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Inspire Policy Making with Territorial Evidence

CASE STUDIES REPORT //

Territorial impacts of COVID-19 and policy answers in European regions and cities

Hannover Region / Landkreis (Germany)

Case Study Report // September, 2022

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This document is a final report.

The information contained herein is subject to change and does not commit the ESPON EGTC and the countries participating in the ESPON 2020 Cooperation Programme.

The final version of the report will be published as soon as approved.

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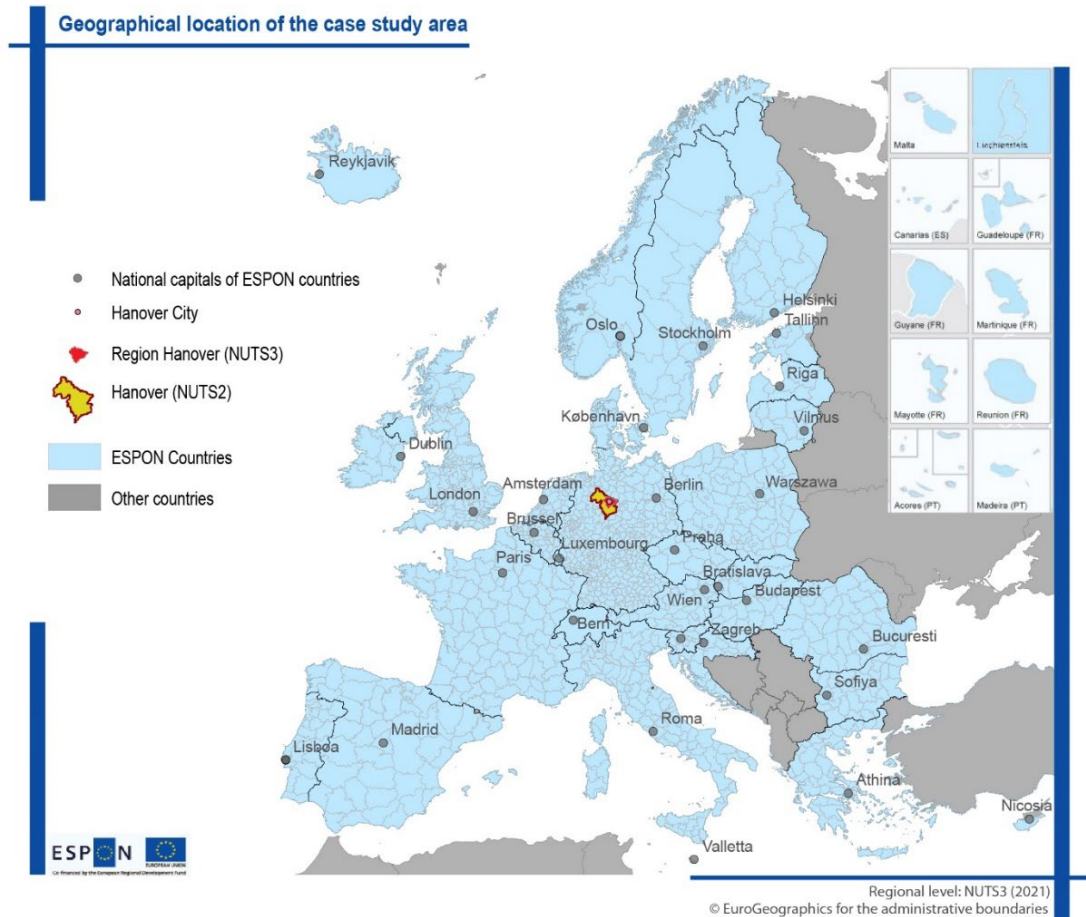
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Introduction

This case study report examines the policy response to Covid-19 within the Hannover Region (Landkreis) (Germany). The report explores which policies have been introduced in response to the pandemic and assesses whether the crisis presented a 'window of opportunity' for regional and local authorities to promote specific spatial planning and territorial targeted policy agendas. The report also offers a regional and local perspective on the answers provided by the decision-makers during the first pandemic wave.

Map 1 Geographical location of the case study area



The case report is structured around the following core sections:

1. **Regional Characteristics:** highlights the key socio-economic and governance characteristics of the region.
2. **Impact of Covid-19:** Highlights the socio-economic impacts of the pandemic on the Hannover region.
3. **Covid-19 Policy Response:** provides an overview of the regional policy response in relation to three core policy thematic areas: the just transition (social policies), green transition (climate policies) and smart transition (innovation policies).
4. **Covid-19 Policy Impacts:** assesses the main socio-economic, governance and financial impacts of the policy measures introduced.
5. **Future Policy Directions:** examines the medium- and long-term direction of policy in the region and analyses whether the policies identified can be upscaled to other EU regions.
6. **Policy Recommendations:** provides policymakers and practitioners with policy, governance, territorial and financial recommendations.

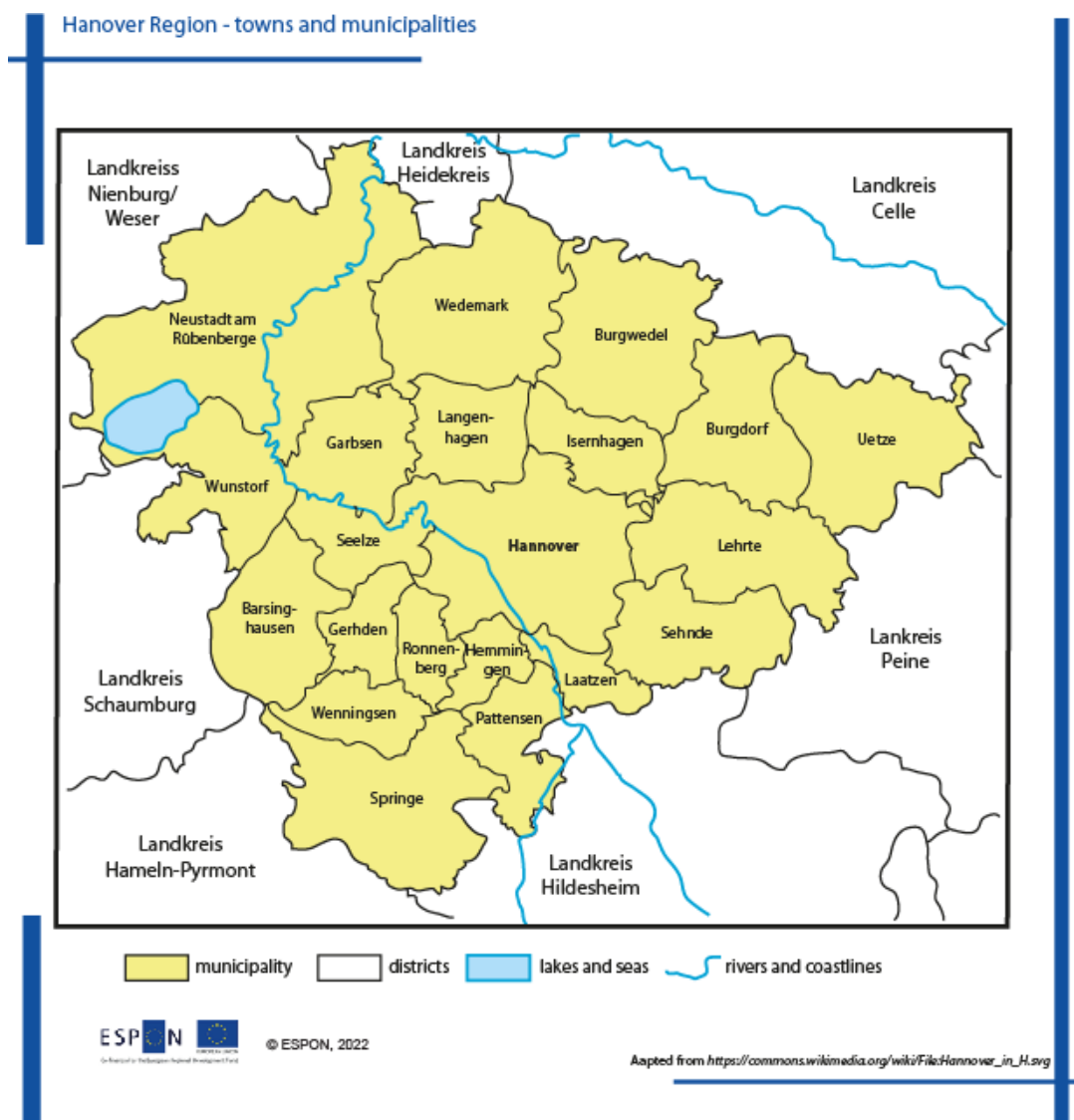
Research Methods

The present case study has been conducted following a two-step approach. In a first step, extensive desk research has been conducted with the aim of 1) documenting the main characteristics of the area, 2) assessing the impact of the pandemic on local society and economy according to various national and local statistical sources, and 3) documenting the policy responses as reflected in online media. The results of this extensive research are presented throughout the first three chapters of the present chapter. In a second step, semi-structured online interviews (either through on-line meeting platforms, either through mail) have been conducted with representatives of local and regional institutions. The purpose of the interviews has been to further document the impact of the pandemic, the policy responses, the impact of the policy responses, as well as the future of local and regional policies.

1 Characteristics of the case study area

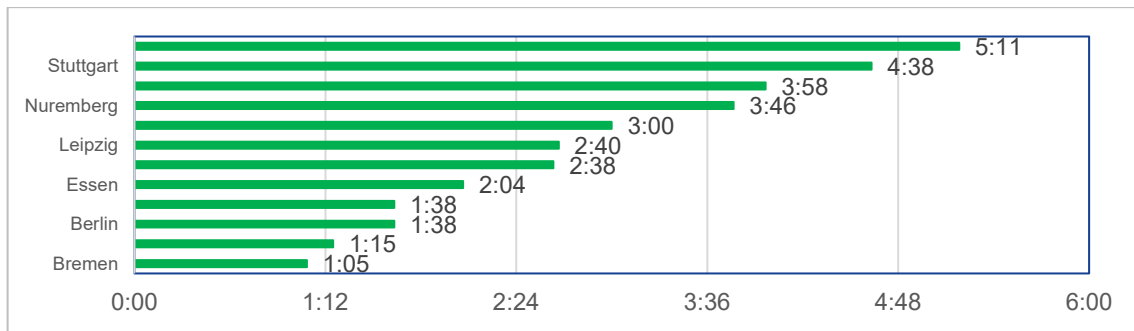
The Hannover region is situated in the south-central part of Lower Saxony (**Error! Reference source not found.**). The highest point in the region is Bröhn (405 m above sea level), being in the transition zone between the landscape areas of Lüneburger Heide and Mittelgebirge (Harz). With an area of 2.290 km² and a population of 1.155.330 inhabitants in 2020 (15th region in Germany, 1,4% of Germany's population), it has a density of 504 inhabitants per km². The region has 17 towns and 4 municipalities, with Hannover, the largest city in the region (over 534.049 inhabitants – 11th most inhabited German city), being its capital. Chronologically, it is the most recent region in Germany, established in 2001.

Map 2 Hannover Region - towns and municipalities



Regarding the rail accessibility (ICE) towards other major German urban areas, Hannover presents the following time-distances: 1:38h to Berlin, 3:00h to Frankfurt, and 5:00 to München. Time-distances towards other cities are displayed in **figure 1**. The region displays a good accessibility towards the northern and western parts of the continent as well, a considerable competitive advantage compared with other regions.

Figure 1 ICE travel time from Hannover to other major urban areas



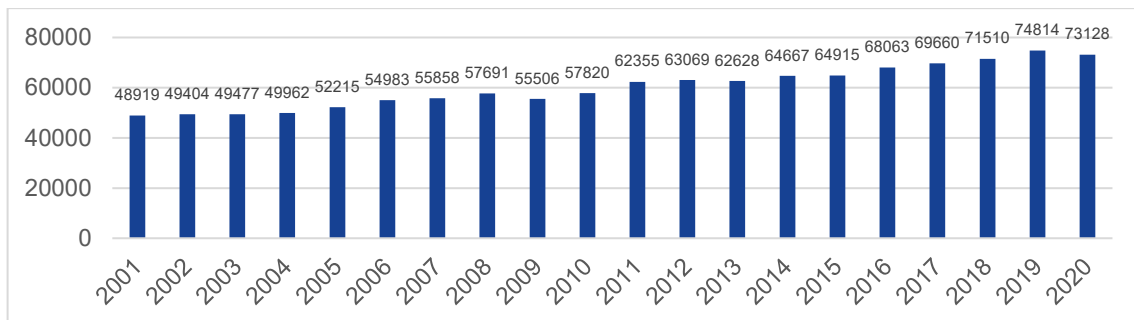
Source: Region Hannover

1.1 Economic characteristics

The Hannover Region is one of the leading business locations in North Germany and produces 2,51% of Germany's GDP (2020). The workforce is represented by 460.000 workers (paying social insurance contributions) in more than 50.000 enterprises. The GDP per person in employment was 73.128 euros in 2020 (compared to 74.814 in 2019), while the GDP per capita was 41.508 euros in 2020 (down 2,3% compared to 2019) (figure 2).

The structure of GDP offers a similar picture as the overall Germany's structure, although with minor variations: the primary sector holds 1,02% (0,8% for Germany), 26,03% for the industrial sector (29,65% in Germany), 72,95% for the tertiary sector (69,55% for Germany). The highly tertiary economy of the Hannover region is also confirmed in terms of the GDP structure and labour force. The unemployment rate in the region in 2019 was higher than the average unemployment rate of Germany (5,9% compared to 5%), while the unemployment by gender showed higher values for men (6,2%) than for women (5,4%).

Figure 2 Region Hannover - GDP euros/per person in employment



Data source: Statistisches Bundesamt (Destatis), 2022

With regards to the agricultural sector, Hannover Region records 6070 agricultural holdings, representing 2,32% of Germany's total. These holdings have a share of 2,91% of Germany's utilized agricultural surface. It should be noted that cereals are grown on 53,3% of the arable land in the region, wheat being the main cereal cultivated. The data displays a high-performance agriculture with large areas (over two thirds of the agricultural holdings have 100+ ha) and above average yields. The primary sector has a share of only 1,31% of the total employment, similar to the national average (1,32%), the region displaying one of the highest degrees of mechanization of agriculture in Europe. The number of animal farms (3642) accounts for only 2,2% of Germany's total. The region's agriculture is one that complements its complex economic profile without being particularly prominent. In recent years, there has been a trend towards organic farming in the Hannover region, albeit timidly, compared to the rest of Germany (only 1,1% of all national organic farms and 1% of organic livestock farms).

The secondary sector (manufacture and construction) is well represented in the region, where the main companies such as Volkswagen, Bahlsen, Continental, Deutsche Messe AG, TUI, ContiTech and others (**Error! Reference source not found.**) have a large contribution towards the regional GDP and job market.

Table 1 TOP 15 companies in the Hannover Region (based on the turnover)

Company	Headquarters	Turnover (€ million)	Employees 2019	Sector	Rank Lower Saxony
Volkswagen Nutzfahrzeuge	Hannover	11473	24821	Road vehicle production	1
Continental AG (K)	Hannover	44478,4	247514	Automotive supply	2
ContiTech AG (K)		6401,5	45801		
TUI AG (K)	Hannover	18928,1	71473	Tourism	3
TUI Agg		390,4	326		
AGRAVIS Raiffeisen AG (K)	Hannover	6454,7	6996	Agricultural trading	5
Dirk Rossmann GmbH	Burgwedel	6391,9	31024	Wholesale and retail (drugstore articles)	6
Clarios Germany GmbH & Co, KGaA	Hannover	3418,1	3353	Production of batteries accumulators	11
		1377,5	479		
enercity AG (K)	Hannover	3268	2663	Energy supply energy services	13
enercity AG		3103,3	1029		
expert SE (K) b	Langenhagen	1858,3	2457	Wholesale and retail (electrical and electronic equipment)	21
MTU Maintenance Hannover GmbH	Langenhagen	1760,7	2369	Aircraft engine maintenance	24
TÜV NORD Gruppe (K)	Hannover	1282,4	11235	Technical services	33
WABCO Holding GmbH (K)	Hannover	1256,5	2794	Automotive supply	34
Konica Minolta Business Solutions Europe GmbH	Langenhagen	1225,8	499	Production and distribution of printing and copying systems	35

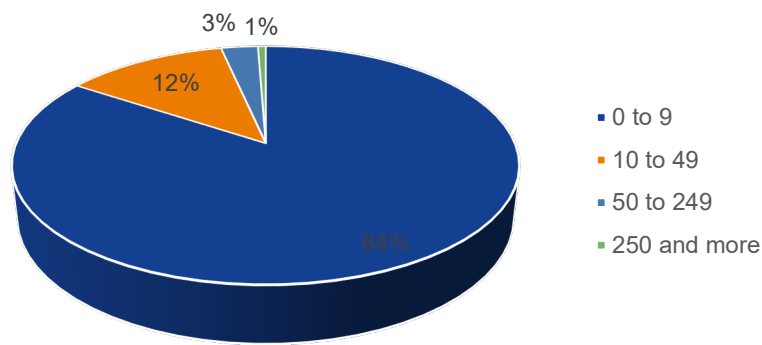
Source: Company information, NORD/LB regional economy presentation

The tertiary sector has a particular importance in terms of labour concentration, with the share of education and health accounting for more than a third of total employment, slightly higher than the national value (31,7%). For the other sub-sectors of the tertiary sector, the shares are almost similar to those of Germany: 26,4% compared to 25,7% for trade, transport, tourism, IT and 17,3% compared to 17,1% for financial-banking activities.

The most important shares are represented by Volkswagen (various divisions including banking), Continental and TUI. In other words, companies of calibre that give economic weight to the region, making it a centre of economic importance through the multitude of connections with other locations in Germany and all over the world. Construction sector (5% of the employed labour force) is an important support for the expansion of the economic activities, acting also as an important engine for the real estate sector.

Numerically, the SMEs represent the vast majority of the existing firms in the region (**Error! Reference source not found.**). The domination of SMEs in Hannover region could be seen as an advantage, due to the fact that SMEs could adapt and/or reorganize easier and quicker in a crisis situation. The SME businesses are a viable economic engine for the region and could be considered a major regional advantage.

Figure 3 Businesses in the Hannover Region according to workforce size (%) in 2019



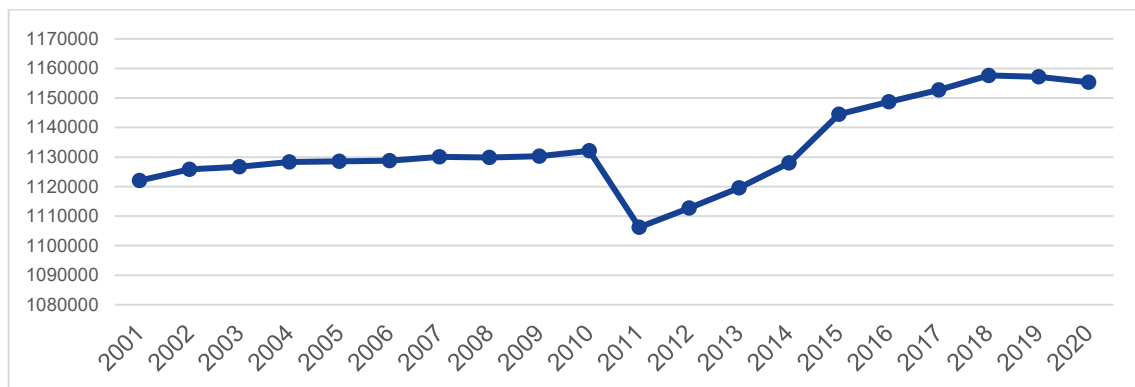
Source: State Office of Statistics Lower Saxony, Hannover Region calculations

The fact that 18,4% of tourist arrivals and 15,8% of overnight stays in Germany occurred in this region shows the above-average attractiveness in terms of tourism, the travel accommodation structures being extremely diversified. In the pandemic context, the tourism sector endured one of the heaviest immediate effect of the pandemic measures (lockdown, limitations of travel, etc.).

1.2 Social and demographic characteristics

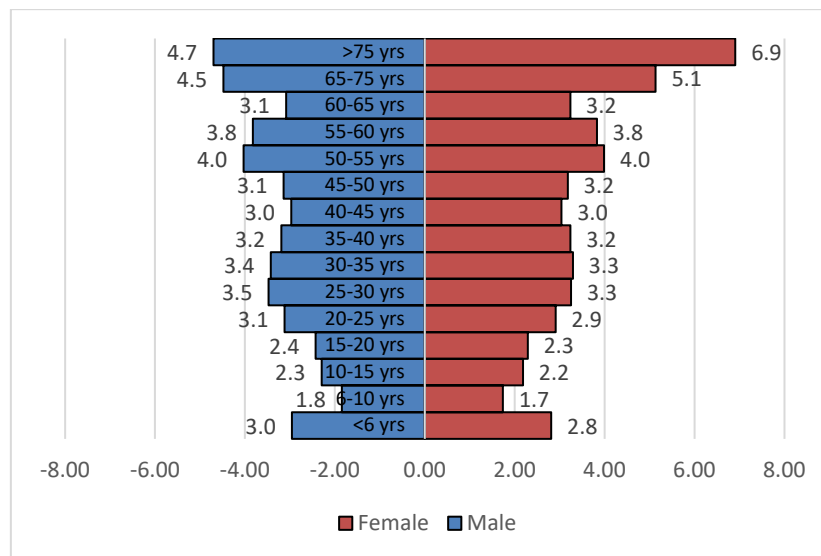
Demographically (figure 4), the Hannover Region faces a number of major challenges. The first challenge is the demographic aging index, with a rather high value (21,4%), which means a special attention for the social services destined to the aging population. The demographic dependency ratio is 0,55, being the result of two main causes: an overrepresentation of the aging population and an underrepresentation of the young population. These structural imbalances will have medium and long-term effects in addition to the visible trend of demographic aging, with a decrease in young age groups due to a declining birth rate. All the mentioned indicators show similar values with the national averages, with no significant differences between the regional and the national context, therefore there is no demographical context specific only to Hannover.

Figure 4 Region Hannover - numerical evolution of the population



Source: Federal Statistical Office, Wiesbaden 2022

The dependency rate of the elderly in the Hannover region was 32,7% in 2019, below the European average of 35%. However, the outlook is pessimistic because the younger age groups are undersized and the cohorts that will enter the labour market in the coming years will be undersized as well (compared to those who will retire), being expected a weakened labour market. In other words, the elderly population will be oversized , while the active population will be less and less numerous (figure 5).

Figure 5 Region Hannover - population pyramid before the pandemic (2019)

Source: Federal Statistical Office, Wiesbaden 2022

The gender structure of the population of the region is slightly feminized, with 51,05% (50.7 for Germany). The reversal of the ever-shrinking population pyramid can give rise to medium- and long-term concerns in terms of ensuring a balance between the main age groups, but especially in terms of replacing large sections of the population, especially the working age. For the Hannover region (similarly with the national context) the immigration rate was higher than the emigration rate with a positive difference of about 2%, justified by the acute need for labour.

The birth rate is relatively low (9‰ in 2019, compared with 9,4 ‰ at national level). The mortality values were higher in the pre-pandemic period compared with the national averages (12,04‰ in 2019 for the region, 11,3‰ for Germany). Marriage in the region in the pre-pandemic period was slightly lower than in Germany (4,6‰ / 5‰). Divorce in 2019 was slightly higher in the Hannover compared to the national values (1,92‰ / 1,90‰).

1.3 Governance characteristics

Following the NUTS classification the German „Länder“ like Lower-Saxony are “regions” in the sense of European nomenclature while Hannover Region, despite the term “region” in his name, is a NUTS 3 structure, which is comparable to a county, but with significant more competencies. While some other German regions are subdivided in districts (Regierungsbezirke) at NUTS 2 level, Lower Saxony Government abolished them in 2004. Their tasks were transferred to four Offices for regional state development and to the counties. The Hanover Region in Lower Saxony plays a special role as a county as it is a new and unique communal organization model that completely covers a functional space consisting of an urban centre and suburban and rural areas outside of it. It was created in 2001 from the merger of the county of Hanover and the municipal association Greater Hanover, parts from the district of Hanover and parts of the city administration of Hanover. Hannover Region administration today bundles essential services of general interest for 1.2 million residents in 21 cities and municipalities - including the state capital Hanover:

- Promotion of Economic Development
- Environmental & Climate Protection
- Waste Management
- Regional Planning & Recreation
- Youth Welfare Service and Social Service
- Public health and hospitals
- Mobility (public transport and road infrastructure)
- Vocational schools
- Consumer and animal protection
- European Affairs

Around 3200 employees work in administration to help shape the living space for people in the Hanover Region. The budget of the Hanover Region is around 2 billion euros a year. Its public health department is the biggest one in Lower Saxony. When the first Covid-19 cases appeared in February 2020, their medical officers were able to initiate the measures provided by the Federal Infection Protection Act, whose task is to “prevent communicable diseases in humans, to detect infections at an early stage and to prevent them from spreading”. It gives the Robert Koch Institute (RKI) an important role in the prevention of communicable diseases, the early detection and prevention of the further spread of infections. The RKI uses epidemiological and laboratory-based analyses and conducts research on the cause, diagnosis and prevention of communicable diseases. During the Covid-19 pandemic, the RKI published a whole series of empirically based guidelines on which measures are best suited to protect against a Covid-19 infection and how they should be best implemented in practice. They were the guidelines for all public health departments. The German Constitutional Law (Grundgesetz) assigns measures against the dangers or communicable diseases in humans and animals to the concurrent legislation, in which the federal and regional governments (Länder) have to agree on a procedure. In practice, the former Chancellor Angela Merkel and her Minister of Health met regularly with the 16 Prime Ministers of the federal states and adopted decisions (for example on the duration of the lockdown or the obligation to wear masks, etc). The county public health services acted as transmission belt for these measures. One issue, however, was that some federal states passed their own guidelines instead of the common guidelines, so that there were different specifications from federal state to federal state, e.g. with regard to the type of mask that should be worn in public transport.

However, when it comes to personnel management or the health sector management, the pandemic situation asked for quick and appropriate reactions in order to avoid collapse. This was the major role of the health departments existing at county level. The new federal government largely withdrew from this process in 2022 and left it to the federal states.

2 Impacts of COVID-19 on the region

2.1 Economic impacts

The main short- and medium-term economic effects of Covid-19 have been endured by the tourism sector. Thus, in the Hannover region, the number of tourist arrivals decreased in 2020 compared to 2019 by 53%, while the overnight stays recorded a fall by 51%. These declines have troubled the sector, which was the first to require aid policies from the German state.

The Covid-19 pandemic put additional pressure on the finances of Hannover Region and its 21 municipalities. The digitalization process and the need to redevelop the health defence strategy against Covid-19 have made these administrative units even more financially dependent on the national and land centres. The Covid-19 crisis has shown that crisis management and thus the interaction of the various levels of government in a federal state like the Federal Republic is not free of interface conflicts. It was less a question about money, but more about the ability to get several hundred employees for contact tracing and notification within a very short time, to train them, to hire them on temporary contracts and to accommodate them appropriately in offices with the appropriate technical equipment such as notebooks and telephones. In the Hanover region, this meant that the health department, which had around 120 employees before the pandemic, had to accommodate 750 employees at the peak of the Corona crisis. These employees were withdrawn from other departments of the regional administration, came from state ministries, the Bundeswehr (Federal Army) or were students who were able to compensate for the cancellation of their lectures. The additional costs were supported through 4 billion euro "Pact for the Public Health Service", which was adopted on September 29, 2020 by the Federal Chancellor and the heads of government of the federal states (Regions). The goals of the pact were to increase the staff, to digitize the work and to better connect local health authorities in Germany.

The Covid-19 crisis led to additional spending, resulting in an estimated global public deficit for 2020 of 4,2% (at national level). Huge fiscal losses due to slowing economic growth and stimulus programs were recorded at regional level as well. Among the sectors with high losses in 2020, can be mentioned cultural institutions, fairs, airports, etc. Trade taxes were the most affected in terms of revenues to the municipal budgets. The economic analysis showed that the industry was strongly affected by Covid-19, as well.

During the first pandemic period (2020), only four economic domains, mainly industrial, recorded decreases in the number of companies (mining and quarrying, manufacturing industries, trading maintenance and repair of vehicles, and professional scientific and technical services), while all the other sectors managed to keep positive dynamics, with sectors such as property and housing, financial and insurance services, or energy supply recording increases in the number of companies between 8% and 10%.

The impact of Covid-19 first waves on the main companies from Hannover was unequal. The companies from the financial and insurance domain managed to record significant increases in their added value during the first pandemic year (up to +21,47% for VGH Versicherung), denoting their resilience capacity during a crisis situation. Nevertheless, it is worth mentioning that three companies out of TOP 9 recorded negative dynamics, which, while less significant than the positive increases, weighted on the economic landscape of the region (**figure 6.**).

Figure 6 Changes in the added values between 2020 and 2019 for the top companies from Hannover

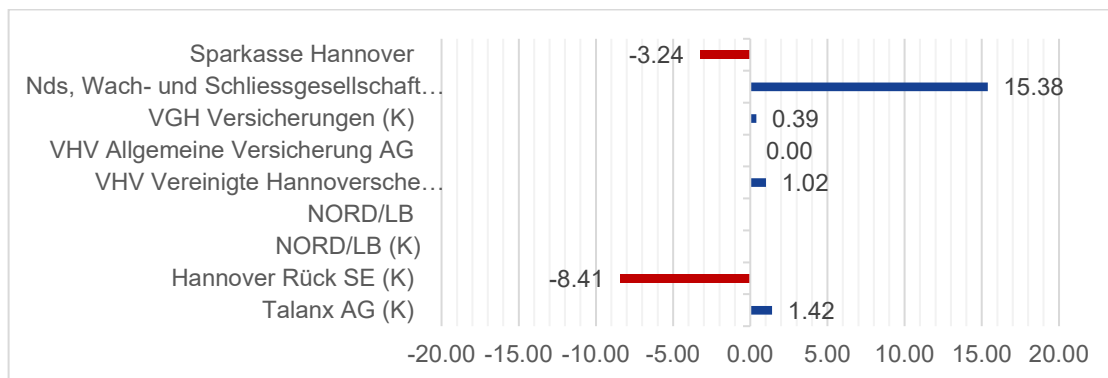


Activity domains: Sparkasse (banking), Wach-und Schliessgesellschaft Eggeling (security), VGH Allgemeine Versicherung AG (insurance), VHV Vereinigte Hannoversche Versicherung (insurance), Nord /LB (banking), Hannover Ruck (insurance), Talanx AG (insurance)

Source: NORD/LB: Niedersachsen Report – Die 100 größten Unternehmen in Niedersachsen

Regarding the impact on the number of the employees during the first pandemic year, it can be observed that the economic output does not automatically translates into the employees' dynamics. The relatively resilient landscape in terms of added value was less visible in terms of employees. In fact, the discrepancy between the economic performance and employees' dynamics resumes the medium and long-term uncertainty of the main companies (figure 7). Hannover Ruck SE exemplifies this scenario with its +10.87% increase in added value, but a decrease of 8.41% in employees.

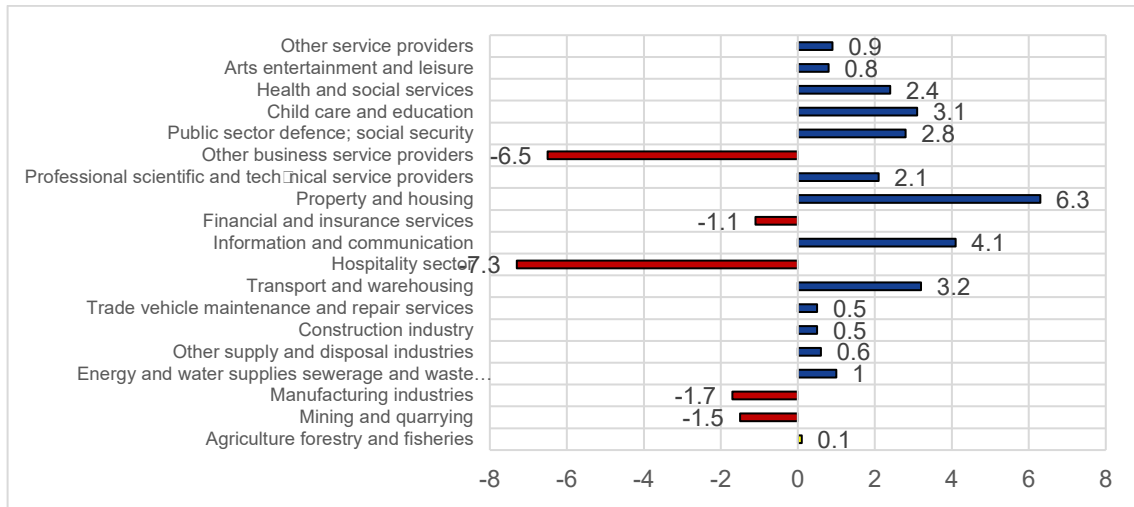
Figure 7 Changes in the number of employees between 2019 and 2020 for the top companies from Hannover (%)



Of the 21 administrative units forming the Hannover region, the vast majority (15), displayed an increase in the number of employees paying social contributions during 2020, producing an overall regional increase of 0.28%. There are short-term developments at the territorial level that denote an economy that ranges from resilient behaviours (administrative units with increases in the number of employees paying social contributions) to least resilient units, with minor decreases but with real possibilities for recovery.

The graph from figure 8, highlights the economic sectors that seemed less resilient, at least in terms of job losses, between 2020 and 2019. Tourism is by far the most affected sector, but also insurance and financial services (rather surprisingly). On the other hand, real estate and IT sectors were the better performers, with significant increases in terms of employees, which can be explained by the acute demand on the market in pandemic conditions.

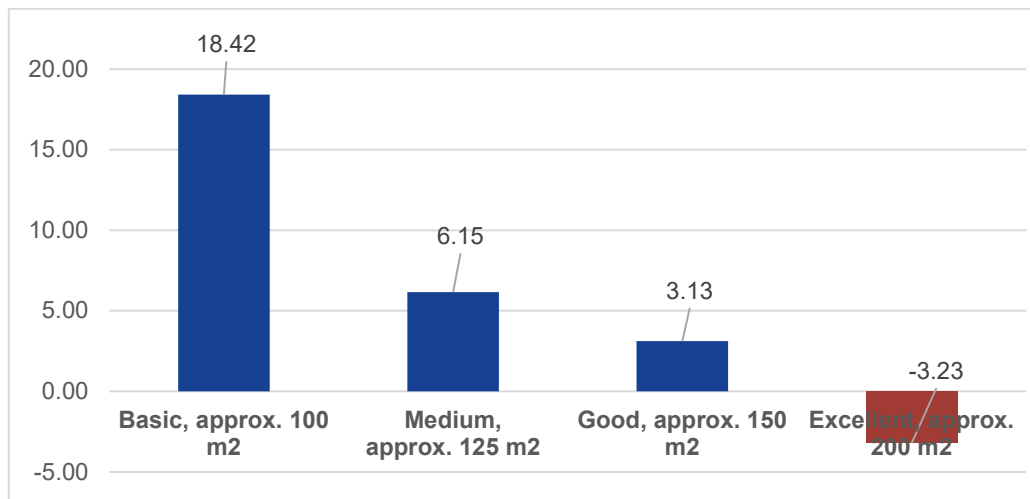
Figure 8 Employees paying social insurance contributions according to business sector (change 2020/2019 %)



Source: Federal Labour Office, calculations by the Hannover Region

Regarding the purchase prices for houses (ready for immediate occupation) (figure 9), the high increase for basic and medium categories are justified, the pandemic having oriented the population towards a preference for individual dwellings. Similarly, the demand (and purchase price) for spacious houses diminished, as a result of the economic vulnerability.

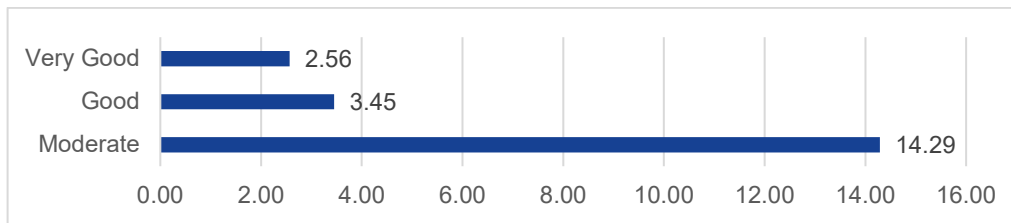
Figure 9 Purchase prices for houses (ready for immediate occupation) in Hannover city - change 2021/2019



Source: IVD residential comparison 2021/2020 and 2020/2019

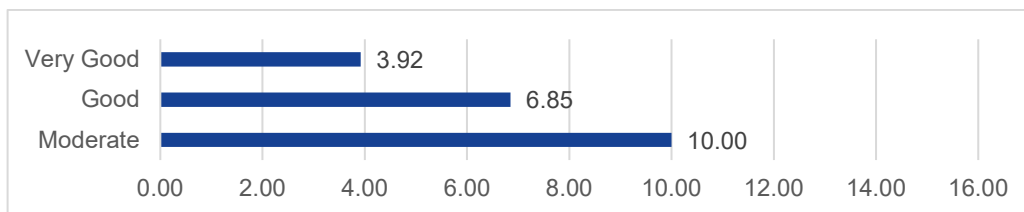
A similar trend could be observed for owner occupied apartments, where the highest increases were for the moderate apartments, while the top end apartments displayed less pronounced increases in prices (figure 10, figure 11). The purchasing behaviour was rather similar for both existing and newbuild apartments, although, the more pronounced inflation of the prices for the existing apartments is a supplementary sign of the overall preference for the cheaper options. Overall, this behaviour betrays a certain preference for apartments with smaller surfaces / fewer rooms, better adapted for the needs of the middle-class. While the prices were available only for the city of Hannover, similar trends were reported at the level of the county as well.

Figure 10 Purchase prices for owner-occupied apartments (existing apartments) in Hannover city - change 2021/2019 (%)



Source: IVD residential comparison

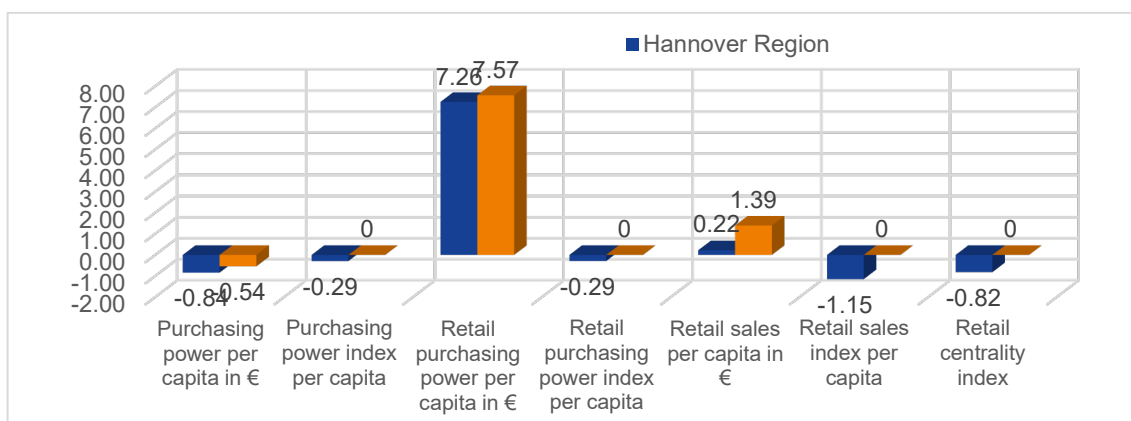
Figure 11 Purchase prices for owner-occupied apartments (newbuild) in Hannover city - change 2021/2019 (%)



Source: IVD residential comparison

It is worth mentioning that the economic impact of the pandemic upon Hannover region should be put in a national context as well (figure 12). Overall, the performance of the region was below the national average. The commercial sector faced many challenges during the pandemic, all indicators clearly indicating a deeper socio-economic impact at the level of this commercial sector, dependent on the purchasing power of the population. The discrepancies between the regional and national performance raises a series of issues on the inter-regional dynamics, and further supports the idea that the national strategies based on “one size fits all” approach are unsuited for a sanitary crisis.

Figure 12 Purchasing power and retail, comparison between Hannover region and the national performance - change 2021/2020 (%)



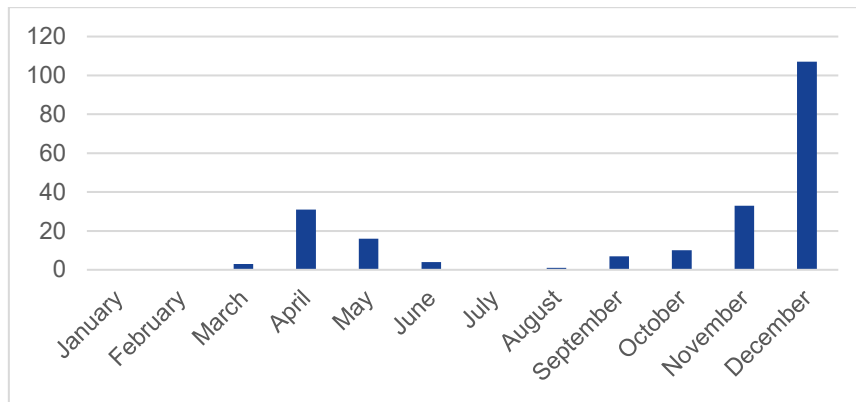
Source: GfK Geomarketing, 2020, 2021

2.2 Social and demographic impacts

Regarding the mortality rates, the values increased from 12,04 ‰ in 2019 to 12,4 ‰ in 2020, a major contributor being, without a doubt, the pandemic context (figure 13). At national level, the mortality rate increased

from 11,3 ‰ to 11,85 ‰ in the same period. Small decreases were recorded in the marriage rates (4,62 ‰ to 4,19 ‰) and divorce rates (1,92 ‰ to 1,87 ‰) as well.

Figure 13 Coronavirus deaths in the Hannover region – 2020

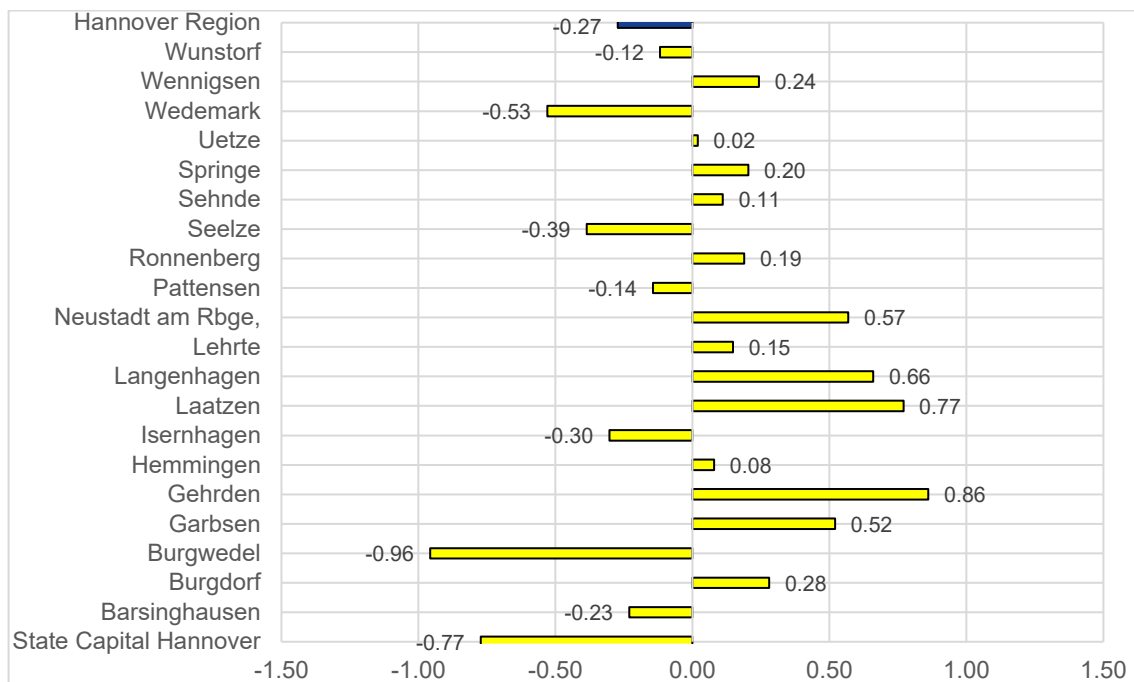


Source: Todesfälle und Corona 2020 Daten zum Thema Übersterblichkeit, Statistische Kurzinformationen 8/2021

The social trends that can be traced following the Covid pandemic could be those towards a reorientation from collective to individual housing, more bearable in lockdown conditions, an acceleration of the digitalization, especially for the public services, the relation between citizens and institutions, a greater orientation to work from home and reduced working time.

From a demographic point of view, the population of the Hannover region decreased by 0,27% (changed from 0,15 following the official statistics) in 2020 compared to 2019, a decrease that could be considered irrelevant, but it considerably affected the age pyramid distribution. The migratory balance was positive, mitigating the negative natural balance. On the other hand, the 21 administrative units that form the administrative unit had differentiated evolutions, 8 of them recording negative demographical evolutions, while only 13 displayed positive evolutions (figure 14).

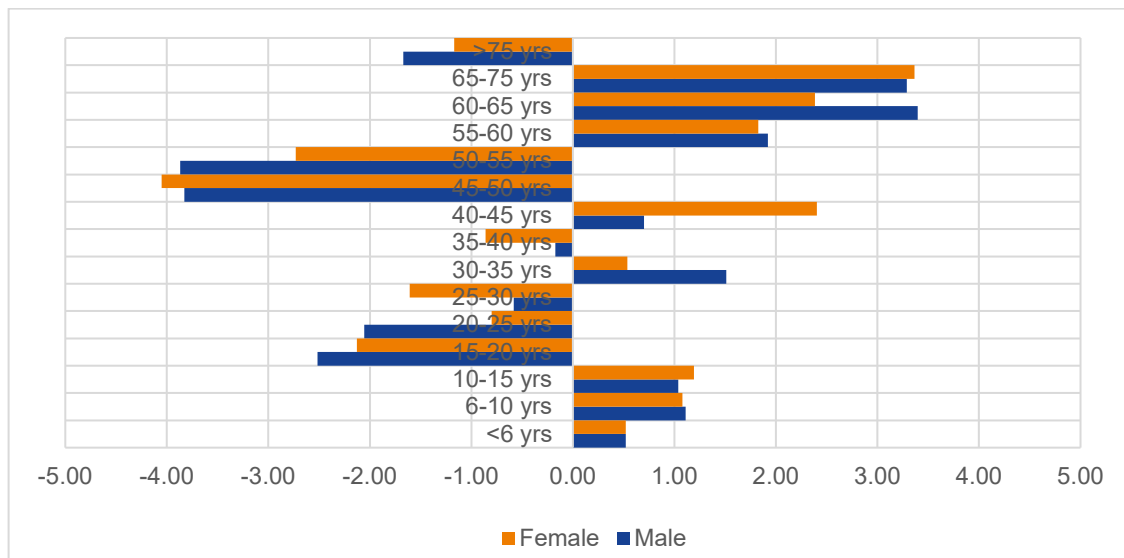
Figure 14 Population evolution in the Hannover region change 2020/2019 (%)



Source: State Office for Statistics Lower Saxony, calculations by the Hannover Region

Similarly, changes in age and gender structure at the regional level show differential impact according to the age group (figure 15). For example, the age groups under 15, or between 55 and 75, become more prevalent in the new age pyramid, while the age groups 75+, but also 15-30 and 45-55 become less prevalent. While the studies on the COVID-19 impact and effects are still undergoing, it cannot be denied that for a series of territories the demographical changes resulted after the pandemic could affect the medium-term demographical balance. Moreover, as detailed statistics are not yet available, it cannot be properly estimated how much of this change is produced by the pandemic and how much by migratory fluxes.

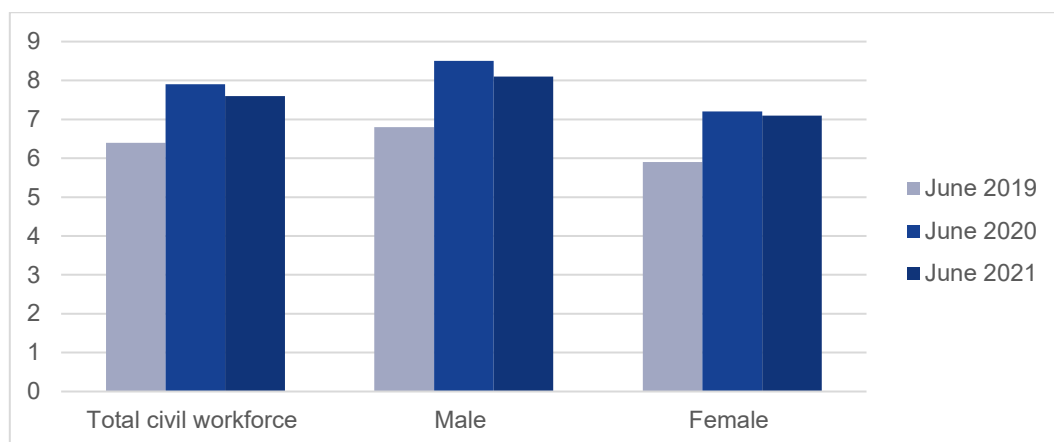
Figure 15 Changes in the population age groups during the first pandemic period in Hannover region - change 2020/2019 (%)



Source: Federal Statistical Office, Wiesbaden 2022

The unemployment rate in 2020 increased, reaching 6,7% (5,9% in 2019) in the region, a significant but not catastrophic increase for a solid economy. The values are higher than those recorded at national level (5% in 2019 and 5,9% in 2020), with some economic sectors, such as tourism, being affected in a harder manner. The unemployment rate increased significantly in the first pandemic year (2020), and stabilized during 2021. Regarding the gender distribution, men were more affected than women during the first year of the pandemic.

Figure 16 Unemployment levels during the pandemic

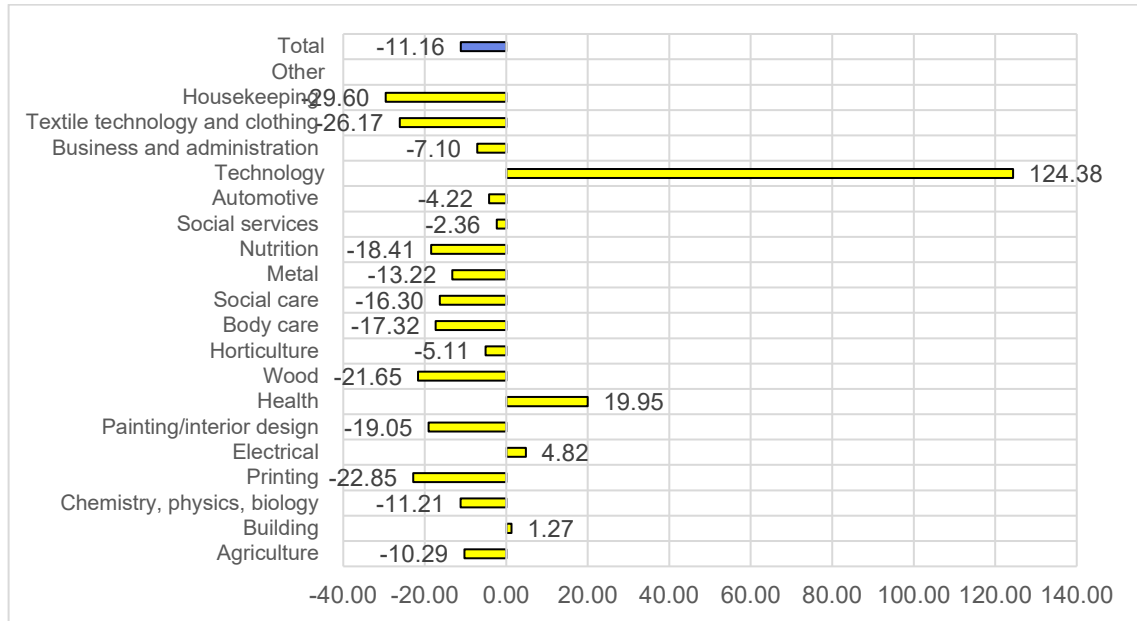


Migration has recorded a decline as well (both interregional and international), understandable giving the pandemic situation. In 2020, the rate of domestic departures and arrivals decreased both by 6%, the

immigration rate by 4%, and the emigration rate by 3,3%. The variations, although resulting from a major sanitary crisis, are significant.

A non-negligible social effect could be observed in the choice of students for vocational school in 2020, compared with 2019 (figure 17). The attractiveness of the technological and health sectors, with major increases between 2019 and 2020 are a clear sign of the shifting in preferences of young students (and maybe an encouragement of authorities towards the key sectors during the pandemic). The overall decrease (-11.16%) is mostly due to the immigrational decrease and the difficulty of foreign students to register and follow courses.

Figure 17 Evolution in the number of students in vocational school by domain (2020/2019)



Source: Hannover Region

3 Policy Response to COVID-19

This chapter sums up the measures taken during the first pandemic waves by local and regional authorities from Hannover region, split by policy theme: Just Transition, Green Transition, Smart Transition. Detailed information regarding the policy focus area, the temporal vision regarding the measure (short, medium- or long-term measure) the date of introduction and the perspectives regarding the continuation of the measure even after the pandemic was provided for each measure. A short description and a link where further details can be obtained were provided as well.

3.1 Policy Context

Overall, looking at the local and regional policy responses, one may argue that the pandemic constituted only partially a window of opportunity for Hannover region and its municipalities.

In Germany, the municipalities have a double task: According to Art. 28 Para. 2 GG, they regulate all matters of the local community within the framework of the law on their own responsibility. On the other hand, they are also entrusted with numerous state tasks assigned by law, which they perform as the local administrative bodies of the federal states. This cooperative structure is typical for the functioning of German state.

Since the financial power of the federal government is stronger than that of the federal states and municipalities, the main burden of the financial support measures during the pandemic lay at federal level. The federal government has supported the economy with around 130 billion euros since the beginning of the Corona crisis. Around 60 billion euros grants were paid out, while additional 55 billion euros were awarded in loans. Due to digital application procedures and the good cooperation between the federal and state governments, it has been possible to approve grants for a total of 4 million applications since the beginning of the pandemic. A total of 4.5 billion euros is available for specific aid in the culture and media sector with the NEUSTART KULTUR program and the federal special fund for cultural events. In addition, there are expenses for short-time work benefits, as well. According to the Federal Employment Agency, around 24 billion euros were spent on short-time work benefits and around 18 billion euros on social benefits from short-time work in 2020 and 2021 (Source: <https://www.bundesregierung.de/resource/blob/974430/1995230/3838ef36ea352e9af06a13b4454416ed/2022-01-07-mpk-corona-wirtschaftshilfen-data.pdf?download=1>).

While the federal government provided financial aid, the federal states were able to concentrate on fighting and containing the virus together with the public health departments on county level.

Nevertheless, from a strategic point of view, the region and the municipality of Hannover managed to adapt in the second pandemic wave to a more medium- and long-term approach. A series of measures decided in the pre-pandemic period were adapted to the new context, the travel and transportation system received a major attention from Region Hanover authorities. The lockdown and the requirement to work from home wherever it is practically and technically possible led to the already loss-making local transport companies being driven further into the red. However, even before that, politicians and decision-makers in the executive floors of local transport companies had realized that the provision of large buses and light rail vehicles and trams were no longer the answer to tomorrow's mobility requirements. Mobility had to be viewed as a holistic approach and that required much more flexibility and new forms of mobility that blurred the boundaries between private transport and public transport.

The obligation to reduce physical contact served as a high-performance catalyst for digital transition (see below) especially for work in public administrations. Moreover, the authorities decided to include in the decision process actors from the key sectors (health, interventions) in order to reduce the time of response to a health-related crisis.

During the Corona crisis, the region was able to fully demonstrate its strength as the most important authority for a functional area of 1.2 million people. On the one hand, it served as a hub for the state and federal health authorities and, on the other hand, organized the cooperation between the 21 municipalities. In a short time, she organized the construction of an emergency hospital when the occupancy rate in the hospitals reached a critical level and helped the state to implement a vaccination centre at the Hanover exhibition ground.

3.2 Proactive Policy Overview

The measures taken within the Just Transition area tend to be mainly oriented on short and medium-term, aiming to offer a support during the pandemic. There are very few discernible long-term effects of the measures taken within this area, which could denote a greater effort towards covering the immediate needs, especially for the vulnerable categories. However, effective measures could be identified. While employees in companies directly or indirectly affected by Covid-19 measures benefited from short-time work grants, since the beginning of the pandemic, the Federal Government has launched a whole series of bridging aids and special support programs for all kind of enterprises and self-employed that can still be used today. Despite the relief measures, there was a structural change in the labour market that is still having an impact today. Due to the lockdown, many employees in the hotel and restaurant sector left their jobs and looked for crisis-resistant jobs. The same happened in the low-wage sector of the service sector, such as baggage unloaders at airports. However, it also affected highly paid specialists such as airline pilots who became unemployed due to the flight ban. They had themselves retrained to become train drivers. After the end of the Corona measures, they were all missing in their original economic areas and led to a reduction in the range of services in that particular sectors.

Regarding the measures taken within the Green Transition area, things are slightly different. Most of them were taken during the second phase of the pandemic, required a longer planning process and were implemented for a long-term strategy. The vast majority of measures under this category tackled issues related to the mobility and transportation, as this aspect suffered major transformations and challenges during the first pandemic waves. As most of the major cities all over the world, Hannover had to find solutions in order to avoid the exposure of vulnerable populations, the overcrowding of public transportation, and the promotion of alternative transportations means. For the Hannover region the pandemic represented an opportunity to think medium and long-term development strategies for the transportation system, or to implement/adapt solutions already in the plan. A considerable part of these measures represent re-adaptations and reinterpretations of existing measures and strategies to the pandemic and post-pandemic context.

For the Smart Transition area, the region took a series of measures which are affirming the compromise between necessary rapid answers to the pandemic situation and long-term strategies. On one hand, several measures from the field of digitalization were taken in order to ensure the correct functioning of public institutions in an unexpected situation. On the other hand, the local and regional actors took advantage of the context for the development of new tools allowing better and more-adapted services from the cultural area or transportation. It is worth noticing that several measures aimed at offering real-time updated information regarding the pandemic evolution and the vaccination process. These dashboards proved to be a very useful tool in keeping the population updated and in speeding up the vaccination process. The existence of this type of dashboards raise the question of adapted policy measures at local level, since data regarding the spread of the virus, the sanitary conditions and financial prowess of each locality were available. For the moment, however, we are unaware of measures taken based on granular data (local level).

3.3 Just Transition Measures

The measures from the Just Transition domain were, by far, the most variate in term of targeted population. Several issues specific to the vulnerable groups were addressed, however, one may notice that the duration betrays a mostly short-term strategy. The diversity of the measures shows the intention of the regional and municipal authorities to cover the most vulnerable groups as possible, while maintaining full functionality of the public services (see below) in a health-related crisis.

Table 2 Just Transition Measures

Focus area(s)	Policy description	Target group(s)/ Beneficiaries	Responsible level of governance / Financing	Stakeholders involved in policy implementation	Timing of policy	Duration
Social support	City of Hannover granted financial support for youth welfare organizations to secure their existence (such that they can continue deliver free services to those in need): full payment of the expense allowances for trainers, non-disposable cost shares of the facilities, support for cancellation costs for events that cannot be carried out during the pandemic. Outside the city, but within the Region of Hannover, the regional authorities granted similar financial support for welfare organizations to secure their existence. Link: https://www.hannover.de/Leben-in-der-Region-Hannover/Gesundheit/Gesundheitsschutz/Coronavirus-in-der-Region-Hannover/Wirtschaftliche-Hilfen/Umsetzung-des-SodEG-%E2%80%93-Region-Hannover .	Children and youth Public stakeholders	Municipal level	City of Hannover - City Hall Region of Hannover - Regional Council	Pandemic	Short term
Business support	City of Hannover granted financial aid for freelancers and small and medium companies (one-time grants going from 3000 EUR for the smallest up to 30.000 EUR for the largest companies, depending on the number of employees). Link: https://www.hannover.de/Service/Presse-Medien/Landeshauptstadt-Hannover/Meldungsarchiv-f%C3%BCr-das-Jahr-2020/Zehn-Mio.-Euro-f%C3%BCr-Unternehmen-und-Freiberufler*innen .	Businesses Employees and self-employed people	Municipal level	City of Hannover - City Hall	Pandemic	Short term
Income support Cultural offers	Financial support from the State of Lower Saxony for self-employed individuals in culture (affected by the pandemic). Link: https://www.mwk.niedersachsen.de/ausschreibungen/niedersachsen-dreht-auf-192816.html . This initiative is correlated with other nation-wide measures, such as the introduction of a voucher scheme for the actors from events sectors for a limited period. Event organisers could issue vouchers for music, cultural, sporting and leisure events that have had to be cancelled as well as for leisure establishments that have been closed instead of reimbursing costs..	Employees and self-employed people	Regional level	Hannover - Regional Council State of Lower Saxony	Pandemic	Short term

Business support	Loans from the State of Lower Saxony (via Nbank) for non-profit organizations who have run into a liquidity shortage due to the pandemic. Link: https://www.mwk.niedersachsen.de/coronavirus/niedersachsen-schnellkredit-fur-gemeinnutzige-organisationen-194536.html .	Public stakeholders	Regional level	Hannover - Regional Council State of Lower Saxony	Pandemic	Short term
Income support	The Region of Hannover granted compensation for loss of earnings for employees, self-employed or freelancers due to quarantine (isolation) issued by the Regions' Health Department (Compensation is paid in accordance with the Infection Protection Act (federal government), the Hannover Region Health Department implements the law). Link here.	Employees and self-employed people	Regional level	Hannover - Regional Council Hannover - Health Department	Pandemic	Short term

3.4 Green Transition Measures

We could consider the pandemic “a window of opportunity” for the Hannover region in terms of Green Transition, a window that served as a platform for the implementation of a series of innovation. Several projects, especially from the domain of transportation were implemented during the pandemic period in order to address the particularities of the crisis, but also to strengthen the short and medium -term strategic priorities of the territory. All projects are driven by the public transport plan which is adopted every 5 years by Region Hanover Assembly. The case of Hannover is not singular, as many other European territories took advantage of the context to speed up the green and accessibility transition of their municipal and regional transportation systems.

Table 3 Green Transition Measures

Focus area(s)	Policy description	Target group(s)/ Beneficiaries	Responsible level of governance/ Financing	Stakeholders involved in policy implementation	Timing of policy	Duration
Travel and mobility	Encourage the use of bicycles by providing special parking spaces for GVH buses and trains. GVH (Hanovra Großraum-Verkehr) promotes the urban mobility and includes 8 transportation companies. As Üstra and Regiobus are companies of Region Hannover, and Region Hannover is the ordering authority in public transport. Link: https://www.gvh.de/service/mobilitaetsangebote/fahrradmitnahme/	General population	Regional level / Municipal level	The Transport Association of Greater Hannover (GVH) (51% region of Hannover)	Pandemic	Medium/ Long term
Travel and mobility	Transport companies in the Hannover region offer passengers an additional timetable at certain times and on bus lines. Regular taxis, minibuses and on-demand services, such as the on-call bus or the on-call taxi, replace regular buses when there are fewer people on the road and bring passengers safely to their destination.	General population	Regional level / Municipal level	The Transport Association of Greater Hannover (GVH)	Pandemic	Short-term

	Link: https://www.gvh.de/fahrplan/sonderverkehre/			(51% region of Hannover)		
Travel and mobility	Since 2018 MOIA, a subsidiary of the Volkswagen Group, offers a ridepool system in Hanover. Since August 2021, MOIA gives the go-ahead for fully electric ride pooling. Hanover will thus become the largest German city in which emission-free ride-pooling is available throughout the city.	General population	Municipal level	MOIA	Pre-pandemic, but strengthened during the pandemic period	Long term
Travel and mobility Social support	Rikscha Project for Seniors Cooperation with old people's homes and nursing homes. The project was implemented in the city of Hannover together with the municipal initiative "Hannover - Lust auf Fahrrad". This initiative was strengthened in 2021 (reference to EU: "cycling without age", only limited to several districts of the city area of Hannover, implemented with volunteers).	Elderly people	Municipal level	City of Hannover	Pandemic	Medium/ Long term

3.5 Smart Transition Measures

The same “window of opportunity” was not as visible for the Smart Transition domain. Most of the measures were short-term orientated, aiming at accelerating the vaccination process, pandemic containment or citizens information. It should be noted, nevertheless, that Hannover, as well as other European regions, used the pandemic context in order to speed up the digitalisation process for their administrative work, citizen registration, digitalisation of official documents, etc. A measure that they already had to implement with regard to the EU regulation of 2018 on the establishment of a uniform digital gateway to information, procedures, assistance and problem-solving services.

Table 4 Smart Transition Measures

Focus area(s)	Policy description	Target group(s)/ Beneficiaries	Responsible level of governance/ Financing	Stakeholders involved in policy implementation	Timing of policy	Duration
Communication and knowledge sharing	COVID-19 Dashboard - Dashboard is an offer of the Hannover Region; financing is provided by Region Hannover, the dashboard will continue indefinitely; The financing is ensured by Region Hannover; Description: An online dashboard informing the citizen about the evolution of the pandemic (cases, deaths, recoveries) by age, locality, etc. https://experience.arcgis.com/experience/7d52c64b899d4d72bde23950dad56ffb	General population	State level / Regional level	State authorities / Regional Council	Pandemic	Short term
Communication and	Vaccination Portal Description: An online portal for the vaccination process (appointment, information), financed by the land authorities, but implemented at county level.	General population	State level / Regional level	State authorities / Regional Council	Pandemic	Short term

knowledge sharing	https://www.impfportal-niedersachsen.de/portal/#!/appointment/public					
Cultural offers	<p>Online cultural events</p> <p>Level - county and local / Financing: local and county councils</p> <p>Description: During the pandemic a series of cultural events were transposed into a digital form (such as the Virtual Remembrance Day for the victims of displacement / International World Refugee Day).</p> <p>Similar initiatives were taken for other cultural events.</p> <p>https://www.hannover.de/Kultur-Freizeit/Architektur-Geschichte/Erinnerungskultur/ZeitZentrum-Zivilcourage/Meldungen/Meldungen-aus-2020/Virtuelles-Erinnern-am-Gedenktag-f%C3%BCr-die-Opfer-von-Flucht-und-Vertreibung-Internationaler-Weltfl%C3%BChtlingstag</p>	General population	Regional level / Municipal level	City of Hannover - City Hall Region of Hannover - Regional Council	Pandemic	Short term
E-governance	<p>Citizens Registration Office Online</p> <p>Level: local/county / Financing: local/county</p> <p>Description: an online registration office dealing with passports, parking permits, central business information, civil registry documents, etc.</p>	General population	Regional level / Municipal level	City of Hannover - City Hall Region of Hannover - Regional Council	Pandemic	Medium/ Long term

4 Policy impacts

4.1 Policy impact

The proper estimation of the policy impacts for the Hannover region is extremely difficult due on one hand, to the lack of detailed statistics and georeferenced/timestamped data, and on the other hand, to the low level of information gathered until this moment from local and regional actors. While information regarding the measures taken during the first two waves and their most visible impacts was gathered, there is still unknown information regarding the full scale of the impact upon the medium and long-term development strategies. It is worth mentioning that, due to the lack of statistical data covering the study period, it is impossible to detail precise impacts, therefore approximations will be presented, where required.

An important aspect which appeared during the first months of the pandemic and will have repercussions for the following period is the speeding up of the communication process between public actors. While at first, only the fax was an acceptable communication system for official documents (legally), the new context required a more rapid system, adapted for the work from home, and large-scale available. Therefore, the digitalization process eased the transition towards emails and online data transfer as legally accepted process, therefore speeding up the whole decision-making process.

4.2 Governance impacts

No major transformation in the governance process was mentioned during the interview (or found in the media and official source, for that matter), however, it was mentioned that the cooperation between local/regional actors improved both in terms of speed and quality. It was mentioned a major upgrade regarding the cooperation with the healthcare structures and medical practitioners' associations, a closer relation with the actors from the intervention system, such as police or firefighters. Due to its nature, the pandemic offered the premises for a better and more direct cooperation between the healthcare/intervention system and the local/regional policymakers. It was mentioned a more direct relation and a more profound implication of these actors in the local and regional decision-making process. While this may be due exclusively to the nature of the crisis and the necessity to cooperate and offer quick answers, especially during the first and second wave, the relations created offered the opportunity for a better long-term cooperation during any type of crises. It was mentioned as well the awareness of having a more direct connection with the actors ensuring citizens' health and security in any moment, regardless of the type of shock that may appear.

On the other hand, the cooperation with the private actors (stakeholders from the financial sector or the sizeable economic actors) did not change significantly as an effect of the pandemic measures. This may be due to the fact that the economic support measures were mostly managed through national and land authorities, therefore the local and regional policymakers had little to no influence during the allocation of the economic support funds. Therefore, no change was required in the already existing dynamic.

Another reported major change was the restructuring and digitalization of the sanitary system; following the first pandemic wave and given the new context, several changes in the sanitary system were operated in order to exchange faster relevant data and to provide better, faster, and more adapted to the regional context measures. While the restructuring was a direct effect of the pandemic, the change will most likely be permanent.

4.3 Socio-economic impacts

Regarding the socio-economic environment, a major change with long-term consequences was the work from home system. While during the pre-pandemic period the work from home was rather isolated and a rarity in the region, more institutions were forced to adapt during the first months. At first, the work from home was seen only as a method to avoid large crowds and to speed down the spread of the virus, however, even during the relaxation periods between the waves, the employees had the opportunity to take 2-3 days per week as work from home.

This measure had two major consequences: a) less traffic in Hannover and the neighbouring localities, less traffic congestions and an overall greater air quality; b) a lower pressure on the office spaces, as the same number of offices can sustain a greater number of employees. This allowed several institutions (as well as local firms) to hire new people to keep up with the demands of the pandemic context without requiring additional office spaces or costs. Home office is also very suitable for combining the different requirements of family and work. The authorities envisage to maintain on a permanent basis the possibility for employees of taking work from home days, as this will ensure the continuation of positive impacts recorded during the last year.

4.4 Financial impacts

The crises hit the municipalities in terms of income and expenditure. In total, the financial damage in 2020 can be estimated at least 17 billion euros stated a research of Bertelsmann Stiftung (Source: <https://www.bertelsmann-stiftung.de/de/themen/aktuelle-meldungen/2021/juli/kommunalfinzen-und-covid-19-neue-haushaltskrisen-drohen>). The business tax (gross trade tax) of the municipalities in 13 less dense Regions fell by almost 9 billion euros compared to the previous year. Losses of more than 4 billion euros also occurred in the municipality's share of income tax and fees. The tax losses primarily affected the municipalities in economically strong regions. The compensation for the reduced trade tax revenue alone and the increase in the federal contribution to the municipal Hartz IV costs amounted to almost 14 billion euros in 2020.

The financial impact on local level is due to the slump in economic output at all economic levels with the exception of online trade. Due to the peculiarities of the German tax system, the economic effects on the tax revenues of the municipalities may have a delay of one year. They reinforce the economic impact of the Ukraine war and pose major financial challenges for German municipalities like Region Hanover, which expect a deficit of €180 million for the coming year 2023 and up to €75 million for the current year 2022.

The impact could be considered major, giving that some public institutions no longer functioned in normal conditions during the pandemic and had to take complementary decisions to those coming from the federal or state level. Income budget of communes in Germany are fixed by law. In times of crisis, the federal government can provide additional financial resources for municipalities. Since the finances of the federal states themselves are very tight, the support from that this administrative level is limited. A major challenge was represented by the coherence between the upper and lower levels of the administration during the pandemic in order to ensure a direct positive impact of the measures and to think ahead of policies/measures enabling the local institutions to manage more efficiently crises. The pandemic crisis reiterated the importance of collaboration between all actors and the making of the best decisions by interinstitutional consensus and the involvement of all responsible actors.

5 Future policy directions

Proactive policies that could be considered for upscaling and replication in other EU regions

The partnership between car sharing companies and public transport companies as seen in the Hannover region could be further explored. Car sharing system knew an easier adaptation to the citizen's needs. The regional actors can further support the public-private partnership and the connection with the vulnerable populations.

The impact of the pandemic on the future direction of policies in the case study area

The pandemic has triggered a significant proliferation of online geospatial dashboards as a means of informing citizens in real time about the evolution of the pandemic. The Region Hannover - COVID-19 Dashboard is such an example. Although Hannover COVID-19 dashboard will most likely not continue after the pandemic, such instruments might be considered for other areas of public administration (transportation, data regarding the financial performance, involvement of citizen in the decision-making process, etc.) as part of smart transition policies.

How can governance and stakeholder collaboration be improved in the future?

We consider that representants of various stakeholders' groups can be partially integrated in the decision-making process, at least with a consultative role. If considerable progresses were made in the relation between the policymakers and the sanitary/intervention systems, regarding the collaboration with other stakeholders (from the business environment, for example), no major changes in the pre-existent relation were recorded.

Proactive policies highly probable to remain in place in the future

The policies for *just transition* seem particularly adapted for the existent pandemic context. Nevertheless, a number of initiatives were taken without regard to Covid-19, but with regard to climate protection issues, and afterwards adapted to the pandemic context. Some measures taken during the pandemic (or prior to the pandemic, but adapted during the 2020-2021 period) have the potential to actively contribute to the medium and long-term development strategies, especially in the area of Green and Smart Transitions.

Some *green transition measures* are also likely to remain in place if demand for them will continue to exist, especially those related to car-sharing. The peculiarity of this service consists in being the outcome of a partnership between a car sharing company and the public transport company association (GVH) to create convenient offers (prices) aimed at those using cars less than a certain number of hours per month. One could argue that this measure could lead to slightly lower motorization rates inside cities and hence to lower pressures on public spaces (due to a lower demand for parking spaces).

How can territorial cooperation frameworks, tools and resources for cross-border regions be strengthened in times of crises?

Not applicable for Hannover region. Even if a cross border cooperation is not possible for Hannover Region due to its geographic location, an exchange of best practices (regarding measures best suited to fight the socio-economic impact of Corona) with other European Regions in the framework of Interreg programs could be a good solution.

6 Regional recommendations

6.1 Policy Recommendations

Two major recommendations emerge in terms of policy recommendations, both justified by a certain deficit shown by the region during the pandemic period:

- Acceleration of the digitalisation process, as Hannover had a mostly short-term smart strategy during the pandemic period;
- Further developing housing planning strategies, as the pandemic period showed an increase pressure on the basic houses and moderate apartments, which could further reduce the middle-class access to affordable housing.

6.2 Governance Recommendation

The Covid crisis clearly showed the weaknesses of the public health system in Germany in relation to the digital networking of the various actors at all levels, including the resident doctors. This also applies to communication with the population. The traditionally very high data protection standard in Germany is proving to be a stumbling block for a quick solution.

Therefore, we focused on the following recommendations:

- Moving a series of strategies responsibilities towards the regional actors (especially intervention, health system), where the region is not already the deciding actor, in order to ensure a timed and more adapted answer in a crisis situation or unforeseen event;
- Develop the management skills of the public stakeholders at regional and local level for a swifter implementation of responsive measure and an increased efficiency.

6.3 Territorial Recommendations

After the refugee crisis in 2015, the Corona crisis was the second test for the Hannover region and its administration. The third followed in 2022 with the admission of Ukrainian refugees as a result of the war. It was shown that a regional authority that is not only responsible for an urban centre but also for the suburban and rural regions and thus for a functional area in all important policy areas has a clear advantage over other German urban regions, where the responsibilities of the city and Surroundings are still divided. Because the region involved the mayors of all municipalities early and regularly in crisis management, it was possible to implement decisions quickly for an area with 1.2 million inhabitants.

6.4 Financial Recommendations

Regarding the financial recommendation, as the region has limited responsibilities in terms of financial attributions, the recommendations were thought for this specific context:

- Allocating special funds for the stakeholder bottom-up projects, further involving smaller stakeholders from the region;
- Dedicate special regional funds for the digitalisation process which can accelerate the financial answers during a crisis;



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