at least 'Silver' type.[11]

The school supply data are from the Ministry of Education, covering the 2018-2019 school year. In order to verify the fulfilment of the "school criterion", the school Pathways and the relative Sectors present in the various schools were taken into consideration. More specifically, the data relating to the "Technical" and "Professional" Pathways were used in full, while for the "Licei" Pathway, the "Classical", "Scientific", "Scientific Applied Sciences" and "Scientific Sports" sectors were taken into consideration.

The data on hospitals with DEA service are from the Ministry of Health, referring to 31.12.2019.

Data on railway stations with active passenger services are from the source Rete Ferroviaria Italiana (RFI) and other regional railways, as at 31.12.2019.

Identification of the reference territory

The minimum spatial element considered was the municipality, with reference to the geography in force on 30 September 2020 (**7,903 units**).

Since it was necessary to apply distance measurements between point elements on the territory, it was necessary to identify which element was the most suitable to consider for each municipality. Similar to what was done in the previous edition, the centroids[12] of the 2011 census sections in which the municipality is located were used as a reference point for calculating road distances between municipalities. A special case is represented by the Service provision centre municipality of Rome, whose surface area is particularly large compared to the rest of Italy's municipalities (as many as 1,287 km^2): in this case the distance was calculated not with respect to the centroid of the Service provision centre municipality, but with respect to the centroids identifying the locations of the 15 boroughs, which, due to the provision of essential services, either totally included or present on municipalities that are contiguous to each other, can each be considered a Service provision centre in its own right.

With regard to the smaller islands that are connected via ferry lines, the data obtained from the calculations performed were all geographically consistent with the connection to the nearest hub, only for the Tremiti Islands municipality it had to be manually assigned to the nearest hub.

The Classification of Municipalities by Type Inner Areas

The 2020 mapping of Inner Areas envisages updating the classification of municipalities adopted in 2014. The geography of Inner Areas 2020 was constructed in two sequential steps:
1. Identification of the centres (single or groups of contiguous municipalities that are Service provision centres) that jointly offer the three essential services relevant to the defined classification;

2. Calculation of distances (in terms of actual average road travel time) from the nearest service delivery centre (Service provision centre).

More specifically, the following were identified:

1. Service provision centre' municipality, i.e. the municipality where all three services are present;
2. Group of contiguous Municipalities that form a Service provision centre, i.e. a group of neighbouring municipalities where, together, all three services are present;
3. Outlying areas municipalities, i.e. those municipalities for which the distance (expressed in road travel minutes) to the nearest Service provision centre is less than the median of the actual average travel times;

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[10] The combined presence of high school and technical-vocational routes approximates the choice of educational pathway.

The **'Licei'** pathway includes the following sectors: Artistic, Classical, European, International, Linguistic, Musical and Choreographic, Scientific, Scientific applied sciences option, Scientific sports, Human sciences, Human sciences economic and social option.

The following sectors are included in the **'Professional'** pathway: Vocational Education and Training, Industry and Handicrafts, New Vocational, Services.

The following sectors are included in the **'Technical'** pathway: Economic, Technological.

[11] The presence of a railway station does not only signal rail transport services, but is also often a broader indicator of accessibility services, since other collective transport hubs (bus and coach services; taxi services; parking facilities for private vehicles) are typically located in the vicinity of railway stations of a certain importance. RFI (Rete Ferroviaria Italiana) classifies stations into: PLATINUM; GOLD; SILVER and BRONZE considering differentiated levels of service and frequentation by passengers. PLATINUM stations are those of higher rank, BRONZE stations of lower rank. SILVER level stations provide direct connections to metropolitan-regional and long-distance services.

[12] The centre of gravity or centroid or geometric centre of a two-dimensional figure is the 'mean position' of all its points, i.e. the arithmetic mean of the positions of each of them. The definition extends to any n-dimensional figure in an n-dimensional Euclidean space n-dimensional space.

4. Intermediate municipalities, i.e. those municipalities for which the distance (expressed in road travel minutes) to the nearest Service provision centre is between the median and the third quartile of the distribution of actual average travel times;

5. Peripheral municipalities, i.e. those municipalities for which the distance (expressed in road travel minutes) to the nearest Service provision centre is between the third quartile and the 95th percentile of the distribution of actual average travel times;

6. Ultra-peripheral municipalities, i.e. those municipalities for which the distance (expressed in road travel minutes) to the nearest Service provision centre is greater than the 95th percentile of the distribution of actual average travel times.

Thus, the three parameters considered in 2014 were confirmed; applying them to the 2020 data and the new calculation method results in the following thresholds:

1. Median: 27.7 minutes;
2. Third quartile: 40.9 minutes;
3. 95th percentile: 66.9 minutes.

Criteria for defining 'Service provision centres' group of Municipalities

While the identification and mapping of the single Service provision centre Municipalities does not present major difficulties, the identification of the group of contiguous Municipalities Service provision centres required greater rigour in its definition and careful cartographic control.

Service provision centre municipalities are those municipalities where all three types of service are present. In inter-municipal Service provision centres this condition occurs between neighbouring municipalities[13] and specifically in the following situations:

–   Three neighbouring municipalities, even two by two, each present one of the three services (respect of 1st level contiguity).
–   Municipality A has only two services and forms an inter-municipal cluster by joining with neighbouring Municipality B that has the missing service. If there are several neighbouring municipalities that present the missing service, all the municipalities identified form the inter-municipal Service provision centre.
–   Municipality A has only two services and constitutes an inter-municipal Service provision centre by first joining Municipality B, which has one of the two services already present in Municipality A, and then joins Municipality C in order to complete the presence of the three services (respect of 2nd level contiguity).

A further condition for more than one municipality to form an inter-municipal Service provision centre is that the distance between them should not exceed the average of the distribution of the actual average travel times of the potential inter-municipal Service provision centres alone (i.e. approximately 23 minutes). This criterion has been waived in the case of the Erice-Trapani inter-municipal Service provision centre in Sicily, Villa Literno and Giugliano in Campania and Cassano all'Ionio and Corigliano-Rossano in Calabria.

Inter-municipal Service provision centres can be defined by aggregating together also municipalities belonging to different administrative regions. For the calculation of travel times, the municipality of the most populous inter-municipal cluster was taken as the destination.

The road graph and the use of *speed profiles*

In calculating the distances between the "Service provision centre" and all other municipalities, the national road graph "Multinet Italia" produced by the company Tom Tom and updated as of December 2019 was used. This graph has some limitations in the way it can be used and has been released to Istat in a user licence format, which means that it does not allow the source data of the graph to be released, but only the elaborations developed as a final result.

Distances between two municipalities are always expressed in terms of minutes of driving time and road kilometres.

However, the road graph provided in standard mode incorporates, for each road arc, what we might call a standard journey time, i.e. a time defined on the basis of the speed limits present, in the absence of traffic and which does not consider possible suspensions in the linear continuity of the road, such as the presence of traffic lights and/or roundabouts. Travel restrictions, even temporary ones, e.g. due to works in progress, are also not considered

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[13] It should be borne in mind that the concept of contiguity for the definition of inter-municipal service provision centre could be influenced by the presence of administrative islands of municipalities that are a part of the municipal territory entirely surrounded by the territory of other municipality(ies).

In the work carried out, it was considered essential to achieve a more correct and realistic measurement of the road distance between two municipalities, and precisely for this specific updating activity, Istat purchased a further extension of the user licence for the "Multinet Italia" graph in order to be able to introduce into the calculations also the[14] "speed profiles", "profiles" of road traffic available for each road arc in which the graph itself is composed and which represent "classes" generated by traffic at different times of the week days (midweek and weekends).

Each road element has a specific speed profile assigned and dependent on the time of day and day of the week. Speed profiles are calculated every five minutes from midnight on the basis of the travel times of each individual arc of the graph.

In the *network dataset*, the following impedances (costs) can be set on the geographic layer to calculate routes:

1. Average travel time: average travel time of the stretch calculated on all days of the week;
2. WeekdayFallBackTravelTime: average travel time of the stretch calculated on weekdays only;
3. WeekendFallBackTravelTime: average travel time of the stretch calculated on the weekend days of the week only;
4. Travel time: travel time depending on the time set in the route calculation:
a. If the time and date are not set, then it is equivalent to *Average travel time*;
b. If a time is set on a Mon-Fri day then the profile of that time is used or if there is no profile defined for that time frame, the *WeekdayFallBackTravelTime* is used;
c. If a time is set on a Sat-Sun day then the profile of that time is used or if there is no profile defined for that time period, the *WeekendFallBackTravelTime* is used;

Based on the above, an Origin-Destination (OD) cost matrix was defined that identifies and measures the 'least expensive' (in terms of travel time) routes along the network from one origin to several destinations.

When setting up an OD cost matrix analysis, it is possible to specify the number of destinations to be found and a maximum search distance. An OD cost matrix is a table that contains the total impedance of the network from each origin to each destination. It also ranks the destinations to which each origin connects in ascending order according to the minimum impedance required to travel from that origin to each destination.

In the processing under consideration, several OD cost matrices were drawn up, setting three different times (7:30/8:30/9:30) for each working day of the week 14-20 October 2019; further averages were then made on these values.

On the basis of the calculations made for each 'non-Service provision centre' municipality there is thus a total of 15 travel times to reach the nearest Service provision centre municipality. The choice of the autumn month such as October is attributable to the fact that population movements in this period highlight the potential criticality of the infrastructures taken as reference for the identification of attractive Service provision centres with respect to potential population movements.

For technical and methodological clarifications

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[14] *Speed profiles* represent the average speed along one or more road elements sharing the same behaviour in five-minute time intervals over a 24-hour period.