R-Map

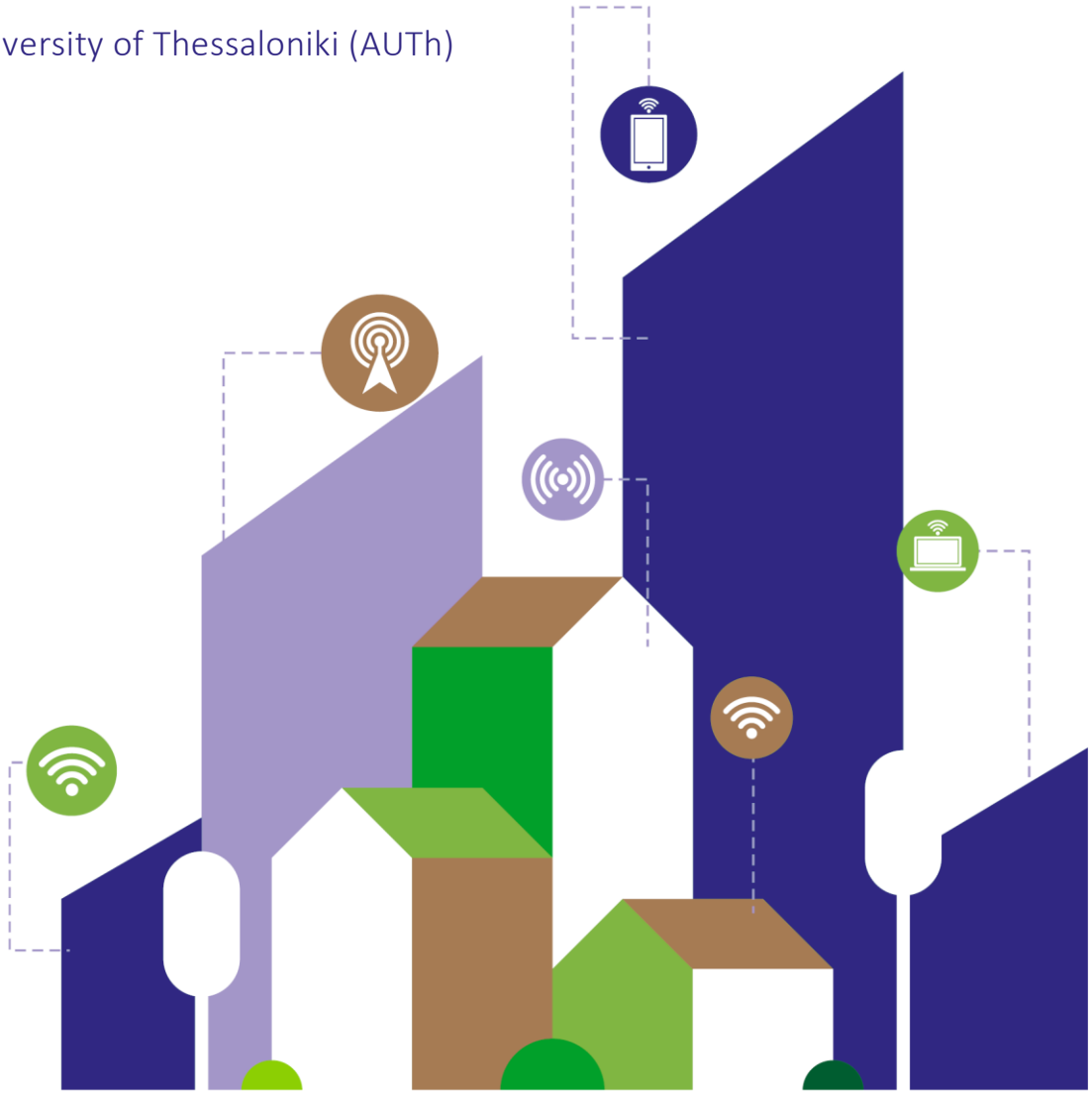
MAPPING THE EFFECTS OF REMOTE WORKING ARRANGEMENTS IN URBAN AND RURAL AREAS

D1.2

Spatial implications of remote working arrangements across Europe and beyond

Aristotle University of Thessaloniki (AUTh)

31/08/2024



Funded by the European Union

The R-MAP project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101132497.

Project Information

ACRONYM	R-MAP
TITLE	Mapping, understanding, assessing and predicting the effects of remote working arrangements in urban and rural areas
GRANT AGREEMENT No	101132497
START DATE OF THE PROJECT	1/02/2024
DURATION OF THE PROJECT	36 months (2024-2027)
TYPE OF ACTION	Research and Innovation Action (RIA)
TOPIC	HORIZON-CL2-2023-TRANSFORMATIONS-S01-01
WEBSITE	www.r-map.eu
COORDINATOR	Aristotle University of Thessaloniki (AUTh)
PROJECT OVERVIEW	R-Map aims to analyze the impact of remote working arrangements (RWAs) on the disparities between urban and rural regions in Europe. An Integrated Impact Assessment Framework (powered by the R-Map model) will be produced for the assessment of individual, social, economic, environmental and spatial impacts of RWAs. It will also allow decision-makers to monitor and assess how remote work arrangements affect people, communities, space, economy, and environment in urban and rural regions. Furthermore, R-Map will formulate policy recommendations on how to create environments conducive to remote work, that are tailored to the needs of local governments in both urban and rural settings.

Grant Agreement: 101132497 | Research and Innovation Action (RIA) | 2024 – 2027 | Duration: 36 months | Topic: HORIZON-CL2-2023-TRANSFORMATIONS-S01-01.

Document Information

D1.2: Title of deliverable:	Spatial implications of remote working arrangements across Europe and beyond
Issued by:	Aristotle University of Thessaloniki
Issue date:	28/08/2024
Due date:	31/08/2024
Work Package Leader:	Koç University

Dissemination Level

PU	Public	X
PP	Restricted to other programme participants (including the EC Services)	
RE	Restricted to a group specified by the consortium (including the EC Services)	
CO	Confidential, only for members of the consortium (including the EC)	

Version Control Sheet

Version	Date	Main modifications	Organisation
v0.1	05/08/2024	First draft shared with the reviewers	AUTh
v0.2	28/08/2024	Second draft with incorporated review comments and suggestions	AUTh
v1.0	31/08/2024	Final version ready for submission	AUTh

Main Authors

Name	Organisation
Prof. Georgia Pozoukidou	AUTh
Prof. Marilena Papageorgiou	AUTh
Prof. Efstratios Stylianidis	AUTh
Ms. Theodora Istoriou	AUTh
Ms. Dimitra Plastara	AUTh
Mr. Ioannis Tavantzis	AUTh
Mr. Alexandros Skondras	AUTh
Mr. Thomas Mone	AUTh
Ms. Zoi Eirini Tsifodimou	AUTh

Contributing Organizations

Organisations
UT
SURREY
Q-PLAN
RWW

Quality Reviewers

Organisations
UT
UB

Table of Contents

Table of Figures

List of Tables

Abbreviations

CBD	Central Business District
CS	Coworking Space
ESPON	European Observation Network for Territorial Development & Cohesion
Eurofound	European Foundation for the Improvement of Living and Working Conditions
ICT	Information Computer Technology
ILO	International Labor Organization
JRC	Joint Research Centre
NWS	New Working Spaces
OECD	Organization for Economic Cooperation and Development
OKR	World Bank Open Knowledge Repository
RO	Research Objectives
RQ	Research questions
RW	Remote Work
RWAs	Remote Working Arrangements
WFH	Work From Home

Table 1: Abbreviations

Executive Summary

This report titled “Spatial implications of remote working arrangements across Europe and beyond” is a key deliverable under Work Package 1, Task 1.2., of the R-Map project led by the Aristotle University of Thessaloniki. R-Map aims to explore how remote work affects the urban-rural divide in Europe by mapping, understanding, assessing, and predicting the impacts of remote working arrangements (RWAs).

This deliverable provides a comprehensive understanding of how the widespread shift to remote work is transforming urban and rural landscapes, affecting housing preferences, mobility trends, energy consumption, and overall spatial patterns. It seeks to identify the underlying causes and driving factors behind the emergence of new working spatialities, with an emphasis on place-based policies. The study also involves examining specific case studies to analyze how spatial effects manifest locally, drawing insights from interviews with key local actors. Finally, the research aims to provide a contextual understanding of these spatial impacts across regions.

The research employed a mixed-methods approach, incorporating a systematic literature review, a narrative review, and empirical research from multiple case studies across Europe and the USA. The case studies were selected based on predetermined criteria, facilitating a cross-case comparative analysis that highlighted the regional differences in the impacts of RW. The analysis was enriched by correlation matrices, providing a detailed understanding of RW’s spatial effects.

Initially, the report identifies and analyzes the diverse spatial effects of remote working arrangements across various European regions. It highlights the emergence of new working spaces (NWSs) such as coworking spaces, digital hubs, and third places and explores the concept of multilocality, where individuals and/or businesses operate across different locations. These two interrelated forms of remote working spatialities (NWSs and multilocality) present multifaceted implications on urban development, land use patterns, real estate, mobility patterns, social interactions and community dynamics affecting the urban landscape and the urban-rural dynamics.

The report highlights several significant findings related to the spatial implications of remote working arrangements. Urban landscapes are undergoing considerable transformations, with a decline of central business districts and a simultaneous increase in suburbanization trends and peri-urban growth. These changes are also contributing to the revitalization of small and medium-sized cities. There is a noticeable shift away from traditional office spaces in terms of housing and office space, accompanied by a growing demand for housing in suburban and rural areas that offer more space and improved living conditions. The urban-rural divide proves to be a complex challenge, as remote work has the potential to both bridge and widen this gap, depending on how effectively remote working opportunities are integrated into local economies and supported by appropriate policies. Mobility patterns are also transforming, with reduced daily commuting leading to changes in transport infrastructure and public transit demand. In terms of energy consumption and environmental impact, remote working has mixed implications, with the potential to reduce commuting-related emissions offset by increasing energy use within the home, raising new concerns for sustainability.

Finally, the report emphasizes the importance of place-based policies that are responsive to the unique features and needs of different regions. Through the case studies, the report illustrates how local

manifestation of spatialities of RW vary, reflecting the diverse socio-economic and geographical contexts across Europe.

The findings of this report mark a vital step in understanding the evolving dynamics brought about by remote work. It lays the groundwork for the upcoming packages, particularly the conceptual development of the R-Map model in WP2, where key spatial factors will be integrated to assess the spatial impacts of remote working spatialities at the European level. Within WP1, D1.2 contributes to Task 1.5, as the literature review findings provide a basis for formulating the questionnaire for the large-scale survey regarding the spatial aspects.

1. Introduction

In recent years, the rapid shift towards remote working (RW) has significantly impacted the spatial dynamics of work and living environments across Europe and beyond. The transition from traditional office settings to flexible working environments has given rise to new workplace models, such as coworking spaces, working hubs, office clubs, etc., reshaping urban and rural landscapes. These changes have influenced not only where people work but also housing markets, mobility patterns, energy demand, and the overall socio-economic structure of the communities (Akhavan et al., 2021; Di Marino et al., 2023; Eliasson, 2023; Hölzel et al., 2023; Korelina and Zheleznyak, 2019; Krasilnikova and Levin-Keitel, 2022; Mariotti and Akhavan, 2020; Pajević, 2021). The increasing prevalence of remote work has also challenged established planning paradigms, urban planning practices, and policy frameworks, requiring innovative approaches in urban management.

This report entitled Deliverable 1.2 (D.1.2) "Spatial implications of remote working arrangements across Europe and beyond", explores the spatial implications of RW, focusing on the evolving urban development trends and spatial configurations that have emerged because of these changes. Furthermore, it explores the potential spatial effects of remote working arrangements on the urban-rural divide. The Objective of Task 1.2. is to analyze the potential spatial effects of diverse remote working phenomena across the EU and beyond, to understand their cause-effect patterns, and to highlight how these effects have manifested at the local level by further studying relevant regional case studies. Within this context, this study addresses the following research objectives (RO) set for T1.2:

RO1: Investigate the spatial effects of RW across the European Union and associated countries.
This objective seeks to comprehend the various changes in the urban and rural landscape due to RW, including urban development patterns, infrastructure, mobility, and environment.

RO2: Identify the causes and driving factors behind RW spatialities in different regions.
This objective includes exploring policy measures and initiatives that have contributed to the emergence of the various spatialities of work, with emphasis on place-based approaches.

RO3: Examine and compare specific case studies to analyze local manifestations of RW's spatial effects.
This objective involves conducting interviews with local key actors to acquire insights into critical changes in the urban and rural landscape, mobility patterns, infrastructure strains, and other relevant aspects.

RO4: Provide a contextual understanding of RW's spatial effects.
This objective includes compiling and synthesizing research findings to understand the variations of the spatial effects of RW across the selected case studies comparatively.

Based on the objectives, the research questions (RQ) that were formed and addressed in this report are the following:

RQ1: What are the primary spatial effects of remote working arrangements, and how do they vary across different European regions/cities?

- How did urban development trends change?
- How did the urban and rural landscape change?
- What are the impacts of RW arrangements on land use, infrastructure, and mobility patterns?

RQ2: How do the spatial effects of remote work arrangements vary across selected case studies?

- What are the specific local changes recorded in each case study?
- How do changes differ across different cities and regions?
- What are the key factors that influence the variations in spatial effects?
- What correlations can be identified between the different spatial attributes from the case studies regarding the spatial effects of RW?

RQ3: How RW may have brought changes to policy measures and other initiatives?

- How do policies prepare regions to cope with RWs' spatial implications?
- How should a place-based policy encompass RW aspects?

The study adopts a mixed methods approach to address the research objectives and the respective research questions, combining literature review with empirical data gathered through case studies and interviews. Specifically, the literature review includes a systematic literature review of relevant academic research publications, a narrative literature review approach to provide a broader context and offer a more nuanced understanding of the research objectives and questions, and a policy document analysis. The literature review provides a theoretical foundation, identifying key themes such as urban development trends, housing and office demand, the urban-rural divide, mobility patterns, and energy consumption. The empirical component includes in-depth semi-structured interviews with key local actors across various regions, offering insights into the local manifestations of RW's spatial effects. The qualitative data was analyzed using thematic coding facilitated by the ATLAS.ti software to ensure a systematic exploration of the interview material. Finally, a correlation matrix was utilized to qualitatively synthesize the results for the case studies, facilitating the comparative analysis to identify variations in the cause-effect patterns of remote working across Europe and beyond.

The report is organized into several key sections. After establishing the research objectives and questions guiding the study, the first section focuses on a detailed explanation of the methodology. Subsequent sections delve into the spatialities of remote working arrangements, discussing the rise of new working spaces and the concept of multilocality. The report then presents the specific spatial effects of remote working, including the impacts on urban development, housing and office demand, the urban-rural divide, mobility patterns, transport infrastructure, and environmental concerns. The literature review is completed with a policy analysis specifically focusing on policies dealing with the spatial implications of remote work, policies suggesting a place-based approach for new frameworks linked with regional development, and examples of existing strategies that incorporate remote work in development approaches for rural and remote areas.

Following the literature review and policy analysis, a qualitative analysis is performed by conducting interviews with local key actors for eight selected case studies. The findings from the literature review were incorporated into the design of the interviews in order to provide a more in-depth understanding of the local changes due

to RW and their spatial implications. The interviewees were selected to be experts for each case study, such as researchers, regional authorities' representatives, urban planners, and real estate experts in these regions. A correlation matrix was used to quantitatively synthesize each case study's results. Finally, a cross-case comparative analysis was performed, enabling the identification of variations in the cause-effect patterns of remote work across Europe and beyond. Based on the comprehensive analysis above, the report highlights the current situation as well as the trends in the spatial impact of RW.

Work Plan and Time Frame

			Title	**Mapping, understanding, assessing and predicting the effects of remote working arrangements in urban and rural areas**		
			Acronym	**R-Map**		
			Start date	12-Feb-2024		
WP	**Task**	**Task Leader**	**Action No**	**WHAT**	**WHO**	**DUE TO**
1	1.2.	AUTh	1	Complete Literature Review	AUTh	M5
			2.1	Network of potential participants in the interviews	AUTh, UT, SURREY, Q-PLAN, RWW	M2
			2.2	Draft Guide & Questionnaire for interviews	AUTh	M3
			2.3	Getting feedback from partners	UT, SURREY, Q-PLAN, RWW	M3
			2.4	Final Version of Questionnaire	AUTh	M4
			2.5	Implementation of interviews	AUTh, UT, SURREY, Q-PLAN, RWW	M5
			3	Correlation matrix & Cross-case analysis	AUTh	M5
			4.1	Daft of D1.2 Report	AUTh	M6
			4.2	Internal review	Partners	M6
			4.3	Final Version of D1.2 Report	AUTh	M7

Table 2: Task 1.2 - Action List

Additionally, D1.2 contributes to Task 1.5 (led by RIM), as the literature review findings provide a basis for formulating the questionnaire for the large-scale survey regarding the spatial aspects.

Remark Regarding T1.5. Targeted Sample in Large-Scale Survey - Inconsistency Within the R-MAP Proposal

In WP1 Task 1.5, we have identified an inconsistency within the R-MAP proposal. While the WP description on page 8 (or 78 in the grant agreement) specifies our commitment to engage at least 20,000 participants in the large-scale survey, page 36 mentions 30.000 participants. Our primary aim is to ensure that we target at least 20.000 participants within the allocated budget, taking into account fair payment practices. Throughout the writing process, the work description remained central, and it appears that the table on page 36 may not have been updated in the final stage. However, all calculations and plans are based on engaging at least 20.000 participants as described in the WP description on page 8 (or 78 in the grant agreement).

2. Methodology

To examine the potential spatial effects of RW, the exploration was structured around four research goals centered on the comprehensive understanding of the spatial effects of RW in Europe and beyond. The first goal is to investigate the multifaceted changes in urban and rural landscapes with an emphasis on urban development patterns, infrastructure, mobility, and the environment. The second goal is to identify the causes and driving factors behind the spatial transformations, with an emphasis on policies and initiatives that promote a place-based approach and have contributed to the emergence of the various RW spatialities. The third goal is to understand the local context and manifestation of RW's spatial effects by examining and comparing specific case studies that correspond to different cities. This involves analyzing critical information through interviews with local key actors. Finally, the research aims to provide a contextual understanding of the identified changes by compiling and synthesizing information drawn from interviews, thereby facilitating a comparative comprehensive overview of the RW spatial effects variations across the EU.

The research approach was based on **five key themes** derived from the research objectives and respective research questions:

- **Urban Development trends:** Understand the various changes in urban development patterns due to RW arrangements. Emphasis is placed on the emerging forms of RW spatialities, such as New Working Spaces (NWS) and multilocality. The focus is also on how these spatialities influence the development patterns in city centres, CBDs, suburban and peri-urban areas, as well as small and medium-sized cities.
- **Housing and Office Demand:** Identify changes in the housing preferences and office demand and record potential urban transformations and spatial reconfiguration of cities. This includes exploring decentralization and suburbanization phenomena, as well as gentrification and urban regeneration potentials.
- **Urban-Rural divide:** Explore how the new spatialities of work can accentuate or alleviate, bridge or polarize the disparities between urban (cities and towns) and rural (countryside and villages) areas. Emphasis is placed on the spatial inequalities of the divide and the potential transformation of rural areas.
- **Mobility Patterns and Transport Infrastructure:** Understand how the rise of RW has altered mobility patterns. This encompasses considerations related to changes in residential preferences, commuting patterns, mobility choices, functionality and efficiency of the transit systems, and the respective stress on the transport infrastructure.
- **Energy Consumption and Environment:** Explore the positive and negative effects of the new working arrangements on energy consumption and carbon emissions. This involves a twofold understanding of how changes in mobility patterns and the variation of energy consumption at home and work affect energy balance and environmental quality.

The research is grounded in literature reviews and interviews. A mixed-methods approach was used to interpret the interview results and identify policy measures, innovations, initiatives, and trends that have

influenced remote working phenomena and their spatial effects. The following diagram provides an overview of the methodology and methods employed in this research.

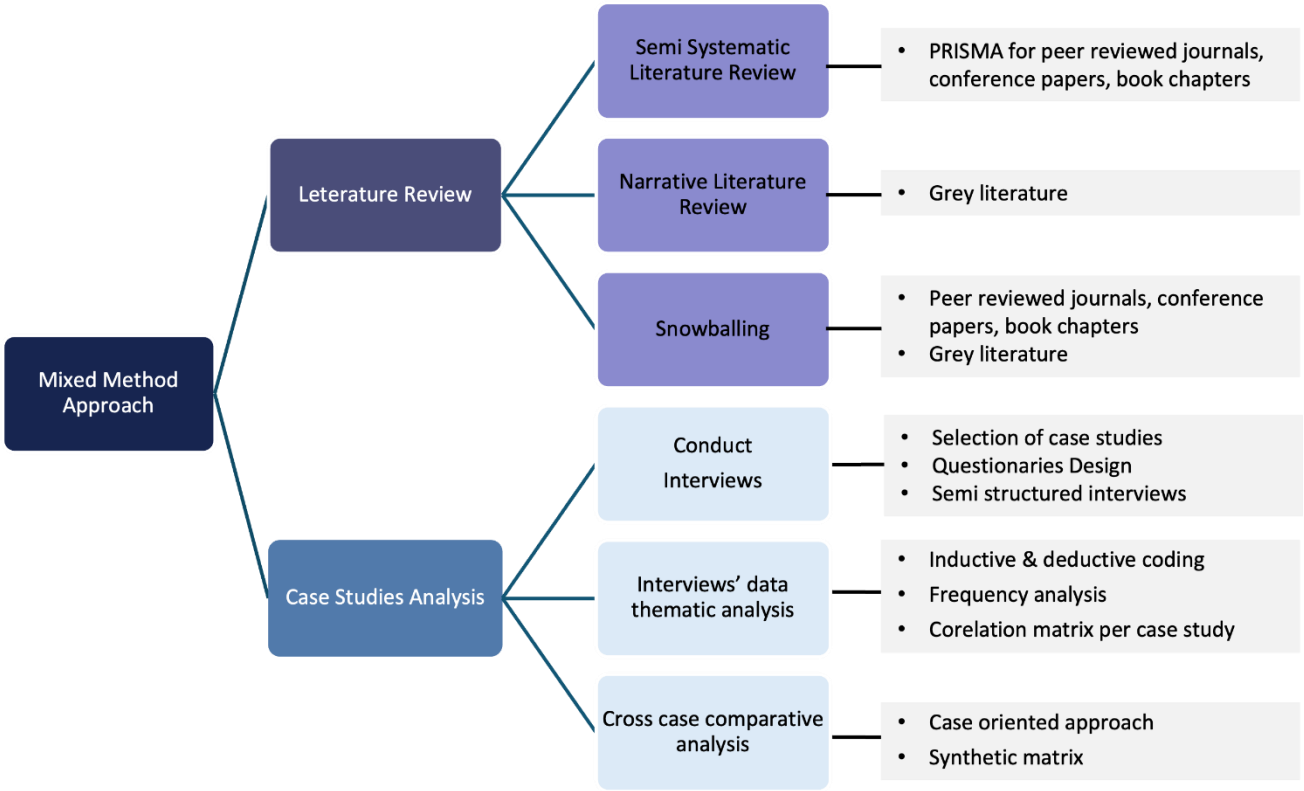


Figure 1: Task 1.2 Methodology Overview

2.1 Literature review

A comprehensive literature review was performed to thoroughly and systematically examine the existing research regarding the spatial implications of remote work. Two approaches were used: a systematic literature review and a narrative review, complemented by snowballing. The systematic literature review provided a structured analysis of the relevant peer-reviewed studies, ensuring an objective assessment of the existing research. Concurrently, a narrative review was employed to explore a broader range of themes and grey literature, including theoretical frameworks and contextual discussions on spatial planning, thus allowing for a more nuanced interpretation of the findings. To comprehensively understand the spatial implications of remote work, the two approaches were integrated to interpret the results and to synthesize the findings. Different data collection methods were utilized to triangulate the findings, ensuring the reliability of the research outcomes.

The following table (Table 3) summarizes the methods and types of sources used in the literature review.

Methods	Sources	
	Peer-reviewed literature	Grey literature
Systematic Literature Review	x	
Narrative Literature Review	x	x
Snowballing	x	x

Table 3: Overview of the methods and document types used in the literature review

2.1.1 Systematic Literature Review

To identify the spatial implication of RW arrangements, a semi-systematic literature review was conducted based on PRISMA (Preferred Reporting Items for Systematic Reviews) (Page et al., 2021). The study was conducted in March – April 2024. Scopus and Web of Science's electronic databases were used to retrieve a comprehensive body of literature. The initial search was refined by the elimination criteria presented in (Table 4). These criteria help to ensure that only relevant studies meeting specific methodological standards are included in the review, thereby enhancing the quality and validity of the findings. The database searching process was restricted to peer-reviewed literature written in the English language, which is acknowledged that it might exclude important publications in other languages. Search included only peer-reviewed articles in academic journals, peer-reviewed conference papers, and book chapters. Books, theses, grey literature, and meeting abstracts were excluded. In terms of publication year, no date restrictions were applied.

	Inclusion Criteria	Exclusion Criteria
Publication Type	Peer-reviewed journal articles, conference papers, book chapters.	Non-peer-reviewed sources i.e. meeting notes, dissertations, conference review, books
Language	English language	Not English
Consistency	Open-access abstract and full-text	Unavailable abstract or full-text access
Relevance	Studies related to Land Use, Infrastructure requirements, Mobility patterns and Transport Infrastructure, Housing Market, Environmental Stability, Workplace Unitization	Studies irrelevant to spatial implications i.e. social, economic, well being, health

Table 4: Inclusion and exclusion criteria for the systematic literature review

Based on the research objectives and the key strands of the current research, three sets of keywords were used for the document fields: title, abstract, and keywords. Initially, the search was conducted using the first two sets of keywords, including terminology related to the types of RW and major spatial attributes. The spatial attributes include development patterns (compact, sprawled), typologies (urban, rural), implications (arrangements, urbanization), properties (resilience, sustainability), and management (development, planning, legislation). With no additional exclusion criteria applied at this stage, the search yielded 378 records. Then, a 3rd set of keywords related to the place of RW was applied. Including this set of keywords

reduced the number of documents to 42. The duplicated records were removed, leading to a final set of 39 relevant records.

Type of RW	"remote work*" OR "virtual work*" OR "work* from home" OR "hybrid work*" OR "flexible work*" OR "distributed teams" OR "telecommuting" OR "telework*" OR "remote-work*" OR "remote employment" OR "remote job" OR "distributed work*" OR "digital nomad*"
	AND
Spatial	"spatial legislation" OR "spatial implication*" OR "urban sprawl" OR "compact cit*" OR "spatial arrangement*" OR "spatial resilience" OR "rural development" OR "spatial impact*" OR "urban planning" OR "suburban development" OR "urban development" OR "city planning" OR "urban design" OR "geospatial analysis" OR "urbanization" OR "spatial analysis" OR "spatial model*" OR "urban spatial patterns" OR "regional disparities" OR "spatial data" OR "territorial"
	AND
Place of RW	"home office" OR "new work* space*" OR "cowork*" OR "co-work*" OR "co work*" OR "third place"

Table 5: The applied three sets of keywords' strings

Next, manual screening was applied, and the documents were assessed based on the predefined inclusion and exclusion criteria. Documents were excluded when the criteria were not met or when the abstract was not fully related to the scope of our research. After this screening process was completed, 11 documents were excluded, and the total number of documents was reduced to 28. Finally, the full text was retrieved and assessed for documents deemed potentially relevant based on the title and abstract screening to determine their final eligibility.

In addition to the systematic literature review, the **snowballing** method was used to enrich the pool of documents. Based on the set of 28 documents retrieved from the systematic literature review (see Annex 11.1), the reference list of these documents was examined to find additional relevant studies. A detailed check of the academic literature was conducted to trace significant academic publications backward and uncover earlier research that critically contributed to the research topic. Since few systematic reviews exist for remote working and its spatial implications, snowballing proved useful for retrieving relevant documents. Therefore, the final pool of documents was composed of 44 records.

Nearly 80% of the pool of documents were empirical studies, while only six were theoretical. With regard to the geographical distribution of these documents, the largest proportion was found to originate from European countries, accounting for 60% of the total. Oceania was the second most represented continent, with a notable 20% of the studies. North America also had a significant presence (around 10%), particularly in the northern states and Canada, followed by Asia and South America, with relatively fewer studies (less than 5%).

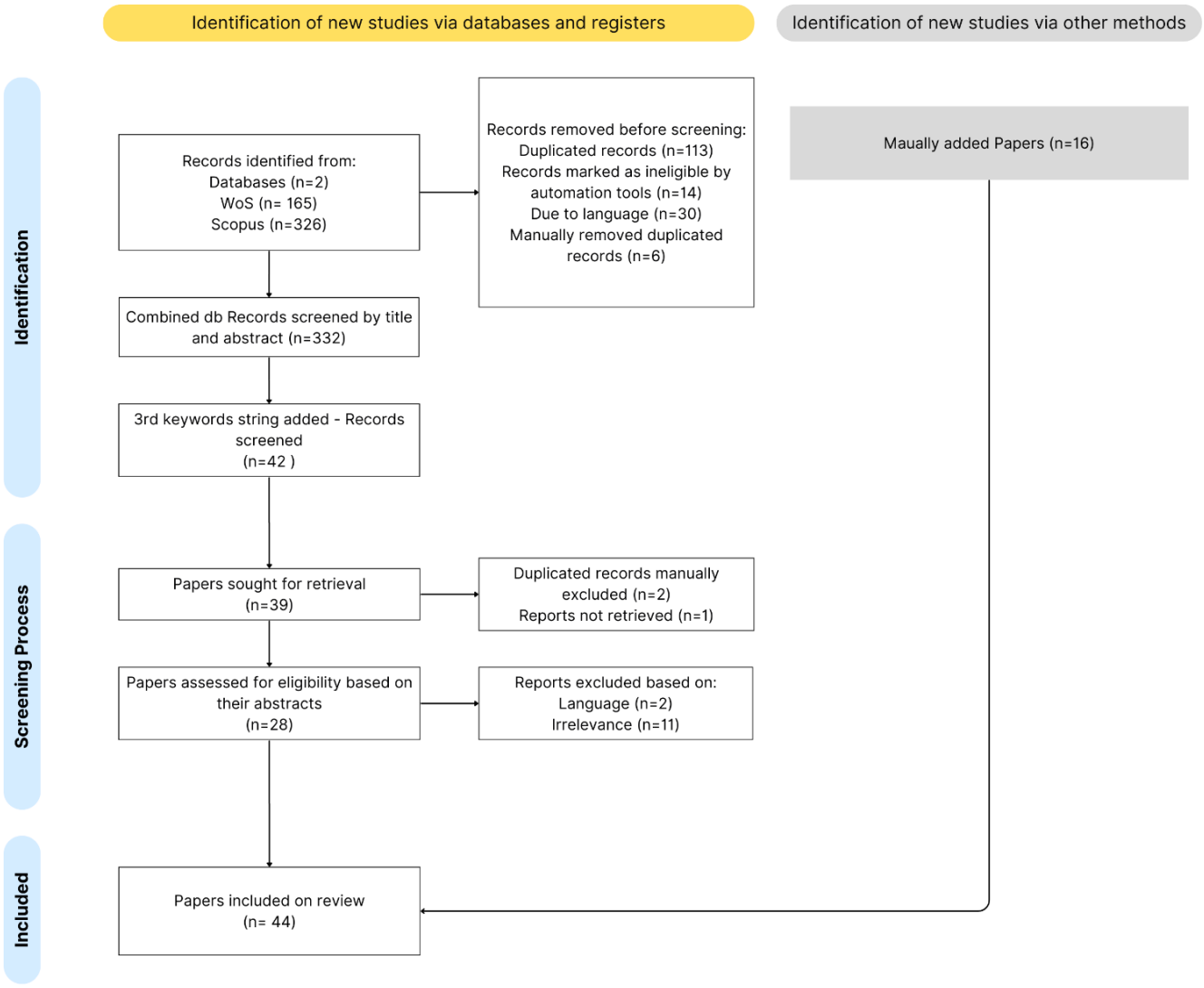


Figure 2: PRISMA chart flow showing the selection process

2.1.2 Narrative Literature Review

A narrative literature review was used complementary to the above and for the grey literature. It is a comprehensive and interpretive analysis of existing literature, not adhering to predetermined protocols and inclusion/exclusion criteria (Ferrari, 2015; Basheer, 2022). This approach was selected to provide the framework and offer a more nuanced understanding of the research objectives and questions. It also allowed the exploration of various perspectives, theories, and debates in spatial planning in relation to remote work while aiding the interpretation of the systematic review results.

Grey literature - institutional reports, policy documents, policy briefs, research findings, and other non-peer-reviewed sources - was incorporated to ensure a comprehensive understanding of the subject. This grey literature was identified through online libraries and databases, including, but not limited to, the OECD iLibrary, the Research Repository of the International Labour Organization (ILO), the European Foundation for

the Improvement of Living and Working Conditions (Eurofound) library, the European Commission, the Joint Research Centre (JRC) Publications Repository, and the World Bank Open Knowledge Repository (OKR).

For the grey literature, the review included a "mapping" of policy documents (i.e., EU, UN, Eurofound), organizations' reports (i.e., OECD, ILO, Nordregio), and territorial policy documents to gain a broad understanding of the current situation regarding the implications of remote work. Then, the research focused on literature dealing with the spatial implications of remote work, policies suggesting a place-based approach for new frameworks linked with regional development, and examples of existing strategies that incorporate remote work in development approaches for rural and remote areas. Snowballing was also used, scanning the reference lists for complementary material.

2.2 Case studies

2.2.1 Methodological considerations for case studies' selection

The selection of case studies was based on the regional typologies defined by the European Union. Specifically, the no1/2011 Regional Policy (Dijkstra and Poelman, 2011), which outlines six regional typologies used in the 5th Cohesion Report, served as a partial guideline. This typology was later supplemented by Eurostat's edition, namely the "Methodological manual on territorial typologies" complied by Eurostat (Eurostat, 2018). The common criteria for standardizing these reports' regional typologies enable consistent comparisons across regions. Therefore, by using standardized categories, it was possible to assess, compare, and interpret the results accurately.

The regional typologies considered in this study at the NUTS 3 geographical level include four territorial typologies: urban-rural, metropolitan, coastal, and mountainous regions. The following is a short explanation regarding the criteria used for the composition of each category.

- The urban-rural typology is a classification based on the following three categories (Eurostat, 2018):
    - predominantly urban regions, NUTS level 3 regions where at least 80% of the population live in urban clusters. Urban cluster is defined by a population density of at least 300 inhabitants per km² and a minimum population of at least 5.000 inhabitants;
    - intermediate regions, NUTS level 3 regions where more than 50% but less than 80% of the population live in urban clusters;
    - predominantly rural regions, NUTS level 3 regions where at least 50% of the population live in rural grid cells. Rural grid cells are defined by population density that is (usually) less than 300 inhabitants per km² and/or fewer than 5.000 inhabitants.
- The metropolitan typology is a classification based on the following two categories (Eurostat, 2018):
    - metropolitan regions, a single NUTS level 3 region or an aggregation of NUTS level 3 regions in which 50% or more of the population live in a functional urban area (FUA) that is composed of at least 250.000 inhabitants;
    - non-metropolitan regions, NUTS level 3 regions that are not metropolitan regions.
- The basic coastal typology is a classification based on the following two categories:

- coastal regions (that can also be classified according to the sea basin in which they are located);
- non-coastal regions (those regions that are not defined as coastal regions).

- The mountain typology is a classification based on the following two categories (Eurostat, 2018):
  - mountain regions that may be divided into three different categories, defined at NUTS level 3 regions;
    - where more than 50% of the surface is covered by topographic mountain areas;
    - in which more than 50% of the regional population lives in topographic mountain areas;
    - where more than 50% of the surface is covered by topographic mountain areas and where more than 50% of the regional population lives in these mountain areas.
  - non-mountain regions (those regions that are not defined as mountain regions).

Based on the above, the responses received to the interview participation invitations, and the willingness of individuals and organizations to participate, 7 European case studies were selected in Austria, Greece, Italy, Portugal, Spain, Sweden, and The Netherlands. In order to obtain a representative understanding of urban contexts beyond those in Europe, a single case study was selected from the United States. The case studies represented predominantly urban and intermediate regions, metropolitan and coastal areas, with some also being mountainous.

2.2.2 Interviews' Design

The findings from the literature review were complemented by 21 in-depth semi-structured interviews conducted to capture the perspectives of local key actors. Focusing precisely on the spatial effects of diverse remote work spatialities across the EU and beyond, the interviews were designed to tackle RW's local manifestation within the five key themes elaborated in this research.

The interviewees were individuals with expertise on various spatial aspects of RW and included urban planners, regional authorities' representatives, real estate experts, researchers, and experts on coworking spaces. Each interview lasted approximately 60 minutes and was held online over seven weeks (early June to mid-July 2024). For each case study, 2 to 3 interviews were conducted. The interviews were carried out by Aristotle University of Thessaloniki, with contributions from the University of Twente, the University of Surrey, and Q-Plan. The interviews were audio-recorded and transcribed.

The questionnaire was developed based on an extensive literature review and policy document analysis. The questions were drawn from the five key themes elaborated in this research, namely, urban development trends, urban-rural divide, house and office demand, mobility and transport infrastructure, and energy and environment. Furthermore, to address the diverse skills and specialization of the interviewees, four kinds of questionaries were developed, with 15 to 19 open-ended questions included. The questionnaires were developed by the Aristotle University of Thessaloniki and reviewed by consortium partners for recommendations and quality assurance. The questionnaires obtained ethics approval from Aristotle University and can be found in the Appendix (see 11.2).

2.2.3 Interviews' Data Thematic Analysis

A qualitative data analysis was performed to provide more systematic documentation and analysis of the material acquired from the interviews. The ATLAS.ti software tool (https://atlasti.com/) was used to facilitate the analysis. With the help of the specific software, an array of keywords or else "codes" were used to classify the data on a predefined framework or theoretical concept, performing a "deductive coding" process. The codes were provided and manually added by the user.

In the current research, the codes were derived from the extended literature review and policy document analysis, as well as the interview material. The codes were organized based on the five key themes strands: urban development trends, urban-rural divide, home and office demand, mobility and transport, energy and environment. Then, this structured pool of codes was enriched by applying an "inductive coding" technique. This technique identifies patterns, themes, or concepts that emerge directly from the data gathered rather than being imposed by pre-existing theories or frameworks (as in inductive coding). With the completion of the inductive coding, the final "codebook" was formulated, including a total of 29 codes (Table 6).

The Codebook	
Key Themes	**Codes**
Spatialities of RW	Coworking Space
	Home-Office
	Third Place
	Digital Nomads
	Hybrid
Urban development	Urban Area
	Suburban Area
	Rural Area
	Movement to the City Centre
	Movement to Periphery
	Land Use Pattern
	Urban Form
	Gentrification
Multilocality	Multilocality
	Second Homes
Urban-Rural Divide	Urban-Rural Divide
Mobility Patterns	Mobility Patterns
	Modes of Transport
Housing & Office Demand	Housing
	Housing Prices
	Office Demand
	Office Re-use
Energy Consumption & Environment	Energy/Environment

Infrastructure	Utilities Infrastructure
	Digital Infrastructure
Planning & Policy	Regeneration
	Other Policies
	Transport Planning
	Urban Planning

Table 6: The structure of Codebook (key themes and codes) for interviews' thematic analysis

The systematic documentation of the interview material through deductive and inductive coding enabled the application of a structured approach, ensuring that the analysis stayed focused on specific themes and facilitating the comparison of findings across case studies. Furthermore, it helped validate and refine the five key theme strands of this research based on empirical evidence. It allowed the exploration of the interview data without any preconceived notions, discovering new insights.

2.2.4 Correlation Matrices

The coding process described above allowed the quantitative thematic analysis of the interview material. Quantitative analysis is being reported as an efficient way to recognize patterns across data and identify links between terms (Braun and Clarke, 2012). For the quantitative analysis, the interview material was systematically documented through coding (see 2.2.3). Coding was based on the relative codebook and its 29 codes (i.e. multilocality, mobility patterns, rural areas). The statistical data analysis comprised two distinct parts. First, descriptive statistics were used to perform frequency analyses on the set of the 29 codes. At this point, the datasets were cleaned to eliminate errors, such as pseudo-correlation between codes. Then, a correlation matrix was developed, one per case study, to associate the co-occurrence of the 29 codes and their "statistical" weight. The method used to calculate the correlation coefficient is referred to as the c-coefficient for code co-occurrence (see Atlas.ti). This coefficient ranges from 0 to 1, where 0 indicates that the codes do not co-occur at all, and 1 means they always co-occur. The statistical analysis was performed per case study, producing distinct correlation matrices.

2.3 Cross-case Comparative Analysis

The systematic comparison of the 8 case studies was conducted with a cross-case analysis within a case-oriented approach. Case oriented approach is a research strategy used in qualitative research focussing on complex phenomena by examining individual case studies. This method prioritizes the uniqueness and context of each case, acknowledging that different case studies may not be directly comparable due to their unique circumstances. Therefore, the objective here is to identify patterns, similarities, and differences across multiple spatial contexts.

A cross-case comparative analysis was performed following the qualitative and quantitative analysis of the interview material and the correlation matrices for each case study. The analysis was articulated around the 29 codes identified earlier in the process (see 2.2.3). Each code represents a distinct spatial implication (i.e., gentrification, urban sprawl, multilocality, decreased office demand, etc.) that could be attributed to the new RW arrangements. To illustrate the results clearly, the codes were color-coded based on their relation to RW,

namely, if they are or are not induced by RW. Consequently, blue indicates spatial implications that are induced by RW, while red indicates spatial implications that cannot entirely be attributed to RW. This color-coded information was organized in a matrix presenting the spatial implications for the case studies.

3. The Spatialities of Remote Working Arrangements

Major cities are experiencing the rise of alternative workplace models, such as coworking spaces, working hubs, office clubs, cafes, libraries, community centres, and recreational venues, as part of a wider transition towards flexible working arrangements (Yu et al., 2019). Unlike traditional office settings where work is confined to a single location, remote work allows for a diverse range of environments. This highlights the flexibility and fluidity of workspaces, enabled by technological advancements, digital technologies, and changes in work culture, which enable work to be conducted outside of the conventional office spaces. Nevertheless, the proliferation of these new working spaces is not only reshaping the physical layout of urban and rural areas but also influencing commuting patterns, economic activities, and social interactions. This section explores the emerging new working spatialities through the concepts of new working spaces and multilocality, highlighting their implication on the urban and rural landscape.

3.1 Definitions

At this point, it would be useful to clarify the use of the terms remote work, telework, and hybrid work. The term "Remote work" usually refers to various types of working modes. Based on the extensive literature review conducted in Task 1.1 (see Deliverable 1.1, Section 3.1: p.25) *"…. terms such as remote work, telework or hybrid work are used interchangeably based on the preferred or more dominant terminology of each source or clusters of sources, as well as contextual appropriateness. For instance, policy documents frequently use the term 'telework,' while academic research often employs terms such as 'remote work' or 'hybrid work'"*. Therefore, for the purposes of this report, the term "remote work" is adopted when discussing the various configurations of remote, hybrid, telework, or other such configurations collectively.

The term "spatialities" of remote work refers to the diverse range of physical and virtual locations where work can be conducted outside of the traditional setting of an office space. Besides the different types of workspaces, spatialities also refer to the associated movement/commuting patterns and workers' distribution. The various types of spatialities are defined by the location and nature of the working environment. The typology introduced here is based on the work of (Yu et al., 2019), which focuses on the historical evolution of flexible working models and their impact on the urban environment, economy, and planning. The typology includes the following six categories:

1. **Home offices** are specifically dedicated spaces within an individual's residence designed for work activities (Hölzel and de Vries, 2021).
2. **Coworking Spaces (CSs)** are shared office environments where individuals from different companies or freelancers rent desks or offices at the same location and work on their own projects or tasks. Within the coworking space, workers can network, socialize or cooperate with their "space mates" (Hölzel and de Vries, 2021).
3. **Third Places** constitute informal public gathering places outside of the home and workplace, such as cafes, libraries, community centers, shopping centers, gyms, and outdoor recreational venues (Li et al., 2024).

4. **On-Demand Workspaces** are notably flexible workplaces that can be reserved as needed, i.e. hourly/daily/monthly/yearly. They cater to individuals who need a workspace infrequently or teams working on a particular project. Renting prices may vary based on the fluctuation of demand.
5. **Digital Working Hubs** are high-tech, collaborative workspaces optimized for telework, providing advanced telecommunication technologies. They are often accompanied by traditional office facilities like meeting rooms, event spaces, kitchens, and cafes.
6. **Office Clubs** are shared office spaces and facilities typically located in suburban areas. They could cater to the needs of employees living nearby or business associates working together. Office space is shared by numerous collaborating organizations.

The identification of the different types of new workplaces presented above portrays that there are blurring boundaries between digital or physical, permanent or temporary, flexible or firm, formal or informal, monofunctional or multifunctional, and "on-demand" or fixed spaces for work. The literature review regarding the spatial implications of RW suggests that the generic term "**new working spaces"** has been widely used to describe the different socio-spatial and functional implications of remote work arrangements (Akhavan et al., 2021; Biagetti et al., 2024; Korelina and Zheleznyak, 2019; Li et al., 2024; Yu et al., 2019; Zenkteler et al., 2022a). Hence, for the purposes of this research, we assume that all the above-mentioned spatial typologies are specialized counterparts of New Working Spaces (NWSs).

3.2 Emerging types of Spatialities

The profound changes in work patterns, technological advancements, and societal preferences contributed to the emergence of **new working spaces** and **multilocality** concepts**,** as significant factors in reshaping the urban and rural landscape. The rise of NWSs as key workspaces offering flexible locations and services has provided a dynamic alternative to traditional office settings. This trend reflects the shift towards more fluid and adaptable work arrangements catering to a diverse range of professionals. Multilocality, the practice of individuals or businesses operating across multiple locations, complements this evolution by enabling a more geographically dispersed and flexible workforce. These two interrelated forms of spatialities have multifaceted implications on urban development, land use patterns, real estate, mobility patterns, social interactions, and community dynamics. This section of the literature review focuses on understanding these dynamics and the potential benefits and challenges associated with these emerging forms of spatialities for urban development and spatial patterns.

3.2.1 New Working Spaces (NWSs)

3.2.1.1 The rise of New Working Spaces

The global proliferation of New Working Spaces (NWSs) signifies a paradigm shift in the landscape of workspace, driven by the rise of digital nomads and flexible working arrangements (Pajević, 2021). Over the last 3 decades, the prevalence of labor market flexibility, which has been greatly accelerated by the pandemic, enabled people to avoid daily commutes to work, thus being able to go to the office two/three days a week (hybrid working) (Florida et al., 2023; Glaeser, 2022). As this is becoming the "new normal" it is expected that

there will be an increasing demand for collaborative spaces, including coworking spaces and satellite offices to promote ”near working”, aka working close to home (Flipo et al., 2022; Krasilnikova and Levin-Keitel, 2022; Mariotti et al., 2023). This “spatial hybridity” of workspace challenges the existing functional structure of cities and has profound implications for urban planning.

Flexible working arrangements are not something new. Initiated by the digital elites of Silicon Valley, coworking spaces have been promoted as a profitable business model and office real estate strategy (Gandini, 2015). Since then, companies have increasingly looked to coworking providers like WeWork and Spaces to reimagine their office layouts and attract digital talent. Currently, CSs are emerging as key workspaces for SMEs, freelancers, digital nomadism, etc., and have become a symbol of innovation, social entrepreneurship, and the so-called “collaborative economy” (Akhavan et al., 2019; Flipo et al., 2022; Zhao et al., 2020). In some cases, CSs are a bottom-up response to the local labor market crisis, providing alternative working spaces to economically constrained occupiers (Fiorentino and Livingstone, 2021).

At the same time, coworking spaces have been used as a cost-saving strategy, where companies piece off segments of their office space and sublet these segments as temporary workplaces to start-ups (Pajević, 2021). Merkel (2017) notes that CSs are used as a coping strategy to share resources like space, materials, and networks and as an antidote to isolation. Hence, the proliferation of NWSs is often viewed as a measure of “austerity urbanism” and a valuable supplement to corporate real estate management, providing greater agility and flexibility for large corporate organizations and achieving higher density and utilization rates (Garrett et al., 2017). For instance, in the case of the “hub and spoke” working model, companies retain one central office per city and several local branches in coworking spaces (Sargent et al., 2018). This working model is aiming at reducing the meters per person in prime spaces and cutting real estate costs by 20-40% (Fiorentino and Livingstone, 2021). For smaller businesses, the reduction in costs could be more substantial considering the possibilities of offering flexible locations and services to employees without additional costs spread over multiple locations (Sargent et al., 2018).

There are several types of coworking spaces (layouts, leases, etc.) with a variety of memberships. According to Garrett et al. (2017), coworking spaces should offer a combination of open physical space, beneficial features such as community, flexibility, and social connection, as well as efficient workplace attributes that include shared wi-fi, IT security, and consistently available space. This blend of features is believed to enhance opportunities for business collaboration and innovation (Garrett et al., 2017).

Currently, NWSs are emerging as key workspaces for SMEs and start-ups, as well as a model work for self-employed and freelance workers (Merkel, 2017). They are predominantly perceived as flexible workplaces that allow for resource sharing, promoting a collaborative atmosphere and professional interaction that could stimulate knowledge transfers (Akhavan et al., 2019; Alizadeh, 2012; Zhao et al., 2020). During the COVID-19 pandemic, they served as a remedy for social isolation, providing opportunities to share basic resources and “working alone together” (Richardson, 2017; Ross and Ressia, 2015; Spinuzzi, 2012).

3.2.1.2 The Status Quo of New Working Spaces in European Countries

Hölzel et al. (2023) report that there has been a notable shift in office space demand during the COVID-19 pandemic across several European countries. This trend, ignited by the need for social distancing and the rise of remote work, has become the new normal. In Poland and Slovakia, the market demand for office space presented a shift towards short-term leases and NWSs. This enabled the companies to maintain their flexibility, aiming for short-term leases and preferring less centralized office locations closer to residential areas. Specifically, in Poland, the demand for CSs has surpassed that for traditional office spaces, reflecting a broader trend toward decentralized working environments. Slovakia, on the other hand, provided ready-to-work, furnished desks. Similarly, in Italy, as the pandemic faded, companies adopted a decentralized approach and reduced the need for traditional office spaces, with coworking spaces closer to residences, providing an alternative for occasional in-person meetings (Hölzel et al., 2023). As Pajević (2021) indicates the proliferation of CSs and the growth of CSs providers in cities across the globe are a manifestation of the changes in existing organizational and managerial structure and the fact that work activities are taking place across professional and domestic spaces (Pajević, 2021; Shearmur et al., 2022). In other words, work "sprawls" beyond the physical boundaries of the office or designated/fixed workplace (Pajević and Shearmur, 2021).

As mentioned earlier, NWSs can have several forms, including libraries, community centres, extraordinary spots like radio stations, art galleries, etc., for an impressive work experience (Hölzel et al., 2023). Discussing the effects of NWSs across Europe, Hölzel et al. (2023) provide valuable information for major European cities regarding the trends, types, and policies for NWSs:

- In Estonia, the government has been proactive, and since 2018, there has been a systematic effort to create CS to offer remote workplaces and public services. NWSs manifest in the form of libraries, community centers, and unique spots like igloos and art galleries.
- In France, there was a substantial demand for NWSs even before the pandemic, a trend that continues until today (Flipo et al., 2022). Freelancers and self-employed workers prefer NWSs due to flexible leases. Combining NWSs with other uses helps mitigate investment risks for coworking space owners in low-demand areas. The establishment of these spaces has been significantly supported by local and national authorities, accompanied by a mounting interest from rural communities (Flipo et al., 2022).
- In Norway, coworking spaces reopened after a temporary closure from March to May 2020. As a lot of activities became virtual or hybrid, there was a substantial increase in the number of coworking spaces. Libraries are popular locations for remote work or study, and many coworking spaces offer additional services as part of the neighborhood. In 2023, 45% of Norwegian coworking spaces were located in small and rural towns.
- In Germany, there has been a continuous growth in CSs, with only a slight decrease due to the pandemic. Critical was the support through governmental programs that helped sustain coworking spaces during periods of reduced use, providing an alternative to commute to the company's office space, especially during lockdowns.
- In the Netherlands, remote work was quite a common practice before the pandemic, but using CSs was not something that was emended in everyday working routine. The pandemic affected revenues from

events and meetings hosted in coworking spaces, but people's choice to move to less dense areas presented new opportunities for CSs to flourish.

- In Poland, the pandemic significantly impacted CSs, leading to declining events and losing memberships. However, CSs outside the capital were less affected by the pandemic. It is worth noting that there's a trend towards corporate-run coworking spaces instead of bottom-up founded and operated CSs.
- In Slovakia, CSs in main cities faced challenges due to contact restrictions, where physical events dropped sharply. On the contrary, remote regions and non-metropolitan areas saw opposite trends. Various support schemes helped businesses to establish and operate CSs. It is also interesting to mention that international operators are opening new CSs in both the capital and remote areas.
- Türkiye is a unique case due to the influx of Ukrainian refugees that has boosted CSs' growth in major cities and remote tourist regions. A wide variety of services are offered (like virtual offices with a postal address, cargo and phone receiving, etc.), while companies book desks in coworking spaces to cut office maintenance costs.
- In Hungary, coworking spaces appeared in Budapest around 2009; since then, they have spread to other regions. With no government support and in an effort to preserve adequate revenues, CSs continue to spread over the periphery. In remote areas, these spaces were used for quarantine and remote teaching.
- In Italy, large CSs were more resilient due to leasing with companies during the pandemic. In remote regions, CSs remained stable, but several others shut down. The number of CSs' customers continues to rise, and the provision of services other than the typical services that facilitate work-life balance could be beneficial.
- In Malta, coworking spaces have been used mainly by freelancers and self-employed since 2014. In the future, it is expected that a hybridity in working spaces will become even more popular, with CSs offering a solution to the social isolation experienced while working from home.
- In did not operate during the first COVID-19 lockdown, leading to a loss of revenue. However, rural CSs have increased their number of customers due to high-speed internet facilities. The stress caused by the overlapping of personal and professional life at home increased the demand for nearby neighborhood coworking spaces (Tomaz et al., 2023).

Overall, it seems that many European countries, such as Norway and Germany, experienced significant growth in coworking spaces, particularly after the pandemic. The growth was supported by a shift towards virtual and hybrid work models. Similarly, France and Estonia experienced sustained or increased demand for NWSs. At the same time, there is a notable shift towards rural and small-town coworking spaces, as seen in Norway, Portugal, and Poland, due to the preference for less dense living areas and the availability of high-speed internet. To this end, resilience in rural remote areas is a key theme, as demonstrated in Slovakia and Portugal, where non-metropolitan coworking spaces flourished during the pandemic while urban areas faced greater challenges.

As hybrid working models become more common, integrating coworking spaces with other services, as seen in France and Italy, offers a blended work and lifestyle environment. Many coworking spaces are also diversifying their services to attract users, with Türkiye offering virtual offices and Italy and Hungary focusing

on services to promote work-life balance. In terms of types of coworking spaces, Estonia and Norway established coworking hubs within public spaces like libraries and community centers, allowing for remote work alongside other community functions. Estonia also utilizes unconventional and unique locations for coworking spaces. Meanwhile, Malta and France cater primarily to freelancers and self-employed individuals who value the flexibility and affordability of coworking spaces. There is also a growing trend towards corporate-run coworking spaces, particularly in Poland and Türkiye, where these are replacing traditional bottom-up founded spaces.

Policy-wise, Estonia and Germany have enacted proactive governmental support for the establishment and function of coworking spaces, especially during the pandemic. Slovakia has similarly benefited from support schemes that have helped establish coworking spaces in urban and remote areas, with some international operators opening new locations. In contrast, Hungary lacks direct government support, leading to a more organic spread of coworking spaces, especially in peripheral regions. In France, strategies to mitigate investment risks have been implemented, where combining coworking spaces with other uses helps owners sustain their investments, particularly in low-demand areas. Lastly, in Türkiye, the influx of Ukrainian refugees has driven the growth of coworking spaces, showing how societal changes can influence the development of NWSs across the country.

3.2.1.3 Positioning NWSs in the Urban and Rural Context

Research on NWSs often focuses on aspects such as collaboration, co-creation, community, and the ways work is conducted in such spaces. Few studies emphasize the physical space itself, including interior design and health considerations (Alhusban et al., 2022; Alizadeh, 2009) while others explore business models and trends (Alizadeh, 2009; Irlacher and Koch, 2021) as well as real estate considerations. There is relatively limited research regarding the location and distribution of NWSs and their interaction with their immediate surroundings. Additionally, there is a lack of studies on how these spaces might contribute to the vitality and versatility of adjacent areas, towns or villages (Hölzel et al., 2023). Few studies focus on NWSs' locational attributes, particularly within urban contexts (Di Marino et al., 2018; Hölzel and de Vries, 2021; Krasilnikova and Levin-Keitel, 2022; Li et al., 2024; Zenkteler et al., 2022a) and real estate factors (Pajević, 2021). Meanwhile, only a few recent publications explore coworking spaces in rural environments and their potential as a regenerative factor (Akhavan et al., 2021; Greinke and Lange, 2022; Hölzel and de Vries, 2023).

Literature suggests that developing coworking spaces and other flexible work environments in both central and peripheral areas could help **balance economic activity**, providing alternatives to traditional office settings and stimulating local economies. As Di Marino et al. (2023) and Pozoukidou and Chatziyiannaki (2021) point out that individuals who relocate further from their employer's office will likely prefer using neighborhood NWSs in suburban or even rural areas. Therefore, the rise of teleworking presents an opportunity for the spatial reorganization of activities around these telework centers (Adobati and Debernardi, 2022).

From a macro scale perspective, coworking spaces could be **strategically distributed** to maximize accessibility and convenience for users. While initially concentrated in urban centres and high-traffic areas (Di Marino et al., 2023), there has been a significant expansion into suburban and rural areas (Hölzel and de Vries, 2023). This expansion aligns with the increasing preference for remote work and the desire to reduce commuting time, which is beneficial for both personal well-being and environmental sustainability. To this end, Di Marino

et al. (2023) highlight the importance of the existing urban form (compact or sprawled) regarding the levels of access to urban amenities for remote workers and coworkers within the neighborhood.

Other research suggests that the growth of demand for NWSs and third places presents an opportunity for privately operated CSs that would consider establishing themselves in prosperous, appealing neighborhoods within cities known for their attractive lifestyle. Hence, **local neighborhood centers** are expected to play a critical role in the transformation of urban areas into community hubs that provide opportunities for socializing, shopping, and recreation (Zenkteler et al., 2022b), contributing to the objective of the 15-minute city, where all residents meet their needs within a short walking distance from the place of residence (Pozoukidou and Chatziyiannaki, 2021).

NWSs are usually found in high-credibility locations within the inner-city suburbs (Garrett et al., 2017). Recent research by Li et al. (2024), which explores the association between third-place visits for remote work and the **surrounding built environment**, reveals that the popularity of NWSs and third places is highly associated with the urban characteristics of the sounding area, proximity to residential communities, easy accessibility to subway stations and the density of Points Of Interests (Hölzel and de Vries, 2023; Li et al., 2024).

Moreover, in **urban settings**, NWSs are often found in multifunctional buildings that offer additional amenities like cafes, bookstores, libraries, and gyms (Li et al., 2024). This setup not only attracts remote workers but enhances the vitality of the surrounding neighborhood by increasing foot traffic and supporting local businesses. From a planning perspective, Bilandzic and Foth (2017), note that the rising "building multifunctionality" blurs the line between traditional urban functions and associated land uses (libraries, cafes, working space, retail, etc.), contributing to what Di Marino and Lapintie (2017), described as the "post-functional cities," where there aren't any predetermined and designed functions on a building or even on an urban scale. Nevertheless, real estate seems to be quite responsive to this changing mentality and has been integrating coworking spaces into new developments along with other uses (Pajević, 2021).

Recognizing the transformative power of NWSs, several studies focus on identifying and recording their **social and economic impact** on the surrounding areas. Based on the analysis in Sao Paolo, Brazil, Nakano et al. (2020), suggest that for greater impact of CSs in the immediate urban area, they should be designed and act as infrastructure providers, community hosts, knowledge disseminators, local coupling points, and global pipeline connectors. On this matter, Mariotti et al. (2017), note that the more roles and responsibilities CSs have, the higher the impact on the neighborhood and vice versa. However, increased roles could jeopardize the cost-effectiveness of the CS as a business (Nakano et al., 2020).

Fiorentino and Livingstone (2021), argue that to maximize the social and economic impact of CSs, they should be assigned **specific roles**. Based on the previous work of Fiorentino and Livingstone (2021), and their study on the impacts of CSs in London's and Rome's real estate markets, they suggest three distinct roles for CSs: the first role supports a regenerative role promoting social inclusion in local communities; the second role supports entrepreneurs and start-ups, attracting venture capitalists and investments to drive economic growth; and the third pertains to commercial products, which are increasingly integrated into local real estate markets, to meet the increasing demand for flexible and/or serviced office spaces.

Apart from the role of CSs in an urban context, a lot of attention has been paid to their transformative power in **rural and peripheral areas**. In recent years, the number of rural CSs has steadily increased, with policies and

promotional initiatives helping preserve this trend (Hölzel and de Vries, 2021). CSs have been constantly gaining traction as they provide a viable alternative for those seeking a quieter, more affordable work environment away from the busy urban centres. Recent publications see CSs as an opportunity to revitalize rural areas by attracting knowledge workers to small towns and rural centers (Akhavan et al., 2021). The relatively high spending capacity of the influx of knowledge workers could potentially support the local market (i.e., grocery stores, bakeries, butcheries, restaurants, and cafes), reduce vacancy rates (Greinke and Lange, 2022), and combat depopulation trends. However, there is not sufficient research on the impact of RW in rural areas.

Furthermore, the literature review suggests that CSs are commonly related to **multilocality** (Hölzel and de Vries, 2021). Greinke and Lange (2022), mention that CSs are used to leverage the increased demand for multilocality. Establishing coworking spaces near the departure points of multilocals could be part of a wider strategy to reduce commuting frequency and increase the time spent in rural areas. As coworking spaces in rural areas are cheaper than in larger cities, workers that adopt a multilocal lifestyle should be effectively served by both individual and shared workspaces, such as libraries or cafés (Di Marino et al., 2018). While these solutions may not restrict multilocal lifestyles, they can motivate employees to stay with a company without having to change their lifestyle too much from a mono- to a multilocal one (Greinke and Lange, 2022). Additionally, Di Marino et al. (2018), in their research focusing on the multilocality of working, both in private and public organizations employing white-collar workers, mention that the proliferation of alternative workplaces around the city, such as rented coworking spaces, libraries, coffee shops, public transportation, and hotel lobbies, enable workers to function in multiple locations even outside the traditional urban cores.

Finally, a limited part of the urban planning discourse sets CSs as one of the methods and means of territorial **gentrification.** Korelina and Zheleznyak (2019), suggest that the rise of CSs has been linked to gentrification, particularly in urban areas. Coworking spaces often occupy buildings that have lost their former uses, such as old factories or schools, and can lead to the revitalization of neighborhoods. While this can benefit economic growth and urban renewal, it also raises concerns about displacement and the rising cost of living for long-term residents. Furthermore, the integration of CSs into corporate real estate strategies can exacerbate this trend (Pajević, 2021). As large corporations adopt the coworking model to reduce their real estate costs, they often do so in prime urban locations, contributing to these areas' commercial and residential gentrification. Similar concerns are raised for rural areas. The aesthetic and functional improvements brought by CSs to serve knowledge workers in rural areas can lead to an influx of new amenities and services that correspond primarily to higher levels of spending capacity, marginalizing existing communities. Lastly, the transformation of spaces into modern coworking hubs in rural areas often aligns with broader regeneration strategies, which can inadvertently push out lower-income residents (Korelina and Zheleznyak, 2019).

Overall, the development of NWSs, and especially CSs, reflects a significant shift in the way workspaces are conceptualized and integrated within both urban and rural environments. Research highlights that while much focus is placed on collaboration, community, and the evolving nature of work, relatively few studies emphasize the physical and locational attributes of NWSs, especially in less urban contexts. These spaces hold great potential to revitalize surrounding areas by stimulating local economies, attracting knowledge workers, and promoting sustainable living. However, as NWSs spread into suburban, rural, and peripheral regions, they present challenges, particularly regarding gentrification and social equity. With the rising demand for flexible working spaces, the careful spatial distribution and functional integration of NWSs remain crucial for

maximizing their positive impact while minimizing negative socio-economic consequences. Ongoing research and policy adaptations will be essential to ensure that NWSs contribute to both economic vitality and community well-being across diverse geographic settings.

3.2.1.4 Policy and Planning Implications

In a local context, NWSs can have different impacts on regeneration, land use, employment, and real estate values, influenced by institutional and regulatory systems, including planning ordinances, zoning, and governance mechanisms. Hence, as Fiorentino and Livingstone (2021), note emerging NWSs are a "path-dependent phenomenon" reflecting and responding to local trends such as deindustrialization, real estate market dynamics, labor pooling, innovation policies, and regeneration strategies.

Based on their empirical research, Fiorentino and Livingstone (2021), point out that planning regulations can play a critical role in leveraging CSs' demand and its impacts on the local real estate markets. For instance, in Rome, the absence of specific regulations and restrictive planning frameworks has led to the emergence of a wide array of CSs typologies, from regeneration-focused spaces to flexible offices at neighborhood and city scales. On the other hand, London seems to have benefited from the dynamic and demand-responsive interactions that are supported by regulations and clear planning mechanisms. However, this resulted in a shortage of affordable office spaces for SMEs. Thus, planning regulations and real estate frameworks are critical in shaping the landscape of NWSs, emphasizing the need for associated policies.

There is a general notion that NWSs set the base for rethinking planning policies in terms of understanding multifunctionality in cities. Anachronistic policies that promote the functionalistic division of urban spaces into the basic daily functions (housing, work, leisure, and mobility) have been criticized since the 1980s but still dominate land-use planning. Hence, planning needs to address the dynamic multi-functional nature of space which cannot simply mean non-planning or increased flexibility in land-use control (Di Marino et al., 2023).

Regarding rural areas, the literature suggests that there is an increasing number of policies addressing the attractiveness of rural regions through the development of coworking spaces. Hölzel and de Vries (2023) concluded that there should be more research on the contribution of CSs to the vitality and versatility of rural towns, while public authorities should focus on the opportunities and risks of coworking spaces in rural areas. Furthermore, special consideration should be placed on the human interaction factor and its likelihood of occurring, including points of interest (POI), amenities, services, and other opportunities for people to meet each other.

Further research on NWSs should focus on the location of NWSs and the possible opportunities created concerning the relationship between social interaction, vitality, and the enhancement of personal interactions (Hozel et al., 2023). From the perspective of CSs taking additional roles may be of interest due to increased complexity and resource demand. However, from a policy perspective, achieving greater social and economic impact at the local is desirable. Thus, CS should play a more active and diverse role in the functionality of contemporary cities. As far as supporting policies for the development of NWSs Nakano et al. (2020) and Di Marino et al. (2023), report that urban policies and land use regulations are not yet adapted to accommodate NWSs, discouraging the establishment of such spaces.

Overall, while the proliferation of new working spaces provides flexible, collaborative environments for a diverse workforce, their impact on urban and rural areas varies. Potentially, they could contribute to the economic revitalization and reduction of commuting times, but they also pose challenges related to gentrification and the displacement of existing communities. The spatial distribution of NWSs reflects a broader shift towards more flexible, localized work arrangements, emphasizing the need for balanced urban and land use planning to mitigate adverse effects.

3.2.2 Multilocality

Multilocality refers to the phenomenon where individuals or groups maintain connections, residences, or active engagements in multiple geographical locations simultaneously or sequentially. This concept is particularly relevant in the contexts of globalization, migration, and transnationalism, where people's lives, work, social relationships, and cultural practices are spread across diverse locales. Multilocality encompasses various forms of spatial mobility, such as commuting, circular migration, seasonal work, and maintaining transnational family networks. It challenges traditional notions of place-bound identities and communities, highlighting the fluidity and interconnectedness of contemporary social life.

3.2.2.1 The emergence and growth of multilocality

Several factors collectively contributed to the emergence and growth of multilocal lifestyles, reflecting broader changes in work patterns, technological advancements, and societal preferences. Hölzel and de Vries (2021), mention that the increasing distance between where people live and work necessitates a multilocal lifestyle to reduce commuting burdens, while Mariotti et al. (2023), recognize that flexible work environments, that enabled the location of coworking spaces outside major cities, allow individuals to work from multiple locations, fostering a multilocal lifestyle as they move between these spaces.

As far as businesses and corporations are concerned, multilocality enables a significant reduction of operation costs. Sargent et al. (2018), mention that by settling in a common workspace, a corporation can cut between 20 to 40% of their real estate costs and reduce their administration and management expenses. For smaller businesses, the benefits are even more substantial considering the possibilities of offering flexible locations and services to employees without additional costs spread over multiple locations (Sargent et al., 2018).

Greinke and Lange (2022), indicate the significance of modern mobility options like fast rail connections, highways, domestic flights, etc., in supporting the feasibility of living in multiple places. Furthermore, advances in information and communication technology facilitate remote work, allowing individuals to work from different locations without the need for constant physical presence in a single office (Alizadeh, 2012). Greinke and Lange (2022), in their study regarding the effects of multilocal lifestyles in three rural districts in Germany, they reported that multilocality emerges as a compromise for many individuals. Strong ties to family and friends prevent complete relocation, prompting people to maintain these connections while working elsewhere. From the migration point of view, multilocality also helps avoid complete relocation from rural to urban areas, offering a compromise to workers between staying in their original location and moving to a new place permanently (Greinke and Lange, 2022).

3.2.2.2 Impacts of multilocality

Multilocality has diverse effects on local communities and broader socio-economic and environmental contexts, including housing and property markets, mobility, economy, environment, energy consumption, and social involvement.

It has been recorded that multilocal lifestyle significantly impacts **housing and property markets** by increasing the demand for housing, particularly in secondary residences, as individuals need multiple living spaces. Empirical data show that multilocal living arrangements, characterized by temporary presences and absences, can influence local housing and property markets (Greinke and Lange, 2022). For instance, in urban or rural areas with tight housing markets, the increased demand from multilocals can lead to competition, driving up housing prices and potentially prompting new construction to meet this demand (Greinke and Lange, 2022; Weichhart, 2015) or making housing less affordable for permanent residents.

However, the presence of multilocals can also be beneficial in **reducing vacancies** in some regions (Greinke and Lange, 2022). Multilocals often occupy otherwise vacant or underused properties, providing opportunities for property owners to convert oversized homes into smaller, more manageable units. Furthermore, occupancy of vacant houses in underutilized areas, particularly rural areas, can help combat depopulation challenges.

On the other hand, the increased **land consumption** due to multilocality cannot be ignored. The multilocal style of living can take up more space, and multiple residences often remain vacant for large periods of time, leading to inefficient use of land (Greinke and Lange, 2022). Moreover, land consumption linked to multilocality raises serious ecological concerns. The construction and maintenance of additional residences contribute to environmental degradation, including high levels of energy use and carbon footprints, as well as greater strain on local resources. Therefore, while multilocality offers flexibility and potential economic benefits, it also presents challenges in terms of land consumption and environmental sustainability.

Multilocality significantly impacts **mobility patterns** as it is a lifestyle facilitated by advancements in transport and mobility, leading to various effects on how people move and the infrastructure supporting this movement. Multilocality inherently involves more frequent travel between multiple residences and workspaces. Individuals practicing this lifestyle often commute long distances periodically rather than daily, leading to increased overall travel frequency (Di Marino et al., 2024; Greinke and Lange, 2022). This can result in higher demand for transportation services, both private and public. The practice of living in multiple locations often leads to an increase in car-based mobility, especially in rural areas where public transport options are limited. This increase in traffic can cause congestion, particularly during peak times when many multilocals travel simultaneously. Nevertheless, Di Marino et al. (2024), point out that there is a potential for reduced daily commuting if individuals stay for extended periods of time at secondary residences or work from various locations. This can lead to a decrease in daily travel distances and associated emissions, contributing to more sustainable mobility patterns. On the other hand, the rise in travel frequency and traffic volumes associated with multilocality contributes to higher emissions and environmental pollution. Long-distance commuting, whether by car, train, or air, increases carbon footprints and exacerbates air pollution, impacting climate change and local air quality (Greinke and Lange, 2022).

Multilocal lifestyles drive the need for varied and **flexible transportation options**. High-speed rail connections, road networks, and domestic flights have become critical in enabling this mobility. The demand for such diverse options can stimulate investments in transportation infrastructure and services, potentially improving connectivity. As far as public transport, the presence of multilocals can strain existing infrastructure, especially in areas experiencing periodic high demand, such as tourist regions during vacation seasons (Greinke and Lange, 2022). This can lead to overcrowding and increased maintenance needs, putting pressure on local authorities to enhance service capacity and efficiency.

Multilocality can have beneficial effects on **local economies** by increasing demand for services such as retail, recreation, hospitality, local transportation, etc. The influx of temporary residents stimulates local businesses and can lead to job creation to meet the heightened demand for goods and services (Danielzyk et al., 2021; Dittrich-Wesbuer et al., 2015). Additionally, multilocals often require flexible workspaces like coworking spaces, which can drive the development of new business hubs and related infrastructure. The economic benefits are not limited to urban centres; rural areas also gain from the spending power of multilocals who choose to reside there part-time, contributing to the local economy. However, this economic activity is often periodic, peaking during certain times when multilocals are present, which can lead to fluctuations in local market stability.

When it comes to the impacts on **social and civic activities**, multilocal lifestyles often pose challenges, mainly in developing strong ties with the community or engaging deeply in local civic activities (Greinke and Lange, 2022). A multilocal lifestyle often means limited periods of presence in any one location, making it challenging for individuals to participate consistently in local social associations and civic initiatives (Greinke and Lange, 2022). While multilocals can bring diverse perspectives and skills to a community, their short and periodical presence often leads to a lack of long-term commitment, which is crucial for community development. Therefore, while multilocality can benefit local communities due to increased diversity and economic activity, it poses significant challenges to the stability and longevity of social and civic activities in local communities.

Overall, multilocality poses significant spatial planning challenges and opportunities. The shift from a stable, single-location residency necessitates a re-evaluation of infrastructure, transport systems, and public services (Hermelin and Trygg, 2012; Säynäjoki et al., 2014). Wide adoption of the multilocal lifestyle can lead to underutilization of services in some areas and overburdening in others, as well as hinder local civic involvement and community integration due to the limited periods of presence in each location. On the other hand, multilocality offers an opportunity to rethink space optimization and allocation of resources, mainly through the strategic establishment of coworking spaces. It can help alleviate vacancy issues in rural and isolated areas by utilizing underused properties and support local economies by increasing demand for local services and amenities. Planners need to rethink urban and regional spaces as interconnected networks rather than isolated zones, promoting multi-functionality and flexibility to accommodate the diverse needs of multilocal residents.

3.3 Conclusions

The rise of RW has profoundly diversified the spatialities of work, leading to a transformation in how work is conducted. Traditional office settings are increasingly supplemented or replaced by a variety of flexible environments, including home offices, coworking spaces, and third places like cafes and libraries. This shift

reflects broader changes in work culture and technological advancements, creating more fluid and adaptable working environments. These new working arrangements challenge traditional urban planning by blurring the lines between physical and digital spaces, as well as permanent and temporary locations. In urban areas, NWSs contribute to the redistribution and decentralization of work from central business districts, revitalizing local economies and promoting neighborhood hubs. However, they also present challenges such as gentrification and the potential displacement of long-term residents. In rural areas, NWSs offer opportunities for economic revitalization and combating depopulation, though they must be managed carefully to avoid marginalizing existing communities. The concept of multilocality further complicates the spatialities of RW. While multilocality supports a more geographically dispersed workforce and can lead to a sustainable distribution of economic activities, it also increases demand for diverse transportation options, potentially straining various types of urban infrastructure. Additionally, a multilocal lifestyle can drive up housing prices and contribute to environmental concerns. The proliferation of NWSs and multilocality necessitates a revaluation of spatial planning policies to accommodate these changes and balance the benefits of flexibility and decentralization with socioeconomic and environmental risks, ensuring positive contributions to both urban and rural development.

4. The Spatial effects of Remote Work

Having identified the new spatialities of RW, this section aims to explore how these emerging spatialities can influence the urban and rural landscape. The review presented here is sector-specific, covering the five key themes presented in the methodology (see section 2), placing emphasis on the spatial manifestation of the RW effects. It starts with the urban development patterns by discussing how RW spatialities have impacted the use of office, residential, and commercial spaces. This includes urban sprawl, the "Doughnut Effect" phenomenon, suburbanization, and the renewed role of small and medium-sized cities. It delves into housing and office space demand, exploring the shifts in residential choices and market demand for office spaces, as a result of the new spatialities of work. Another major focus is on the urban-rural divide, analyzing how remote work might either bridge or exacerbate socio-economic disparities between rural and urban areas. The review further investigates mobility patterns and transport infrastructure, examining the changes in transportation needs and infrastructure due to the changes in commuting patterns. It also considers the environmental implications, such as changes in energy consumption and greenhouse gas emissions. The review is completed by summarizing the planning implications and considering the potential long-term effects in urban planning and policy-making.

Since this part focuses on identifying the spatial implications of RW, it is imperative to establish a common understanding of critical concepts related to the various spatial forms and configurations, such as what constitutes an urban area, urban sprawl, etc. The terms are presented alphabetically, and various sources are used.

- **City:** A city is a local administrative unit where at least 50% of the population lives in one or more urban centres (Eurostat, 2013).
- **Commuting Zone:** A commuting zone contains the surrounding travel-to-work areas of a city where at least 15% of employed residents are working in a city (Eurostat, 2013).
- **Exurban Areas or Exurbia:** The definitions for exurban areas usually involve geographic or demographic attributes. According to the definition proposed by the Brookings Institute, exurban areas or exurbs are communities located on the urban fringe that have at least 20% of their workers commuting to jobs in an urbanized area, exhibit low housing density, and have relatively high population growth (Berube et al., 2006). Not yet full-flagged suburbs but no longer wholly rural in nature, these exurban areas are reportedly undergoing rapid change in population, land use, and economic function.
- **Functional Urban Areas:** A functional urban area consists of a city and its commuting zone. Functional urban areas, therefore, consist of a densely inhabited city and a less densely populated commuting zone whose labor market is highly integrated with the city (Eurostat, 2013).
- **Urban Area:** The definition of urban area is heavily related to the definition of *"urban extent,"* which varies depending on the different research perspectives. For example, some definitions are related to census data, i.e., population density, while others rely on the physical attributes of the land surface and the condition of the build-up area, i.e., night-time lights (Small et al., 2005). The characteristics of

these definitions are interrelated, and most of the urban areas identified by relevant methods are consistent (Liu et al., 2019).

According to the UN-Habitat (2018), urban area describes an area (geographical extent) that is spatially, functionally, or otherwise urban in nature (urbanized area). The urban/city extent is not limited to existing administrative boundaries and may include more than one administrative unit (Angel et al., 2016). According to the Atlas of Urban Expansion, identifying cities by their geographical extent should follow the Roman tradition of defining a city by the edge of its built-up area, its "extrema tectorum" (Angel et al., 2016, p. 10). Therefore, any effort to delimit a city's urban area involves identifying the extent of the built-up area. In this context, it is important to determine what constitutes the edge of the city and acknowledge that a city can include both built-up and non-built-up areas.

To this end, Schneider et al. (2010) argue that urban areas are defined by the physical attributes and land cover composition of the land surface, meaning that urban areas and their extent are places dominated by the built environment. The built environment includes all non-vegetated, human-constructed elements such as buildings, roads, etc., and the "dominated" implies that the coverage of human-constructed elements is more than 50% of a given spatial unit, i.e., the pixel. When vegetation (i.e., parks) dominates, these areas are not considered urban, without making any further distinction if there are vegetated areas with an urban function.

- **Urban Centre:** Urban centre is an area with a population density of at least 1.500 inhabitants per km² and collectively a minimum population of 50.000 inhabitants after gap-filling (Eurostat, 2013).
- **Urban Sprawl: "**Urban sprawl is a phenomenon that can be visually perceived in the landscape. A landscape is affected by urban sprawl if it is permeated by urban development or solitary buildings and when land uptake per inhabitant or job is high. The more area built in a given landscape (amount of built-up area), the more dispersed this built-up area in the landscape (spatial configuration), and the higher the uptake of built-up area per inhabitant or job (lower utilization intensity in the built-up area), the higher the degree of urban sprawl. The term 'urban sprawl' can be used to describe both a state (the degree of sprawl in a landscape) as well as a process (increasing sprawl in a landscape). The causes and consequences of urban sprawl are distinguished from the phenomenon of urban sprawl itself and, therefore, are not a part of this definition" (European Environment Agency and Swiss Federal Office for the Environment (FOEN), 2016).
- **Peri-urban Areas:** "Peri-urban areas are mixed and transition zones, interfaces between rural and urban areas. According to some scholars, peri-urban areas can be defined as "cities without cities"" (Sieverts, 2003) or as an urban-rural territorial continuum (Davoudi and Stead, 2002).
- **Rural Area(s):** Rural areas are defined as communities with a population density below 150 inhabitants per km² (ECA, 2006).
- **Suburban Areas:** Suburban areas are mostly residential areas already forming part of the built-up urban area, the outermost edge of which constitutes the start of the urban fringe. They are usually part of a metropolitan area, located within commuting distance from the major urban centre (Simon, 2008, p. 170).

4.1 Urban development trends

Teleworking and remote work arrangements are expected to have major implications for the way cities function by altering traditional patterns of office, residential, and commercial space use. Anecdotal evidence and statistical data indicate that significant office spaces in major urban centres remain vacant as more people continue to work from home, even after the COVID-19 pandemic (Biagetti et al., 2024). Research shows that as remote work becomes more prevalent, commuting costs for skilled workers are reduced (Biagetti et al. 2024), individuals often seek larger homes in less densely populated areas, contributing to urban sprawl and expanding the physical footprint of cities. This shift away from central urban areas can alter the hierarchy and economic landscape of cities (Bond-Smith and McCann, 2022; Mariotti and Riganti, 2021), encourage greater use of cars, and cause gentrification in suburban and rural areas.

The arguments that telework increases urban sprawl are primarily grounded in location theory and urban models (Delventhal and Parkhomenko, 2023; Larson and Zhao, 2017; Lund and Mokhtarian, 1994; Rhee, 2009), as well as land use transport interaction models (Moeckel, 2017). Lund and Mokhtarian (1994) and Kim (1997), utilize a monocentric model to portray the impacts of home-based RW on the city size and travel distance. They assume that all the jobs are located in the city centre, and the rest of the city is mono-functionally residential. Increased telecommuting leads to the relocation of people from the inner to outer parts of the city, causing urban expansion. As a result, people live in larger, more sprawled cities, consuming more land on average.

Furthermore, the reduction in commuting costs is assumed to make suburbs more appealing to teleworkers by flattening bid rent curves (Ellen and Hempstead, 2002). Although telework is generally predicted to cause sprawl, this outcome is not certain in all cases (Rhee, 2009), as it depends on the balance between centrifugal and centripetal forces (Rhee, 2009). According to locational theories, centrifugal and centripetal forces include land values, the form of the transport system, residential preferences, energy costs, etc. Other supporting studies use stated preference models of residential location (Tayyaran et al., 2003; Tayyaran and Khan, 2007), but these findings are challenged by research showing no significant effect of telework adoption on home relocation intentions (Ettema, 2010; Muhammad et al., 2007). Nevertheless, these studies refer to the pre-COVID era, and their results should be evaluated as such.

When studying the implications of RW in urban form and development, the present literature review focuses on the following three strands: the decline of Central Business Districts (CBDs) and the "Doughnut Effect," the suburbanization and peri-urban growth, and the revitalization of the smaller cities.

4.1.1 The decline of Central Business Districts (CBDs) and the "Doughnut Effect"

Central neighborhoods in major cities have experienced a marked decrease in human presence due to the shift to remote work. Unsurprisingly, remote work is considered a significant risk for large cities, as it affects their structural dynamics. For instance, cities like Milan experienced a population decrease of 47% to 63% in central neighborhoods, while suburban municipalities saw an influx of remote workers (Mariotti et al., 2022). Similarly, New York, San Francisco, and other major US cities observed the "doughnut effect" phenomenon, where workers and residents left city centers for peri-urban and peripheral areas (Gupta et al., 2023; Ramani and Bloom, 2021). Specifically, the "Doughnut Effect" describes a pattern in urban development where city

centers decline while suburban and peripheral areas grow. This results in cities resembling doughnuts, with vibrant outer rings and hollowed-out cores (Biagetti et al., 2024), with a significant amount of vacant and underutilized office space (Pajević, 2021).

Remote work and flexible working arrangements have significantly contributed to the emergence of the "Doughnut Effect," shaping urban form and dynamics in several ways (Hölzel et al., 2023). In his recent work, Florida (2020), recognizes remote work as the primary "pull force" driving the transformation of cities in the coming years. This includes shifts in settlement patterns, with some people choosing to move away from urban centres, and changes in housing to accommodate work-from-home setups, reducing the need for traditional office spaces. However, there are also "push factors" at play, particularly the preferences of the younger population for vibrant urban environments rich in social interactions and opportunities.

Apart from the changes in housing preferences, the literature suggests that the shift to remote work significantly impacts office demand in CBDs (de Abreu e Silva, 2022). As businesses adopt remote work models, the demand for traditional office spaces in urban centres and CBDs has diminished (Biagetti et al., 2024; Pajević, 2021). At the same time, as employees work from home or in local coworking spaces, central urban areas may see reduced foot traffic and economic activity, impacting the structure of economic dynamics (Florida et al., 2023).

Overall, the outflux of population and activities from city centers can induce economic decline in central urban areas and lead to increased vacancies, disuse and deterioration of buildings and infrastructure in the urban core. As a result, the wealthier suburban areas may prosper, while traditionally prosperous city centers may face economic challenges. This, in turn, can alter the financial landscape and hierarchy of cities on a regional scale (between cities) as well as on a more localized scale (between urban and suburban areas).

4.1.2 Suburbanization and Peri-Urban Growth

The rise of remote work (RW) has significantly influenced suburbanization trends. The ability to work remotely has allowed employees to move away from dense urban centres to suburban areas, which offer more space, lower cost of living, and a better quality of life. Several studies have documented a noticeable decrease in human presence in central neighborhoods, especially during and after the COVID-19 pandemic (Biagetti et al., 2024; Mariotti et al., 2022).

Separation of work from a specific physical site has led to increased demand for housing in less congested and more affordable areas outside urban cores (Biagetti et al., 2024). Consequently, cities have seen a rise in suburbanization, with skilled workers relocating to the suburbs, decreasing central urban population densities, and easing traffic congestion in major cities like Los Angeles (Delventhal and Parkhomenko, 2023). Remote work has also catalyzed the growth of peri-urban areas, characterized by a blend of rural and urban features. Cities like New York and San Francisco have experienced the "doughnut effect," where workers and inhabitants migrate from urban centres to peripheral areas (Gupta et al., 2023; Ramani and Bloom, 2021).

This movement has led to reduced congestion in city centers, lower real estate prices downtown, and increased demand for housing and amenities in peri-urban regions. (Batty, 2020), reports that either way, the trajectory of city growth over the last century indicates that the cities will continue to decentralize by allocating

critical urban functions such as housing, industry, retail, and other services to edge cities, low-density sprawl, and new communities far from the central city. Hence, RW arrangements are expected to enhance this trend.

Nevertheless, the "new normal" work-life balance that favors living in suburban and peri-urban areas has several implications, including increased demand for coworking spaces and satellite offices closer to home as part of the "near working" concept (Mariotti et al., 2022). In addition, increased demand for urban amenities and commodities (Batty, 2021), as well as the preference for larger housing lots and lower-density developments, causes excessive land consumption (Rhee, 2009). Less densely built-up areas on the urban periphery require increased car usage, leading to greater demand for road infrastructure and public transport services. This strains resources and necessitates new investments in suburban and rural transportation networks. Finally, the increased demand for suburban housing drives up real estate prices in these areas, while central urban properties may decline in value, creating housing affordability issues in suburban areas and exacerbating socio-economic disparities.

4.1.3 Revitalization of Small and Medium-Sized Cities

Remote work presents the potential to revitalize smaller cities by offering a viable alternative to living in large urban centres (Alizadeh, 2012). With fewer commuting requirements, remote workers find smaller cities appealing due to their affordability, less congestion, and proximity to nature. Krasilnikova and Levin-Keitel (2022), in their study regarding the spatial implications of RW on mobility, they came to the conclusion that RW has the potential not only to decrease traffic and travel but also to transform these areas into hubs of social exchange and social life again. With more time spent in these areas, they become part of everyday life with shopping facilities, cultural offers, or simply places to exchange and meet.

Zenkteler et al. (2022a), examined the urban planning implications of RW within the city of Gold Coast (Queensland, Australia) and reported that home-based workers prefer living in mixed-use neighborhoods that combine residential amenities with place-making initiatives to boost economic performance, networking, and collaboration. Mariotti et al. (2022) enhance the argument that small and medium-sized cities could benefit from increased fiscal revenues and improved public services due to RW, as the central city's structure tends to become less dense and more spread out (Mariotti et al., 2022; OECD, 2022). For instance, in Italy, a significant proportion of workers express a willingness to relocate to smaller towns or closer to nature if allowed to work remotely (Biagetti et al., 2024). This trend is also observed in other regions, with remote workers moving to coastal towns ("sea-change"), smaller towns ("e-change"), or escaping larger towns to avoid crises ("flee-change")(Guaralda et al., 2020).

4.2 Housing and office space demand

Remote work, along with the rise of NWSs and multilocality, has enabled workers, particularly those with higher incomes, to relocate from urban centres to suburban areas, smaller cities, and rural regions. As companies adopt a decentralized approach, reducing the need for traditional office space and favoring coworking locations near residences, emerging housing preferences create new dynamics in the urban and rural landscape.

Residential choice and relocation preferences are a multifaced issue and depend on the comparison between center, suburbs, and small towns regarding amenities (particularly natural amenities), efficiency, mobility costs, and other services (Biagetti et al., 2024). Research conducted by Hölzel et al. (2023), offers interesting insights into the residential preferences during the COVID-19 pandemic across several European countries, with a notable shift from urban cores to more remote and greener areas. The writers point out that this trend is influenced by the necessity for social distance and the rise of remote work.

Specifically, in Norway, there was an indicative increase in the use of parks and open spaces for socializing and exercising. This preference for open space highlighted the wider trend of moving away from the densely populated urban centres. In Germany, there was a countable migration from major cities to remote, green, and less densely populated areas. This shift was driven by the preference for larger-sized properties and a relaxed lifestyle. Additionally, the shift in residential preferences was perceived as an opportunity to save money and time. In the Netherlands, there was a similar trend with people moving to lower-density settlements that offer easier access to open green spaces and private gardens. The reduced need for work-home commuting made suburban living more attractive. In Hungary, smaller towns in proximity to Budapest experienced an influx of highly skilled workers from major cities. This was driven by the need to adhere to social distancing while maintaining working productivity. The conversion of cultural heritage buildings to residential spaces is recorded as a new trend. In France, Estonia, and Portugal, the trend towards rural areas and small towns was evident, eliminating the demand for commuting. Sufficient Information Computer Technology (ICT) infrastructure enabled many households to relocate to these areas during the pandemic. As a result, companies started to consider relocation outside city centers. However, the long-term sustainability of this trend remains uncertain, with some studies suggesting that the number of permanent relocations to the countryside may be limited.

The pandemic-induced shifts in residential choices across major European cities reflect a broader move towards decentralization, flexibility, and a preference for greener, less dense living environments. While these trends were significantly influenced by the need for social distancing and remote work during the pandemic, it is expected that they will continue and have long-term impacts on urban development (Hölzel et al., 2023).

Research that focuses on residential locational preferences points out that places vary in their attractiveness to people, particularly on different types of residences (one- or two-bedroom, single-family, detached, etc.) and house prices (Kim et al., 2005). Weisbrod et al. (1980), observed that the factors influencing locational decisions are “often beyond the scope of public policy.” These factors include the desire for single-family detached homes among families with children and the reduced frequency of relocation among older persons and families with several children. These findings have been supported by more recent studies by (Cheshire and Sheppard, 1995; Lee et al., 2019; Letdin and Shim, 2019).

In a comprehensive review of residential choice theories explaining workers’ location choices, Storper and Scott (2009), highlight that people primarily make locational decisions based on certain amenities and features of the urban environment (Chen and Rosenthal, 2008). These include housing options, urban amenities at the local scale, the quality of urban design and public spaces, local interactions, educational options, safety, and the broad economic prosperity of the area or city. Buch et al. (2014), validated these observations, emphasizing the importance of natural attractiveness and the availability of consumer facilities and public goods.

Researchers agree that certain features of residential areas are linked to an increased likelihood of stimulating economic activity and offer a supportive environment for the emergence of NWSs. These features include quality of the built environment, housing type (detached, semi-detached, etc.), real estate prices, location in relation to the main urban centre, connectivity, and attractive lifestyle (Chen and Rosenthal, 2008; Hedman and van Ham, 2012). Neighborhoods and residential areas that are highly diverse are recorded to offer a fertile environment for creativity and knowledge-based entrepreneurship (Alizadeh, 2013; Reuschke and Houston, 2016). Other research suggests that remote workers prefer living in multi-use neighborhood precincts that have a unique physiognomy created by targeted placemaking interventions (Zenkteler et al., 2021). To this end, planners and policymakers should pursue the concept of a multi rather than mono-functional neighborhood, fostering a more flexible and dynamic use of space (Reuschke and Houston, 2016).

Recent studies indicated increased economic activities in the outer-suburban areas of cities. In specific, Felton et al. (2010) highlighted the decentralization of economic activities, with more creative industrial establishments appearing in suburban areas traditionally known for their residential nature. This phenomenon is often related to the rise of self-employment, which has made these areas more economically viable options for both employees and employers. In response, researchers suggest rethinking the residential neighborhoods as networked spaces that facilitate remote work (Folmer and Kloosterman, 2017). This requires developing alternative planning strategies and urban design solutions to foster flexible and vibrant use of residential areas and urban districts (Alizadeh, 2013; Felton et al., 2010; Reuschke and Houston, 2016). To achieve these outcomes, we first need to comprehend the nature of the emerging spatialities of remote work.

Shifts in residential choices can lead to **gentrification** in these residential areas as the influx of remote workers increases demand for housing, raises property values, and potentially displaces lower-income residents (Hölzel et al., 2023; Martin and Grodach, 2023; Zenkteler et al., 2022b). This displacement, a hallmark of gentrification, is often exacerbated by the economic benefits remote workers bring, such as increased spending power and investment in local amenities, further accelerating the process. Alongside these economic changes, gentrification can significantly alter the social fabric of neighborhoods with the arrival of new services, restaurants, and cultural activities catering to wealthier residents. These shifts may also lead to social tensions, as differences in income, lifestyle, and expectations between long-time residents and new arrivals create friction within the community.

At the same time, the decentralization of urban areas, fuelled by remote work, can lead to a decline in the population and economic activity in city centers. As higher-income remote workers leave, city centers may become more affordable, attracting different demographic groups and potentially leading to a reverse gentrification process where lower-income residents move into these areas. However, the overall trend points towards a gentrification of the suburban regions and smaller towns as remote workers seek more spacious and affordable living conditions outside city centers.

The "doughnut effect," as discussed earlier, portrays this exact process, the transformation from a gentrified urban core to a suburban-focused living arrangement, leaving city centers with a different demographic mix and potentially leading to a new form of gentrification in the suburbs. Transitioning from a gentrified urban core to a doughnut structure can fundamentally alter urban real estate dynamics. In a gentrified city, skilled workers live near their workplaces in the center, whereas in a doughnut city, they reside in the suburbs, leaving

the center to less skilled workers (Mariotti et al., 2022). This transition impacts housing prices and rent differentials, potentially revitalizing suburbs while diminishing the economic vitality of city centers.

While remote work can lead to gentrification in suburban areas, it also offers opportunities for urban regeneration outside the traditional urban cores. The redundant space Pajević (2021), and the neglected urban spaces can be revitalized to attract remote workers and businesses, potentially leading to new forms of urban gentrification focused on creating dynamic, mixed-use spaces that increase property values and improve public well-being (Biagetti et al., 2024). Urban planners and policymakers should leverage remote work trends to foster sustainable urban development and mitigate the negative impacts of gentrification by ensuring equitable access to housing and amenities for all residents.

4.3 The Urban-Rural Divide

The urban-rural divide refers to the significant socio-economic, cultural, and infrastructural differences between urban (cities and towns) and rural (countryside and villages) areas. This divide is characterized by disparities in various aspects such as economic growth, education and job opportunities, social and public services, etc. (Eurofound, 2023). This part of the report aims to provide information on how the new spatialities of work could potentially affect (bridge or polarize) the urban-rural divide. It starts with a description of the urban-rural spatial inequalities and their manifestation in economic, demographic, infrastructure, etc. Then, it continues with how RW and NWSs could transform rural areas and concludes with how RW can act as a catalyst to bridge or exacerbate the urban-rural divide.

4.3.1 Spatial Inequalities and the Urban-Rural Divide

In Europe, the urban-rural divide is manifested in various ways. Countries such as France, Germany, and the UK considered the Western Europe (Combes et al., 2011), boast well-developed urban centres that provide extensive economic opportunities and advanced services. In contrast, rural areas in these countries often suffer from depopulation and economic decline. In Eastern Europe, countries like Poland, Romania, Bulgaria, and Greece exhibit a more pronounced urban-rural divide, with rural regions facing higher poverty rates and reduced access to services compared to their urban counterparts (Eurofound, 2023). Despite robust social welfare systems in Scandinavian countries like Sweden, Norway, and Finland, which help to alleviate some urban-rural disparities, rural areas still encounter challenges related to access and infrastructure. Other developed countries like the United States of America, Canada, and Australia exhibit significant urban-rural divides, where major cities offer extensive opportunities and services, whereas rural areas struggle with economic decline, lower educational attainment, and reduced healthcare access (Hanley, 2010).

According to Hölzel and de Vries (2023), spatial inequalities are the manifestation of the disparities. Economic disparities play a significant role, with variations in regional economic strength, job availability, wages, and corporate earnings contributing to local economic imbalances. Urban areas often enjoy higher prosperity, leading to greater tax revenues and better public services, while rural areas may lack these economic opportunities (Eurofound, 2023).

Demographic changes also contribute to this divide, as urban areas attract younger, highly skilled workers, leading to an aging population and a decline in youth in rural regions, further exacerbating economic and social

challenges (Hölzel and de Vries, 2021). Additionally, urban areas typically have better infrastructure, including public transportation, healthcare, education, and digital connectivity, making them more attractive to businesses and residents. The digital divide between urban and rural areas is also worth noting. In the eighth cohesion report, the European Commission underscores the profound digital divide between areas within Member States, including France, Hungary, Poland, Romania, and Spain, noting that high or extremely high internet connection speeds are found in cities but not in other areas (Joint Research Centre (European Commission) et al., 2021).

Hölzel and de Vries (2021), in their study regarding rural development policies for coworking spaces in Germany, point out that former and present development strategies are aimed mainly at attracting industry to rural areas by offering cheap land for production plants, offices, public services, and housing. However, these policies led to massive land use changes predominantly in the form of urban sprawl in the outskirts of the cities without promoting real socioeconomic changes in rural areas. Finally, a recent publication on how the rise of remote work has influenced the spatial distribution of work shows that urban areas still dominate in terms of coworking spaces due to better amenities and transport links, while rural areas lag behind (Hölzel and de Vries, 2021; Mariotti and Akhavan, 2020).

The implications of the urban-rural divide are far-reaching. Economically, the divide leads to significant spatial inequalities (Hölzel and de Vries, 2023), affecting local economies, tax revenues, and public services in rural areas. As a result, urban areas experience increased liveliness and economic activity, while rural areas suffer from economic stagnation (Batty, 2021). Research shows that urban-rural divide exacerbates inequalities in access to education, healthcare, and employment opportunities (Byun et al., 2012; Hartley, 2004). Socially, differences in health, education, and social services between urban and rural areas can result in unequal living conditions and quality of life, inducing the depopulation of these areas. Declining populations can jeopardize the economic viability of public services and facilities and reduce the technical function threshold of public facilities like education, healthcare, etc. Community vitality is also impacted, as rural areas may struggle with declining populations and underused urban centres, reducing communities' vibrancy and social cohesion.

4.3.2 Impacts of remote work in rural areas

Remote work and NWSs could transform rural areas in several significant ways. Recent research shows that the influx of remote workers can revitalize the local economy by increasing demand for local services and amenities such as grocery stores, bakeries, cafes, and restaurants, supporting local businesses and potentially preventing closures (Hölzel and de Vries, 2021). Moreover, with access to high-end paying remote jobs, rural residents can increase their income levels, contributing to local economic growth, while the increased demand from remote workers can stimulate local businesses, driving entrepreneurship and innovation.

Furthermore, Hozel's research stresses the significance of coworking spaces in making rural areas more attractive places to work and eventually live (Ananian et al., 2024; Hölzel and de Vries, 2021). Coworking spaces can support local retailers by increasing foot traffic and spending in surrounding businesses, enhancing the economic resilience of rural areas (Adobati and Debernardi, 2022). These spaces which are cheaper than in larger cities (Greinke and Lange, 2022), accommodate various commuting patterns and preferences, making rural living more attractive to remote workers who might otherwise travel long distances to work (Ananian et al., 2024; Hölzel and de Vries, 2021).

Demographically, remote work can slow down or reverse rural depopulation by attracting individuals and families seeking a better quality of life away from urban centres. This can result in a more culturally and professionally diverse workforce in rural areas. From a social perspective, remote workers might engage in local community activities and associations, countering the decline in membership of rural clubs and societies and revitalizing local communities (Flipo et al., 2022). While multilocal lifestyles can lead to sporadic community engagement, they also present opportunities for temporary yet meaningful participation in local social practices, fostering a richer social fabric (Greinke and Lange, 2022).

The impacts of RW on environmental and infrastructural aspects are also noteworthy. RW can significantly reduce the need for daily commuting, lowering traffic volumes and carbon emissions, thereby alleviating stress on urban transport infrastructure (Adobati and Debernardi, 2022; Flipo et al., 2022). It can also encourage sustainable land use and development practices as the demand for sprawling urban infrastructure decreases. However, there is a trade-off with the increased need for robust digital infrastructure in rural areas to support telecommuting effectively associated with so-called “digital pollution” (Adobati and Debernardi, 2022) .

Within the discussion regarding the transformation of rural areas due to RW, Adobati, and Debernardi (2022), emphasize the distinctive role of rural areas with a countable percentage of holiday houses. Their research points out that if these areas have good regional accessibility, they can be great attractors to telecommuters seeking a better quality of life away from urban congestion. However, the periodic fluctuation of demand for utilities (water, sewage, high-speed internet access, etc.) stresses out the infrastructure, causing severe shortages and environmental implications (Greinke and Lange, 2022; Yu et al., 2019).

Overall, NWSs and multilocality have the potential to transform rural areas. There is no certain evidence that specific rural areas are more conducive to remote work than others. However, there is some evidence that factors such as second home ownership, regional accessibility, and quality of local services and amenities could play a critical role in the rise of certain rural areas.

4.3.3 Bridging the Urban-Rural Divide

Addressing the divide poses significant policy challenges, requiring comprehensive interventions at various administrative levels, often leading to complex and contested planning and investment decisions (Hölzel and de Vries, 2021). Implemented strategies to alleviate the urban-rural divide indicate that sustainable land use planning practices should be adopted to prevent urban sprawl and the Doughnut Effect (Hölzel and de Vries, 2021). Improving and expanding public transport links in rural areas is also crucial to reducing car dependency, decreasing carbon pollution, and enhancing accessibility (Krasilnikova and Levin-Keitel, 2022). Enhancing social and other infrastructure in rural areas is also crucial, focusing on digital connectivity (Flipo et al., 2022; Hölzel et al., 2023), healthcare and education to improve living conditions and make these areas more desirable to reside (Byun et al., 2012; Hartley, 2004).

Remote work has the potential to significantly **bridge the urban-rural** gap by attracting knowledge workers in rural areas (Babb et al., 2018) while maintaining employment opportunities traditionally located in urban environments (Hölzel et al., 2023). The opportunity to reduce daily commuting allows remote workers to reside in less densely populated areas, benefiting from lower living costs and improved quality of life (Ge et al., 2018). This shift can lead to the revitalization of rural economies as increased residency drives demand for local services and businesses (Yu et al., 2019; Zenkteler et al., 2022b). Additionally, the establishment of

coworking spaces in rural areas offers a professional environment that mitigates social isolation and supports community engagement (Vallicelli, 2018), further stimulating local economies.

Overall, the resilience and adaptability of rural regions can make them more appealing to remote workers, offering a balance of country life and professional opportunities (Zenkteler et al., 2022b). Remote work can help balance population distribution, reduce urban congestion, and foster economic and social vibrancy in rural regions, bridging the gap between urban and rural living standards. However, robust regional policies are needed to focus on innovation, sustainability, and economic diversification to ensure balanced development, reduce spatial inequalities, and produce equivalent living conditions. These might include targeted economic policies to stimulate job creation and investment in rural areas, offering incentives for businesses to set up in rural regions, and supporting local industries. Furthermore, policies promoting equal living conditions in urban and rural areas that can help redistribute the workforce from urban to rural regions can address the demographic disparities and reduce the trend of rural exodus (Hynes, 2017).

4.4 Mobility Patterns and Trasport Infrastructure

Mobility patterns and the associated transport infrastructure are critical to shaping urban form and development patterns. They are largely regulated by the availability of different modes of transportation and travel behavior at the local level. During the COVID-19 outbreak, major changes in travel behavior occurred, with increased reliance on private vehicles and active transport. Nowadays, mobility patterns have stabilized between car usage and public transport. Yet, the frequency of public transportation usage has not reached the levels observed before COVID-19.

The new spatialities of work that were already established before the pandemic offer employees the flexibility to choose their residential location based on a range of factors beyond the workplace itself (Biagetti et al., 2024). These include considerations such as the air quality, availability of larger housing options, and being closer to nature (Biagetti et al., 2024). Therefore, many individuals opted to relocate to the outskirts of urban centres and engage in work activities within a hybrid model. This section presents how the shifts in residential location choices and the rise of NWSs affect mobility patterns as well as the development of the transport infrastructure.

4.4.1 Mobility patterns

In general, mobility patterns influence both urban and rural development. In most urban areas, a wider variety of transportation options are available compared to rural areas, where the private car is usually the primary mode of transportation due to the vast distances between points of interest and the lack of well-developed alternative options.

The central evolving norm regarding remote work and the urban environment is associated with increased active transport and reduced use of public transport compared to the pre-COVID-19 era. While remote workers have decreased the number of commuting trips, they have also shifted their daily activity patterns, thereby influencing their mobility (Pigalle, 2024). Some studies indicate that remote work reduces the overall demand for mobility and commuting time, yet it increases distances (Hölzel and de Vries, 2021). In Dutch cities,

however, remote work decreases the overall travel distances (PBL Netherlands Environmental Assessment Agency, 2024).

Regarding the **suburban and rural contexts**, family households are relocated farther from the urban core and commute if needed for work purposes. Yu et al. (2019), notes that the allocation of flexible workplaces, such as coworking spaces in regional areas, has multiple benefits for reducing pollution and congestion in central areas as well as increasing worker's productivity (Zenkteler et al., 2023). However, in the case of suburban and rural areas, the total number of shorter non-work-related trips has increased (Krasilnikova and Levin-Keitel, 2022).

This contemporary phenomenon is problematic in many regions, with road congestion becoming a significant issue. It is, therefore, difficult to determine whether remote work mitigates the negative impacts of daily commutes on the environment and living conditions (Yu et al., 2019). Indeed, in less densely populated regions, the adoption of remote work correlates with less proximity between workplaces and residence, which risks generating spatial dispersion with a greater tendency to rely on personal vehicles, while public transport is often limited (Adobati and Debernardi, 2022; Greinke and Lange, 2022). Thereby, RW ignites a need for the development of new transport infrastructure, such as roads and public transit (Greinke and Lange, 2022; Hölzel and de Vries, 2023). However, the impact of remote work on mobility patterns depends largely on regional and national remote work policies, the regional economic structure, and various other factors that may either encourage or hinder the proliferation of remote work (see D1.1).

Krasilnikova and Levin-Keitel (2022), notes that the transport system (bus and train) has low frequency in rural and suburban areas in Germany, a common challenge in most suburban areas. At the same time, biking is not an attractive solution due to large distance access. It is indicative that in the exurban areas of Norway, there is a concerted effort to facilitate access to coworking spaces via public transportation and to encourage the use of active mobility modes despite a decline in public transportation usage during the pandemic (Di Marino et al., 2023).

Several studies highlight that remote work might have different implications on mobility patterns. For instance, (Elldér, 2020), found that in Sweden, the number of trips made by remote workers is less frequent and shorter. Furthermore, remote workers are much more prone to use active transport (cycling or walking), more often with low reliance on cars, compared to non-remote workers presenting higher car dependence. In contrast, Ravalet and Rerat (2019), showed that remote workers present longer commuting times in Switzerland than non-remote workers, and this imbalance increases over time. Non-work trips on RW days partially or fully offset the absence of commuting trips for work.

This **r**esults in **longer weekly distances travelled** compared to non-remote workers and an increase in the car mileage (Ravalet and Rerat, 2019), which in the relevant bibliography is described as the "complementary" effect of remote work (Adobati and Debernardi, 2022). On the same page, de Vos et al. (2019), highlighted that remote workers in the Netherlands have increased their commute length by 12% on average. Krasilnikova denotes that RW could potentially affect overall car usage because companies with low access to public transport can recruit people from a larger spatial range, while young workers who usually prefer to work remotely have no interest in a car-dependent daily commute.

Studies in the USA revealed that full-time remote workers travel less on telecommuting days, while part-time remote workers merely decrease the **number of trips during peak hours** (Asgari and Jin, 2018). Hence, the overall reduction in mileage due to RW varies, depending on the average distance travelled, which tends to be higher for remote workers than for non-remote workers (Adobati and Debernardi, 2022). Other studies note that teleworking eventually results in either a zero reduction or even an increase in total distance travelled (total distance includes work and non-work trips) (de Abreu e Silva and Melo, 2018).

4.4.2 Residential Preferences and Commuting Patterns

Flexible working arrangements allow employees to choose their residential location, in some cases, worldwide (i.e., digital nomads). Typically, the hybrid work model, which is developed by companies with the intention of maintaining collaborative dynamics between colleagues, allows employees to relocate to a suburban or semi-rural area within a commuting distance from the inner city.

There is a strong association between **remote work and suburban living**, with remote workers preferring suburban areas or smaller towns (Biagetti et al., 2024; Zenkteler et al., 2022a). Using an equation model, de Abreu e Silva (2022), predicted that if a person is willing to work remotely, they are more likely to relocate to a suburban area despite the longer commutes that come with this choice. In parallel, the intention to work remotely is higher when living outside the city. Meanwhile, shorter commutes reduce the willingness to work remotely, potentially serving as a coping strategy for managing longer commutes (de Abreu e Silva, 2022).

Workers' decision to relocate is influenced by several factors, including the cost of living, proximity to amenities, efficiency of local infrastructure, family ties, being closer to nature, and the costs associated with mobility in both urban and suburban areas (Biagetti et al., 2024). De Abreu e Silva (2022) points out that current residential choice criteria indicate a shift in residential patterns among remote workers compared to pre-pandemic trends.

Some studies indicated that RW positively impacts sustainable mobility, while others highlighted an increase in travel distance. The mobility patterns of remote workers are determined by their place of residence and the availability of mixed land uses and transport networks (Krasilnikova and Levin-Keitel, 2022). Hölzel et al. (2022), note that commuting is a consequence of separating work from home. In some cases, the increased distance between one's residence and their place of work may result in the formation of a "multilocal" lifestyle (Hölzel and de Vries, 2021). Nevertheless, Greinke and Lange (2022), highlighted the preference for weekly commuting over daily commuting regarding the multilocals. This can affect the vibrancy of both urban and suburban centres due to decreased pedestrian traffic and traditional retail patronage Hölzel and de Vries (2021). In France, the issue of **mobility costs** is a significant concern. The option of remote work provides a solution to mitigate the financial burden of commuting, making it more feasible and cost-effective to relocate to less central, more remote areas (Hölzel and de Vries, 2023). The exodus from urban to suburban areas has been a significant trend in Germany, with an increasing demand for larger properties. This alternative perspective has led to a shift from the city core to more peripheral and greener areas with less population and amenities density. Such changes present opportunities for residents and businesses alike to reduce their expenditures and save time (Hölzel and de Vries, 2023).

4.4.3 Transport Planning and Infrastructure

Remote work has significantly reshaped mobility patterns, reducing commuter traffic and altering traditional demand patterns. With fewer people traveling to centralized offices daily, urban planners and policymakers are redefining infrastructure investments and public transit systems. This shift presents opportunities to enhance sustainable mobility options, like active transport initiatives, while also addressing new challenges, such as the need for equitable, flexible, and adaptable transportation solutions in the suburbs due to changing work habits.

The increasing movement of people to and from suburban areas causes significant pressure on the existing road infrastructure as well as increases the demand for public transport expansion (Biagetti et al., 2024). In addition, the allocation of flexible workplaces, such as coworking spaces in regional areas, has multiple benefits for reducing pollution, congestion, and increasing workers' productivity (Yu et al., 2019). It is reported that multilocality patterns create an increased demand for flexible transportation options such as high-speed rail connections and road networks. The need for such varied mobility options can stress existing transport infrastructure, including overcrowding and increased maintenance requirements. On the other hand, the increased demand could encourage investment in transport infrastructure and services.

In Italy, many companies provide economic benefits (vouchers) to their employees to work in coworking spaces near their homes (Biagetti et al., 2024). Such new working patterns are adopted by national and regional transport strategies to deal with mobility issues and promote the development of low-traffic urban settlements (Biagetti et al., 2024). Li et al. (2024), in their research, found that regarding the travel distance to third places within the urban fabric, the accessibility to subway stations is more attractive to remote workers compared to accessibility to the road network or bus station. In the rural areas, with the increasing number of third places, it is essential that the trend towards flexible working can be accommodated by appropriate transport and urban planning (Yu et al., 2019).

Overall, the impact of RW on mobility can be twofold. While it can reduce car use and promote environmentally friendly transport, it can also increase travel distances, especially in suburban and rural areas (Krasilnikova and Levin-Keitel, 2022). On the other hand, other studies suggest remote work as a viable tool to solve congestion problems and reduce the environmental impact of traffic (Adobati and Debernardi, 2022; Helminen and Ristimäki, 2007). To this end, Yu et al. (2019), suggest that flexible working policies can incorporate different workplace options into a comprehensive workplace approach to achieve outcomes such as reducing commute times and alleviating peak hour congestion.

Regarding the urban-rural divide, Hölzel and de Vries (2023), stated that relocating work from urban to rural areas could be vital in bridging the gap while reducing travel patterns. A worth-noting practice is the allocation of coworking spaces in the periphery closer to where employees live. This also helps to reduce commuting and contributes to the goal of a "15-minute city", fostering sustainability in cities (Krasilnikova and Levin-Keitel, 2022).

4.5 Energy Consumption and the Environment

During the COVID-19 lockdown, Europe and the rest of the world experienced improved air quality, primarily attributed to the imposed mobility restrictions and the prevalence of working from home (WFH). Subsequently, as Badia et al. (2021), and de Abreu e Silva (2022) note, several environmental policies seeking to reduce carbon emissions embodied the notion of WFH to mitigate carbon emissions, while remote work has often been promoted as an attractive solution because of its ecological impact (Biagetti et al., 2024). However, the literature review suggests that WFH is connected both to the increase and decrease of energy consumption, greenhouse gas emissions, and mobility-induced air pollution (Adobati and Debernardi, 2022; Hölzel et al., 2022).

Hölzel and de Vries (2023), recorded a series of **positive environmental impacts** due to remote work, including reduced air pollution, decreased traffic congestion, improved energy use at home and transportation, and reduced greenhouse gas emissions. This is confirmed by Biagetti et al. (2024), arguing that data analysis for Milan depicts a decreasing trend in commuting, traffic congestion, and emissions due to RW that is expected to continue in the future. Furthermore, Büttner and Breitkreuz (2020), posited that extending the duration of remote workdays could reduce traffic congestion, leading to a daily decline in CO_2 emissions by 5%. Overall, increasing the number of days worked remotely could have a positive effect on improving the urban environment and mitigating traffic congestion (Krasilnikova and Levin-Keitel, 2022).

However, a broader analysis of the long- and short-term effects of RW shows that its 'green' effects are less certain than is often assumed, as several policy measures need to be taken to exploit these potential benefits (Biagetti et al., 2024; Eurofound, 2022a). For instance, Greinke and Lange (2022), in their exploration of the ecological effects of multilocality on rural areas, they point out the issue of landscape fragmentation and increased land consumption, which raises serious environmental concerns. Other issues include environmental degradation, increased pressure on local resources, and high energy consumption (see also 3.2.2).

Büttner and Breitkreuz (2020), examined the energy and travel-related rebound effects to determine the range of emissions savings. The efficiency of the rebound effect is defined by commuting patterns and working conditions, as well as the fossil fuel mix of the vehicles. For instance, in the US, the average one-way trip by car is usually longer, while the fuel consumption is 45% more than the average in European countries for the same kilometers (Büttner and Breitkreuz, 2020).

It turns out that the issue of energy consumption **is twofold**. On the one hand, it relates to the changes in mobility patterns; on the other hand, it concerns energy consumption at home. Greinke and Lange (2022) indicate that in a multilocal lifestyle, remote workers in rural areas tend to use their private cars, mainly due to a lack of transportation infrastructure and insufficient transit operation. Other studies point out that regarding public transit, resources will only be saved if there is a retrofit of timetables, particularly during peak hours and commute modal split. In this case, teleworking may lead to changes in demand for public transport, increasing operational costs rather than any real benefits for the environment (Adobati and Debernardi, 2022).

Energy consumption at home and work may vary by region and time of year. The potential for energy savings depends not only on spatial or socio-economic factors but also on how remote work is performed. Whether

employees work overtime from home or split workdays between home and office, i.e., working at home in the morning and then commuting to the office or nearest coworking space, affects energy savings potential (Adobati and Debernardi, 2022; Büttner and Breitkreuz, 2020).

In conclusion, Adobati and Debernardi (2022) mention that it is important to consider the trade-off between the positive effects of decentralization, meaning the reduction of car-induced emissions and the need to develop new infrastructure such as roads and transit infrastructure. It is also important to understand the crucial role of the urban environment in trip generation, modal split, demand for mobility, and their effect on remote work ecosystem (Biagetti et al., 2024). Overall, urban planning should establish integrated guidelines and measures for achieving climate-neutral growth, environmental management, resource savings, and transportation systems (Yu et al., 2019).

4.6 Conclusions

The decline of urban centres, the doughnut effect and the suburbanization trends reflect significant shifts in urban form and existing development patterns driven by changes in work patterns and housing preferences. However, the transition to a doughnut structure is context-dependent influenced by factors, like commuting costs, housing affordability, and the availability of urban amenities. Meanwhile, the collective advantages of urban density, such as innovation, creativity, and economic growth due to the clustering of talents, will continue to attract firms and people to cities (Glaeser, 2022; Storper and Venables, 2004).

European cities might be less affected by RW due to their distinctive amenities in the urban cores, such as parks and cultural life, which are highly valued by residents. Additionally, better regional and local transit systems in Europe could mitigate the centrifugal forces of RW, making these cities more resilient to decentralization (Glaeser, 2022).

Efforts to counteract the effects of remote work in urban centres include urban regeneration policies, by redeveloping underutilized buildings, enhancing public spaces, and promoting mixed-use developments that attract residents and businesses back to city centers. Biagetti et al. (2024) and Mariotti et al. (2023), report that the regeneration of underutilized and neglected urban spaces can boost business and residential areas, by incorporating multifunctional design that encompass natural elements, creating evolutionary spaces such as socio-cultural hybrid areas and collaborative spaces (Biagetti et al., 2024; Mariotti et al., 2023). Revitalization policies are also a well-known talent attraction strategy, championed by Richard Florida, that has been widely adopted by planners.

Establishing coworking spaces and other flexible work environments in both central and peripheral areas can help balance economic activity, providing alternatives to traditional office settings and stimulating local economies. Research indicates that when coworking spaces are equipped with other types of amenities i.e cafes, bookstores etc., they become more desirable destinations (Li et al., 2024). Other factors that play a significant role in choosing a coworking space are the built environment features, proximity to residential communities, access to public transit (especially subway), and the density of Points Of Interests (POIs) (Li et al., 2024).

Real estate proves to be quite responsive in these changes and has been integrating coworking spaces into new developments (Pajević, 2021). Furthermore, regarding the dynamics of office real estate, planners

recognize that there will be an increasing demand for smaller spaces at better locations with flexible leases that offer the opportunity (to the companies) to expand or shrink (Pajević, 2021).

According to Yang (2013), urban planning could play a vital role in achieving sustainable urban growth. This involves considering urban form, land use patterns, transportation systems, natural resource conservation, environmental management, energy, and open spaces. Implementing new urban models, such as the 15-minute city, which emphasizes proximity to daily necessities within a short walk or bike ride, can reduce the need for long commutes and support vibrant, mixed-use neighborhoods both in center cities and suburban environments, promoting sustainable living (Pozoukidou and Chatziyiannaki, 2021). Regarding the 15-minute city and workplace (Pozoukidou and Angelidou, 2022; Pozoukidou and Chatziyiannaki, 2021) point out the critical importance of decentralizing or localizing workplace. As the trip from home to work comprises the main and most inelastic everyday trip, localizing workplaces brings considerable environmental and socioeconomic benefits of reducing commuting to and from work. Furthermore, they suggest that application of the 15-minute city should factor in the potential to increase energy consumption and reduce the benefits of economies of scale achieved through organized workplaces when working from home.

Nevertheless, a study regarding the role of new working spaces (NWS) in promoting the 15-minute city model in Lisbon and Oslo, reveals that in both cities there are no solid planning orientations and guidelines focusing on the use of common -nontraditional- work spaces in the neighborhood as alternative workplaces to the office (Di Marino et al., 2023). Therefore, the 15-minute city model should seek to promote smart, flexible, and hybrid modes of working in which neighborhood-based working spaces offer the opportunity to citizens to interact socially and enjoy the benefits of organized workplaces, while reducing the frequency of commuting and saving energy. In addition, a long-term strategy should consider that job provision at the local level should be treated as a “public service” and change the current employment paradigm (Pozoukidou and Angelidou, 2022).

Investing in efficient public transportation systems that connect central urban areas with suburban and rural regions can mitigate some of the negative effects of urban sprawling trends. Improving accessibility and reducing car dependency can help balance growth and support sustainable urban development. Choi (2022), based on his study regarding the reduction of population pressures in megacities offers several significant practical implications for land use planners and policymakers. Firstly, the study suggests that to enhance the sustainability of megacities, policymakers should establish policies that encourage companies to adopt telework. Until now governmental policies aimed at reducing population pressure by incentivizing business and industries to relocate outside large urban centres (Martin and Grodach, 2023). Therefore teleworking, as a positive influence on individuals’ intentions to relocate from a megacity to a non-megacity, presents an opportunity to achieve the goal of depopulating megacities. Secondly, the study recommends encouraging the development and use of metaverse offices to entice residents of megacities to migrate to other cities, thereby alleviating population pressures. This requires investing in human capital development.

Overall, addressing the shifts in urban form and development patterns through thoughtful urban planning, revitalization strategies, and the promotion of flexible work environments is crucial to sustain both the vitality of urban centres and suburban areas as well as to mitigate the urban rural divide, in the face of changing work patterns and housing preferences.

5. Spatial effects of Remote Work: policies in Europe and beyond

The outbreak of the COVID-19 pandemic led to a significant acceleration in the expansion of remote work, calling for an understanding of remote work post-pandemic. The severity of remote work implications depends on the part of the workforce that works remotely and the degree of teleworkability of the jobs at a regional and local level (Özgüzel et al., 2023).

Policies supporting the adoption of remote work have existed for many decades but are now faced with a unique massification with long-term implications. Even before the pandemic, national, regional, and local governments worldwide were increasingly implementing policies to attract teleworkers and those employed in the digital sector.

Many kinds of policies indirectly touch upon different aspects and implications of remote work, including spatial implications, which are the focus of Deliverable 1.2. They can be organized into the following categories:

- **Policies regarding definitions, legislation, and regulation of remote work** like the EU Framework Agreement on Telework in 2002 (EUR-Lex, 2005), International Labour Organization's Statistics and Definitions (ILO, 2020), Eurofound's "Telework in the EU: regulatory frameworks and recent updates"(Eurofound, 2022b) "Telework and ICT-based mobile work: flexible working in the digital age" (Eurofound, 2020) or national policies such as Belgium's "National action plan to improve the well-being of workers in the performance of their work 2022-2027".
- **Policies on digital transition and sustainable development** (indirect), including the 2030 Agenda for Sustainable Development (United Nations, 2015), EU's Digital Strategy and the Digital Decade Policy Programme 2030 (European Commission, n.d.), EU's Cohesion Policy (Directorate-General for Regional and Urban Policy, 2024).
- **Policies on the urban-rural divide** (indirect), like JRC's (JRC et al., 2021) and Eurofound's (Eurofound, 2023) reports on urban-rural divide.
- **Policies monitoring and dealing with implications of remote work** like OECD's "Implications of Remote Working Adoption on Place Based Policies: A Focus on G7 Countries" (OECD, 2021a) or Japan's Digital Garden City Nation (The Government of Japan, 2021).
- **Policies promoting new spatialities of work** and new working spaces like the project of the European Network for Rural Development "CoLabora" (2021).
- **Policies on attracting remote workers from around the world,** such as Digital Nomad Visas and tax benefits. An early example in this category is Estonia's e-residency policy (Republic of Estonia, 2020).

In accordance with Task 1.2's central focus, this chapter focuses on policies dealing with the spatial implications of remote work, policies suggesting a place-based approach for new frameworks linked with regional development, and examples of existing strategies that incorporate remote work in development approaches for rural and remote areas. The potential implications of RW are explored through the OECD

scenarios along with the approached of Nordregio and Voith Alliance. Then follows the OECD framework for place-based approaches and their assessment with the examples of Trentino, Italy and Ems – Achse Germany. Finally, regional plans from Japan and Ireland are examined demonstrating the incorporation of RW into rural development strategies.

5.1 Policies and the spatial implications of remote work

Few policy documents are currently dedicated exclusively to the spatial implications of remote work. However, as remote work continues to gain momentum over the coming years, this situation is starting to change. As part of Task 1.2, a handful of policies were identified that address the diverse spatial implications of remote work, typically within a scenario-building context. OECD, in the report "Implications of Remote Working Adoption on Place Based Policies: A Focus on G7 Countries" (OECD, 2021a) was among the first research organizations to collect and synthesize the potential implications of remote work and its different outcomes. Nordregio (2022), with the project "Remote work: Effects on Nordic people, places and planning 2021-2024," built on those scenarios and studied the possible outcomes for the Nordic countries.

5.1.1 OECD scenarios

Recognizing that the COVID-19 pandemic shifted people's spatial relationships between home and work, the unequal capacity to adopt remote working based on the type of region, type of worker, or type of firm became a major challenge for the future (OECD, 2021a).

In 2021, the signs suggested that remote work will likely persist but developing a hybrid model where hybrid work "refers to a combination of time between working at home and at the workplace that varies from the reduced working time at home, flexible approaches or only occasional presence at the workplace" (OECD, 2021a, p. 93). Figure 3 presents an interesting elaboration on the hybrid work spectrum and the subsequent spatialities of work that arise.

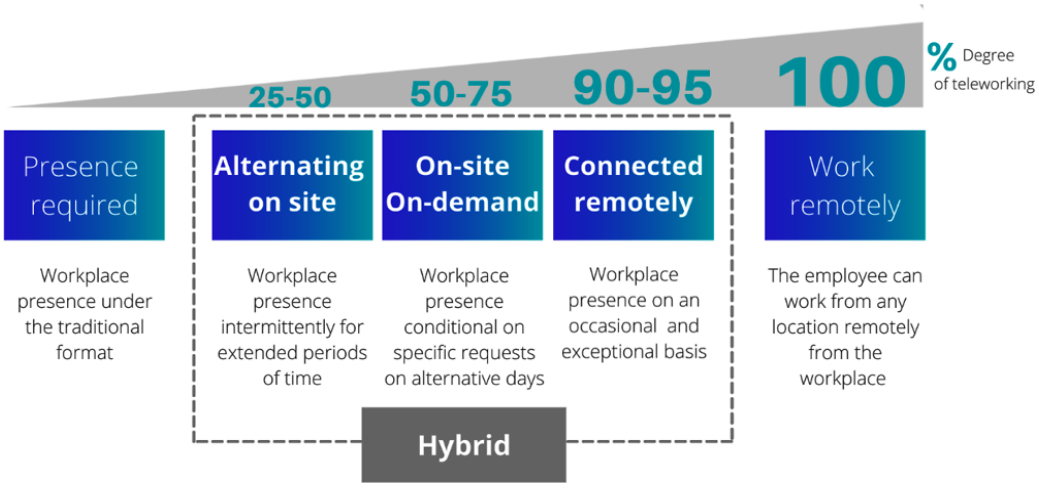


Figure 3: Hybrid telework spectrum (OECD, 2021a)

At the time (2021) and while the pandemic was still underway, an OECD analysis of surveys in G7 countries reflected a greater willingness of people to move outside cities and firms' expectations to modify building offices in cities in comparison to pre-COVID scenarios. Benefits from agglomeration economies will likely be a predominant factor in retaining workers and firms in cities; however, in the scenario of greater migration away from cities, the dispersion of settlements could bring adverse effects on various fronts, including the environment, income of low-skilled workers in large cities or efficiency of service delivery.

Despite the uncertainties at the time of elaborating this report, with the pandemic still unfolding, the OECD (2021), formulated four possible future settlement pattern scenarios that could emerge with the massification of remote work by workers and firms, with their possible effects on mobility and regional development. The scenarios draw from research developing concurrently. Following, each potential urban development scenario is presented along with its effects on mobility and regional development:

1. **Business as usual but with greater adoption of remote working**

In this scenario, peak-time pressure on public transport in large cities is reduced, with increased usage during off-peak times. There is a rise in one-off commuting to telework from secondary houses or rented spaces outside cities. Additionally, non-metropolitan regions with tourist attractions experience more significant yearly inflows.

2. **Doughnut effect** where the city centre becomes more hollow or empty, as businesses and people move to the city outskirts to find affordable and larger housing.

This scenario is inspired by the research of Ramani and Bloom (2021). The doughnut effect results in increased commuting distances but reduced commuting time per person. The outskirts and rural regions face new demands for services and land, improving housing affordability within large cities. There is also greater demand for extending public transport services in some large cities.

3. **A rise of intermediate cities** in terms of attractiveness for workers and firms

It is based on the work of Bond-Smith and McCann (2022), which was not published at the time, who focus explicitly on the role of commuting frequency in spatial changes due to remote work. The scenario predicts greater demand for services and land in intermediate cities. House and office prices in large cities will stagnate or decline relative to other cities. Additionally, there will be increased car usage in intermediate cities with less developed public transport systems.

4. Structural changes from a permanent movement of high-skilled workers outside city centres, namely a **"City Paradox"**

This is based on the work of Althoff et al. (2020), in this case, remote workers have long but less frequent commutes by car, train, and plane, leading to decreased overall commuting time but shorter commutes by car. There will be a rise in coworking places in non-metropolitan regions and city outskirts. Small cities and rural areas experience greater demand for services and land. On the other hand, Central Business Districts struggle, potentially being converted into housing districts or green areas.

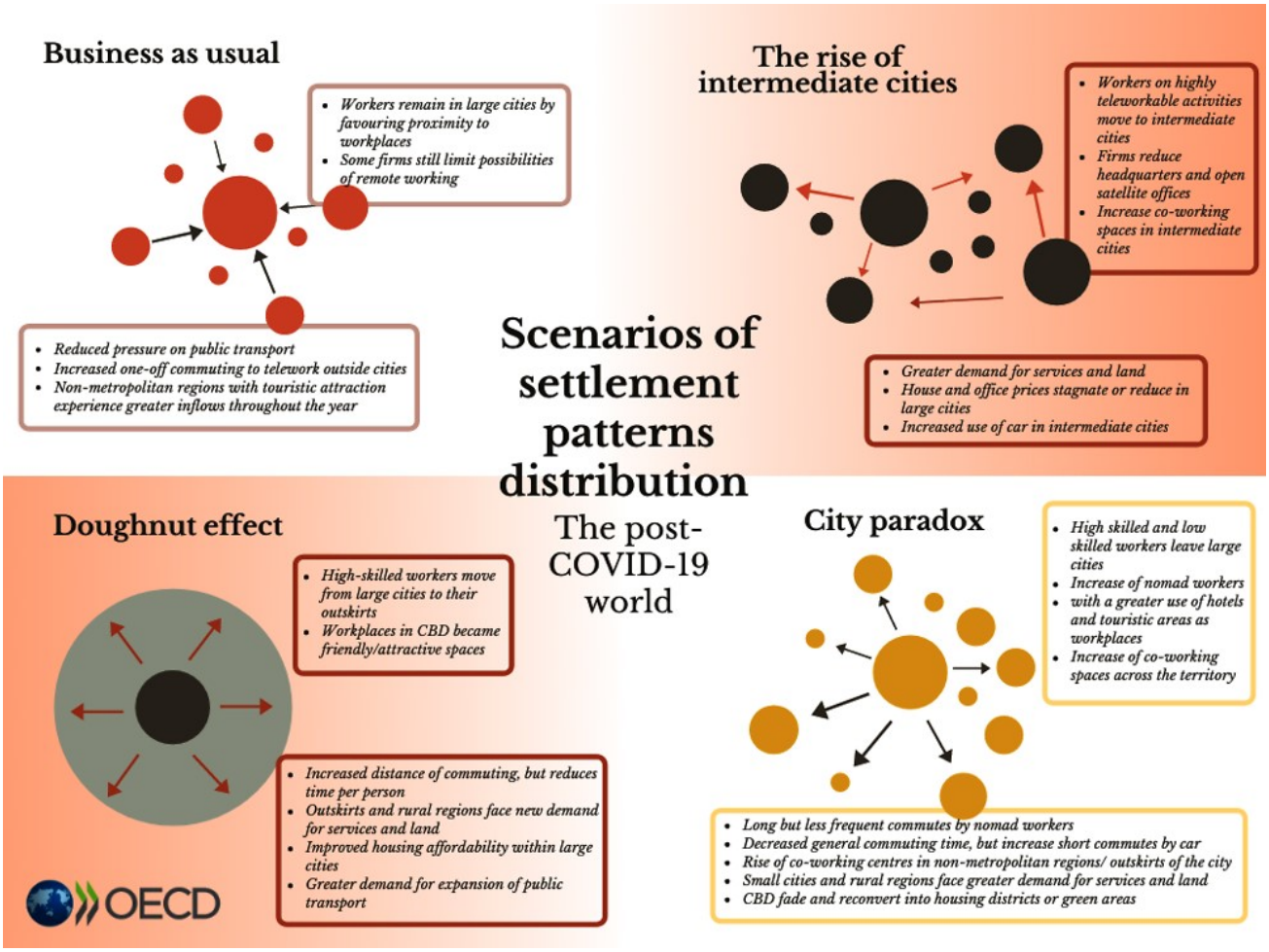


Figure 4: Graphic description of the scenarios of the distribution of settlement patterns in a post-pandemic world (OECD, 2021a)

Regarding the urban-rural divide, there are several observations regarding the situation in the G7 countries (OECD, 2021a). The OECD mapped several technologies that could shape the future of rural regions. While many of the mentioned technologies are rapidly evolving and promise disruptive effects, they could change rural communities. Also, several policies were identified, used by governments to support non-metropolitan regions in future changes related to demographics and digitalization. Key among these policies are e-education and e-health, as improving access to basic services like education and healthcare could make non-metropolitan areas more attractive since the pandemic underscored the need to increase their appeal. On the one hand, digitalization is vital in making non-metropolitan areas economically competitive and improving well-being. However, the pandemic has highlighted and amplified the existing digital urban-rural divide, with a persistent gap in broadband accessibility between non-metropolitan areas and cities, especially regarding high-speed internet access.

In conclusion, relevant policies in the G7 countries to create adequate conditions for the broader adoption of efficient remote work were examined and divided into three categories: i) investment policies such as in digital infrastructure or digital competencies and skills, ii) policies to overcome cultural barriers and improve the legal framework like promoting the right to telework and tax regimes and iii) policies to mitigate the potential

adverse side effects of remote work such as the promotion of coworking spaces or work-life balance (OECD, 2021a).

5.1.2 Nordregio's approach

Nordregio's project "Remote Work: Effects on Nordic People, Places, and Planning 2021-2024" was driven by the increasing trend toward remote work in the Nordic countries (Randall et al., 2022). This trend existed before the COVID-19 pandemic but has surged significantly since its onset. Following the progression of remote work after the pandemic, it was concluded that the most probable outcome would be a hybrid work arrangement.

Nordregio undertook an extensive review of Nordic and international literature that has emerged since the onset of the pandemic, including surveys on the preferences and future intentions of Nordic workers and companies. Interviews were conducted with national policymakers, business associations, and trade union representatives in each Nordic country. Additionally, Nordregio surveyed regional and municipal planners and policymakers throughout the Nordic Region to understand their experiences with changes in permanent and temporary populations during the pandemic, mainly focusing on the impact of increased remote work. Furthermore, relevant statistics related to migration, mobility, and multilocality at various geographic levels were analyzed, including national, regional, and municipal scales(Ormstrup Vestergård, 2022).

The spatial aspect of the project examines the territorial effects of evolving work practices, lifestyles, and routines. These effects are expected to vary significantly between different types of regions and municipalities, making it essential to understand these diverse impacts. Additionally, the planning aspect focuses on the implications of these changes for Nordic policymakers and planners.

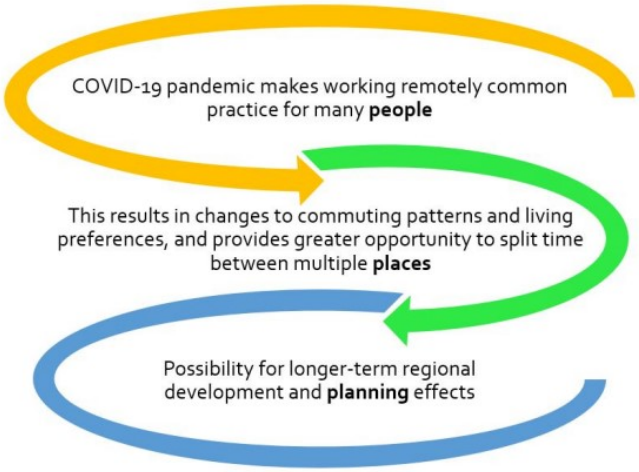


Figure 5: Nordregio's hypothesis (Randall et al., 2022)

The various spatial changes that may occur as a result of an increase in remote work are organized into three categories with overlaps (Randall et al., 2022):

- changes regarding where to live (migration); these may include long-term, stable movements involving residential relocation.
- changes to daily movements (mobility) generally to pursue short-term goals.
- changes in the way people split their time between multiple locations (multilocality); this generally implies access to more than one residence.

The project has revealed several preliminary insights into the impact of remote work on Nordic regions (Ormstrup Vestergård, 2022; Randall et al., 2022). Daily commuting had become less common, with internal migration patterns suggesting a growing willingness to travel longer distances. Some rural municipalities seem to have become more desirable places to live, and there has been an increased demand for and use of second homes. Also, rural municipalities with a strong tourism sector are identified as highly likely to benefit, presenting a crucial route to increased economic diversity over the long term. These trends could be substantial opportunities for positive development in rural areas and smaller cities near larger urban centres. Furthermore, the Nordic countries have high levels of digitalization compared to other European countries. This increased digitalization, coupled with the growing appeal of rural living and second homes, holds the potential to reverse trends toward population decline, fostering positive development in rural areas and smaller cities near larger urban centres.

Nordregio's first findings on the implications of remote work align with multiple OECD scenarios (Ormstrup Vestergård, 2022; Randall et al., 2022). An outmigration from Nordic capitals, as well as from Gothenburg and Malmö in Sweden, is observed, which may initially suggest the evolution of a "doughnut effect," where there is a movement to suburban or peri-urban locations. However, this phenomenon could reflect the 'business as usual' scenario over time, where suburbanization increases while city centers remain important. There is evidence of growth in medium-sized cities and smaller towns within commuting distance of these urban centres, adding to the observed outmigration from larger cities. This trend shows a tendency toward the "rise of intermediate cities" scenario. In this scenario, intermediate cities are becoming more attractive for living and working due to their ability to offer both agglomeration benefits and enhanced affordability and quality of life. Also, in the Nordic context, smaller cities near larger urban centres would likely be valued for their proximity and lifestyle benefits. Thus, a distinction between medium-sized and smaller cities is crucial for urban planners, as it may influence the type of urban development needed to accommodate these varying preferences. As for the "city paradox" scenario, it could be seen as an opportunity for rural development. Since the pandemic, there has been an increased interest in relocating to rural areas, reflecting a shift that might benefit these regions by attracting new residents seeking different lifestyles.

Nordregio is still conducting extensive research on remote work and policy options as part of the "Nordic Co-operation Programme for Regional Development and Planning 2021-2024". At a policy level, reliable data to understand the spatial implications of increased remote work is limited. During the pandemic, the experiences linked with remote work have been relatively similar in all Nordic countries, but different policy responses have emerged. For instance, pre-pandemic policies in Finland and Iceland related to multilocality and jobs without specific placement gained momentum with the intensification of remote work. On the other hand, in

Sweden, Norway, and Denmark, policies linking remote work and regional development didn't exist. Nonetheless, the preconditions for increased remote work are evident in all countries, and the potential regional development benefits align well with broader regional policy goals (Ormstrup Vestergård, 2022; Randall et al., 2022).

The next steps for Nordic cooperation on remote work and multilocality entail sharing knowledge with national policymakers and officials, creating a task force regarding multilocality, and developing a partnership program aimed at supporting knowledge exchange between local and regional stakeholders (Ormstrup Vestergård, 2022; Randall et al., 2022).

5.1.3 Doom Loop or Boom Loop?

The report "Doom Loop or Boom Loop: State and Local Budgeting in the COVID Era" by the Volcker Alliance Voith et al. (2024), examines the economic challenges and opportunities faced by major American cities in the wake of the COVID-19 pandemic, with a particular focus on the effects of increased remote work. The analysis creates scenarios for New York City and makes comparisons with Chicago, Miami, Philadelphia, and San Francisco. The report concludes with policy recommendations for avoiding Doom Loop outcomes in New York.

Volcker Alliance is a nonprofit that supports the public sector by strengthening public service education, championing public service values, and providing strategies for better results. Remote work is examined from an urban economic landscape point of view and with a focus on urban agglomeration. The main hypothesis can be summarized as "as activities in the urban core have shrunk, so might the returns from urban agglomeration" (Voith et al., 2024).

As a starting point for this research, the pandemic has significantly altered the urban economic landscape, primarily due to a surge in remote work. From the available data, in New York City, the percentage of people working from home increased from 4.8% in 2019 to 16.2% in 2022. This shift has profoundly impacted housing, commercial real estate, labor, and transportation sectors. The report outlines three scenarios covering eight years (Voith et al., 2024):

1. **Doom Loop Prevails**: This scenario is built on the "urban doom loop" hypothesis developed by Van Nieuwerburgh, (2022) and is a pessimistic approach. Remote work significantly reduces the advantages of urban agglomeration, leading to a potential annual economic loss of billions for New York City as offices are left vacant. This situation could trigger budget shortfalls, reduced public services, and higher taxes, reminiscent of the urban decline experienced in many U.S. cities during the 1960s and 1970s.

2. **Recovery:** This middle-ground scenario follows a back-to-normal situation in which cities adjust to the impacts of the initial shock of working from home. It suggests resilience for New York City but highlights challenges like high housing costs and expensive commutes. While office real estate values and property tax revenues stabilize and sales tax collections improve, these gains are moderate. This scenario underscores the need for targeted strategies to enhance competitiveness and address long-standing issues.

3. **Virtuous Boom Loop Arises:** This optimistic scenario envisions New York City leveraging changes brought by remote work to boost economic growth. It suggests that successful integration of remote

work could lead to higher worker productivity, increased income tax revenues, and a robust fiscal outlook. This scenario emphasizes the importance of adapting to new work patterns, investing in infrastructure, and enhancing quality of life to attract residents and businesses.

	DOOM LOOP	RECOVERY	BOOM LOOP
Employment	Falls by percentage of WFH	Returns to prepandemic trend	Returns to prepandemic trend
Population	Working households fall by percentage of WFH	Returns to prepandemic trend	Returns to prepandemic trend
Productivity/ wages	Declines by loss in agglomerations	Returns to prepandemic agglomeration	Exceeds prepandemic agglomerations
Office real estate value	Declines permanently	Returns to prepandemic values	Returns to prepandemic values
Income taxes	Revenues decline by percentage loss in productivity; cities raise taxes to make up half of loss	Revenues return to prepandemic levels	Revenues increase by percentage gain in productivity over recovery scenario
Business taxes	Revenues decline by 10% due to loss in firm productivity; cities raise taxes to make up 5% of those revenues	Return to prepandemic levels	Revenues increase by 10% due to increased productivity; cities lower taxes to gain only 5% more revenues.
Sales taxes	Falls by expected loss of population.	Revenues return to prepandemic levels	Returns to prepandemic levels
Office property values	Falls by significant margin (39% for NYC)	Revenues return to prepandemic levels, adjusted for expected gains in employment	Revenues return to prepandemic levels, adjusted for expected gains in employment

Figure 6: Summary of key assumptions for the three scenarios, (Voith et al., 2024, p. 23)

The report advocates for specific policies mitigating the risk of the "Doom Loop" and fostering urban recovery and growth in the post-pandemic era (Voith et al., 2024):

- Innovation hubs: Promote the city as a hub for innovation-generating sectors that benefit from in-person interaction.
- Encouraging In-Person Work: Implement policies that make commuting more efficient and affordable to maintain the benefits of urban agglomeration.
- Investments in infrastructure: Enhance transportation networks and digital infrastructure to support remote and in-person work.
- Housing Affordability: Address high housing costs to make cities more attractive to a diverse workforce.
- Quality of Life Improvements: Invest in amenities and public services that improve urban living standards and appeal to potential residents and businesses.

5.2 Place-based policy frameworks

A place-based approach generally emphasizes the unique characteristics and needs of a specific geographic area when developing plans and policies. This methodology emphasizes the importance of local context, engaging community members, and leveraging local resources to foster sustainable development and improve quality of life. Within the EU framework, as Weck et al. (2022),suggest “A place-based approach is expected

to promote a strategic shift towards more place-sensitive, cross-sectoral, and socially inclusive development." This concept has been used in various EU policies since the 1970s. For instance, the Territorial Agenda 2030 (EU, 2020)promotes place-based policies in Europe by providing a framework to promote territorial cohesion and sustainable development. This includes, among others, a focus on a place-sensitive approach and inequalities, on spatial imbalances, and the encouragement of different level collaborations (EU, 2020).

5.2.1 Teleworking strategies for local development - OECD

In 2020, during the COVID-19 pandemic, as part of the OECD's Local Economic and Employment Development (LEED) Papers, the organization published a report titled "Exploring policy options on teleworking: Steering local economic and employment development in the time of remote work" (OECD, 2020) approaching large-scale remote work as a potential opportunity to minimize pre-existing disparities between people, places, and firms. This document set the frame for creating a place-based toolkit for local development in the following years.

This preliminary policy approach recognizes that remote work is a complex phenomenon with a diverse range of impacts. In urban and rural areas, a set of opportunities and threats is identified (OECD, 2020):

- Regions that are currently underdeveloped, including rural, inner, and mountainous areas, as well as small and medium-sized towns, could become appealing destinations for teleworkers due to their higher living standards and lower living costs.
- Their attractiveness depends on local amenities such as access to nature, air quality, weather, and infrastructure, as well as aspects like affordability, good connectivity to larger centers, and the ability to reach critical mass in service delivery.
- Massification of remote work could contribute to decentralizing jobs away from major cities and their peri-urban areas. Moreover, it could help alleviate rising housing prices in bigger cities and traffic congestion from regular commuting.
- However, it could also reduce commerce revenues in large urban centres or lead to a decline and a loss of economies of scale, impacting productivity, employment, and consumer choices in certain industries (personal services, food services, retail, etc.).

As a conclusion on exploring policy options, it is noted that the COVID-19 pandemic made clear that large-scale, long-lasting teleworking has an impact on people (employers, employees), places (urban, semi-dense and rural areas), and firms (large firms, SMEs), even when applied for a few months (OECD, 2020). From a spatial development point of view, the need for a forward-looking and monitored transition is exceeded, as is the importance of multi-stakeholder dialogue, while remote work could be an opportunity for regions and firms to grow (OECD, 2020).

Some principles are introduced to aid different scale policymakers in a "smooth teleworking transition," fostering a sustainable teleworking model to the advantage of people, places, and firms (OECD, 2020):

- A comprehensive approach to policy design for teleworking by integrating dialogue with different stakeholders at the local level and embracing an adaptive policy approach.

- Promoting fairness and inclusiveness as remote work is unevenly accessible by different types of workers, places, and firms and has diversified effects across them. Policies on teleworking could contribute to minimizing disparities.
- Giving priority to achieving societal goals such as sustainable development, work-life balance, and the right to disconnect.
- Creating relevant framework provisions by ensuring the existence of an enabling legal framework, incentives, and attraction policies for remote workers, up-to-date digital infrastructure, and effective local public services.
- Establishing a new evidence base to collect and interpret data and metrics informing policy decisions. At the same time, policy design could provide for data collection, monitoring, and evaluation.

Building on the above, in 2022, a project note was produced in the context of OECD's place-based toolkit for local development titled "Assessing teleworking strategies for local development: a framework proposal" (OECD, 2022).

This note produces and organizes a framework to holistically approach remote work and provides guidance for national, regional, and local governments on how to effectively implement and assess teleworking strategies to maximize their benefits while minimizing disparities. Strategies should include remote work as a component while also aiming to address spatial divides, reduce commuting and its repercussions, and foster regional competitiveness.

	Policy questions	Opportunities	Threats
Urban areas	How does mass teleworking affect densely populated areas?	Reduced congestion, less pressure on transport infrastructure Lower rent prices if fewer people seek housing in the area Increased cohesion with rural areas	Drop in demand for public and private services Devaluation of real estate investment in urban areas Outflow of human capital
Rural areas	How does mass teleworking affect less densely populated areas?	New work opportunities, job retention Inflow of human capital, repopulation Larger tax base to finance public services Incentive to speed up investment in IT infrastructure Increased cohesion with urban areas	Initially, lower availability of public and private services Pre-existing digital divide with urban areas Risk of excessively increased rent prices/displacement of locals
Society	How does mass teleworking impact society as a whole?	Less greenhouse gas emissions due to lower commuting and business travel Improved wellbeing Improved welfare sustainability (e.g. more flexibility for childcare) Improved territorial cohesion (e.g. inner-city/outer-city)	Increased climate impact of data centres Potentially increased costs for healthcare: sedentariness, anxiety, social isolation Disparities in access to opportunities (high- vs. low-skilled workers, online vs. offline industries) Risk of increased domestic violence

Table 7: Main policy questions and most frequently reported opportunities and threats associated with teleworking (OECD, 2020)

A large portion of OECD suggestions revolve around monitoring systems and assessment approaches. Comprehensive monitoring systems can achieve several goals: preventing teleworking strategies from producing inconsistent and adverse results, deterring zero-sum situations where policymakers must prioritize between objectives or groups, and informing compensatory policies to address any losses in specific areas or groups when necessary (OECD, 2022). A three-step approach may guide the assessment of teleworking strategies for local development, including (OECD, 2022):

1. Screening of local conditions for teleworking

Screening local conditions for teleworking can assist policymakers in the early detection of flaws that may undermine a relevant strategy. For remote work to be applicable, several key requirements must be met: a widespread, high-speed, secure digital infrastructure; available space in households or third places outside the default workplace; a conducive regulatory environment for remote work; adequate local public services (schools, hospitals, etc.); and a transport infrastructure that ensures accessibility to metropolitan areas and larger cities. Periodic assessments of local remote work conditions enable policymakers to monitor changes over time, offering preliminary insights into the effectiveness of the applied strategies.

2. Review of indicators reflecting strategic policy objectives.

Achieving scale is essential for remote work to have a strategic societal impact. Regular surveys, such as those on ICT usage, labor force participation, or business conditions, can provide valuable data for measuring teleworking. However, measuring remote work in regional or local contexts presents unique challenges, including difficulty in regional representativeness when using national data sources, barriers to comparability with other regions, and managing statistical outliers or potential biases in survey evidence and response rates.

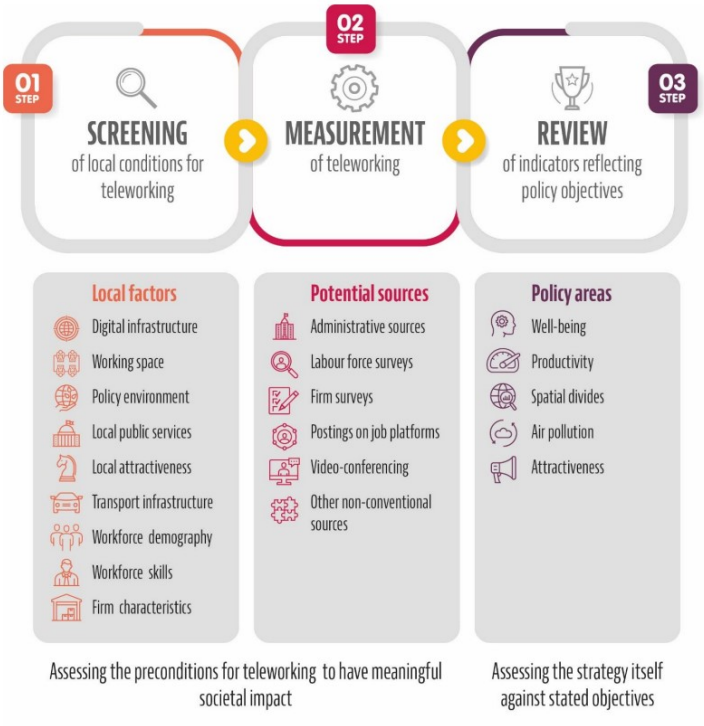


Figure 7: A three-step approach to assessment of teleworking strategies for local development (OECD, 2022)

3. Review of indicators reflecting strategic policy objectives

Remote work strategies need to be evaluated based on their core objectives. Despite certain limitations, monitoring tools can aid policymakers in assessing the societal changes linked to teleworking. These monitoring systems should also consider the unintended effects of teleworking.

5.2.2 A place-based toolkit for local development by OECD: Trentino, Italy and Ems-Achse, Germany

The project "The future of teleworking: A place-based toolkit for local development" aims to support the OECD's national, regional, and local governments in promoting a smooth transition to the likely large-scale and enduring use of teleworking, which is conducive to sustainable social and economic local development. Taking a neutral stance, it aims to inform policy solutions for countries and regions seeking to capitalize on their teleworking potential (OECD, n.d.).

TRENTINO, ITALY

In Italy, the Autonomous Province of Trento for years prepared a plan for teleworking as a way to foster local economic and social development (OECD, 2021b). OECD (2021a), contributed to exploring opportunities and challenges for a smooth transition to a more hybrid work environment in view of a number of societal objectives, including an improvement in living standards, territorial cohesion, and competitiveness. As a result, the OECD identified six policy areas for recommendations (OECD, 2021b) including:

- Frequent labor market surveys and the availability of administrative sources to allow trends to be continuously monitored and, in turn, provide a mechanism to assess the efficacy of policy interventions.
- The facilitation of the sharing of knowledge and experience on teleworking among public and private sector organizations and the wider public.
- The improvement of the regulatory framework for employees and firms.
- The integration of remote work into other policy areas, such as social inclusion and green transition.
- Investment in digital infrastructure and transport planning to accommodate the needs of remote workers
- Raising Trentino's profile as an attractive destination for teleworkers and as a reference for a governed transition to large-scale teleworking.

In collaboration with the OECD, the Autonomous Province of Trento initiated the "Piano Strategico di promozione del lavoro agile nella provincia di Trento" in 2021, with the aim of transforming the Trentino region into a flexible and dynamic territory through the adoption of agile work practices (Provincia autonoma di Trento, 2021). Agile or smart work as used in the policy, includes remote work as is approached in the context of this research. This transformation is grounded in increasing the region's overall "smartness," which refers to enhancing its human, social, environmental, infrastructural, and digital capital.

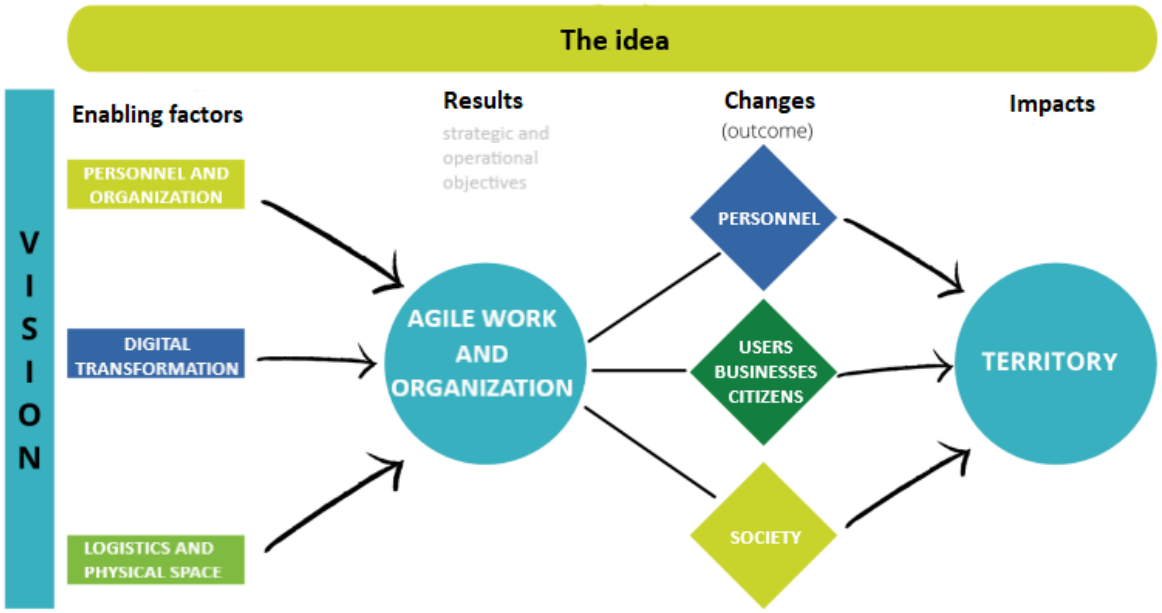


Figure 8: Vision, results, outcomes, impacts of the Piano Strategico di promozione del lavoro agile nella provincia di Trento (Provincia autonoma di Trento, 2021)

The plan's main goals cover the enhancement of the flexibility and adaptability of employers and employees both in the private and public sectors and the increase in the adoption of remote work. Regarding the spatial and environmental dimensions, the goals include:

- The promotion of sustainable development to create a sustainable and competitive community by promoting agile work as a key policy for territorial development. This aligns with broader sustainability goals outlined in the Agenda 2030 (United Nations, 2015).
- A focus on digital transformation by developing adequate digital infrastructures to support innovative interactions and timely responses to citizens' and businesses' needs.
- Integration with national and regional policies such as the National Recovery and Resilience Plan (OECD, 2022) (Piano Nazionale di Ripresa e Resilienza) to ensure alignment with other strategic frameworks that also focus on areas like digital transformation, public-private partnerships, and sustainable growth.

The ultimate purpose of Trentino's teleworking strategy is to enhance regional competitiveness, fostering a better quality of life for its residents through enhanced digital and public services (OECD, 2022).

EMS-ACHSE, GERMANY

The other example is drawn from Germany. The "TEA - Telearbeit in der Ems-Achse" project (see also TEA - Telearbeit in der Ems-Achse - Emsachse), funded by the "Region gestalten" program of the Federal Ministry of the Interior and Community, in cooperation with the Federal Institute for Research on Building, Urban Affairs, and Spatial Development, is a three-year project coming to an end in September 2024 (Wachstumsregion Ems-

Achse e.V., 2022). OECD collaborated with Wachstumsregion Ems-Achse e.V., an association comprising over 800 companies, municipalities, chambers of commerce, educational institutions, and associations in the Ems-River region of Lower Saxony, Germany. OECD created a policy brief with recommendations for using telework to tackle labor shortages in the area, incorporating the element of regional planning (OECD, 2023).

Taking into account that Ems-Achse is a largely rural region with a relatively modest presence of the tertiary sector that faces challenges in attracting and retaining skilled workers in the local labor market, increasing the uptake of teleworking and hybrid arrangements that combine work from home and office work could create new opportunities for the region (OECD, 2023) .

The policy recommendations are formed around three thematic axes (OECD, 2023):

- Improving teleworking readiness by upgrading the internet infrastructure, promoting modern managerial culture, digital skills, and teleworking agreements.
- Targeting specific teleworker groups to address labor shortages.
- Accommodating remote workers: This includes suggestions to improve public transportation accessibility, create a remote work community by using the growing network of coworking spaces, attract young talent, and promote the region as an attractive destination. Moreover, integrating teleworking into tourism promotion efforts and showcasing advantages such as affordable housing, competitive public services, and natural amenities could effectively highlight the Ems-Achse region as an appealing place to visit, work, and live.

In the above cases, the place-based approach to telework has similarities and differences. Both policies emphasize the importance of improving digital infrastructure, as internet connectivity is fundamental to telework, and aim to enhance their attractiveness as destinations for teleworkers; in the case of Ems-Achse, the focus is on promoting the area's amenities, and in Trentino, on integrating telework into broader sustainability and smart development goals. Nonetheless, in Ems-Achse, addressing labor shortages by targeting specific (tele)worker groups and improving teleworking readiness in a rural context is central. In contrast, Trentino's approach incorporates RW into a broader strategic vision of regional development that includes sustainability, digital transformation, and alignment with national recovery plans. This broader scope aims to foster long-term competitiveness and quality of life improvements through a holistic integration of RW into the region's socio-economic fabric. Thus, while both regions approach telework as a tool for regional development, their strategies diverge in scope and focus, considering the local context and long-term regional goals.

5.3 Examples of Regional Plans incorporating remote work

The link between remote work and rural and regional development has been explored for decades, with conversations about a digitally driven 'regional renaissance' emerging as early as the 1980s (Randall et al., 2022). To harvest the positive effects of remote work, a number of policies are being developed to attract teleworkers to less populated, rural, and remote areas. These policies approach remote work holistically as part of regional development.

5.3.1 Our Rural Future, Rural Development Policy 2021-2025, Ireland

Our Rural Future, Rural Development Policy 2021-2025 (Government of Ireland, 2021) represents the Irish Government's blueprint for rural development, focusing on a five-year period. It is part of Ireland's post-pandemic recovery plan and underpinned by the Project Ireland 2040 objective of achieving Strengthened Rural Economies and Communities. Moreover, it follows international approaches to rural development at the EU and OECD levels.

This rural development policy sets a long-term vision for a vibrant and sustainable rural Ireland. It focuses on sustainable economic, social, and environmental development and advocates an integrated, place-based approach to rural development while emphasizing the interdependency of rural and urban areas(Forde, 2021; Government of Ireland, 2021).

The Policy focuses on the following thematic objectives (Government of Ireland, 2021):

- Optimizing the opportunities for rural communities from high-speed broadband.
- Supporting improved quality employment and career opportunities in rural areas.
- Assisting rural towns and villages' regeneration, repopulation, and development.
- Enhancing the participation, leadership, and resilience of rural communities.
- Enhancing public services in rural areas.
- Supporting a Just Transition to a climate-neutral economy.
- Supporting the sustainability of Agriculture, Marine, and Forestry.
- Supporting the sustainability of Ireland and its coastal communities.
- Nurturing Irish culture and heritage.

The action plan involves (Government of Ireland, 2021):

- Investment in remote working infrastructure to provide an opportunity for people to continue to live in rural communities while following their career ambitions.
- Investment in rural towns and villages as economic and social activity hubs.
- Aiming to diversify rural economies, including through the delivery of high-speed broadband to every part of the country.
- Adoption of a place-based approach to rural development to holistically meet the needs of different areas and maximize the impact of investment in those areas.
- Investment and empowerment of rural communities to design and deliver responses that meet their local needs.
- Active involvement of young people in rural areas in decisions that affect them and their future.

Remote work is directly linked to the key deliverables of this policy. The actions stem from the introduction of legislation providing employees the right to request to work remotely, to the transformation of vacant properties in rural towns into remote working hubs (Government of Ireland, 2021).

Figure 9: Outcomes of Ireland's Rural Development Policy 2021-2025 (Government of Ireland, 2021)

Significant investment in remote working infrastructure will enable more people to live and work in rural areas, offering good career prospects irrespective of their employer's location. An integrated network of over 400 remote working facilities should be developed, featuring shared back-office services and a single booking platform. Utilizing these facilities can help retain skilled individuals in rural communities and attract mobile talent. Legislation should consider reviewing the current tax arrangements for employers and employees involved in remote working. Piloting coworking and hot-desking hubs for civil servants in regional towns and aiming for 20% remote working in the public sector in 2021 with annual increases are essential steps. At the same time, organizations like IDA Ireland, Enterprise Ireland, and Údarás na Gaeltachta should promote remote working to support regional job creation. Introducing specific incentives to encourage remote workers to relocate to rural towns and funding Local Authorities for innovative marketing campaigns to attract remote workers and mobile talent are also recommended (Government of Ireland, 2021).

All the above efforts are interlinked with a detailed plan for revitalizing rural towns and villages and improving public transport services, health care within communities, housing provision, early learning and childcare facilities, and community safety (Government of Ireland, 2021).

5.3.2 Digital Garden City Nation, Japan

Japan has been focusing on regional revitalization as a key policy for over a decade. Japan's regional revitalization aims to address population decline and excessive concentration in Tokyo by promoting balanced development. In 2014, a five-year comprehensive strategy was established aimed at creating jobs, attracting people to rural areas, supporting young families, and fostering regional cooperation (OECD, 2021a; Sawagi, 2019).

Following previous strategies, the Digital Garden City Nation Policy of Japan – DIGIDEN – is an initiative aimed at revitalizing rural areas and addressing the challenges posed by Japan's aging population and urban concentration, setting a strategy from 2023 to 2027. In summary, harnessing the rise of remote work and the growing interest in relocating to rural areas, digitalization will accelerate and enhance regional economies' revitalization (Cabinet Secretariat Office - JP, 2022). The strategy also aims to ease the population concentration in the Tokyo Metropolitan Area (TMA) by promoting a multipolar distribution, providing rural residents with access to information and services equivalent to those in urban areas, and using regional social challenges as catalysts for growth. Moreover, it is crucial to continue promoting past initiatives for rural revitalization while building on the results and insights gained so far.

The policy outlines several primary objectives (Cabinet Secretariat Office - JP, 2022; The Government of Japan, 2021):

- Enhancing digital infrastructure and connectivity across the country.
- Supporting rural revitalization while implementing digital services to solve rural issues.
- Fostering human resource development focusing on providing residents, especially in rural areas, with the necessary skills to thrive in a digital economy ensuring inclusivity and digital literacy.

The Digital Garden City Nation strategy promotes remote work as a significant factor in revitalizing rural areas and counteracting urban concentration via (Cabinet Secretariat Office - JP, 2022):

- Providing financial support to local governments in developing remote work facilities such as coworking spaces and satellite offices.
- Offering incentives for telework implementation, such as encouraging businesses to adopt telework practices and promoting relocation without a job change.
- Offering financial incentives and support for businesses to relocate or hire from rural/small-town talent pools.
- Introducing the concept of "dual residency" which encourages individuals to split their time between urban centres and rural areas.
- Introducing the concept of "workation" to revive the tourist economy in rural areas.

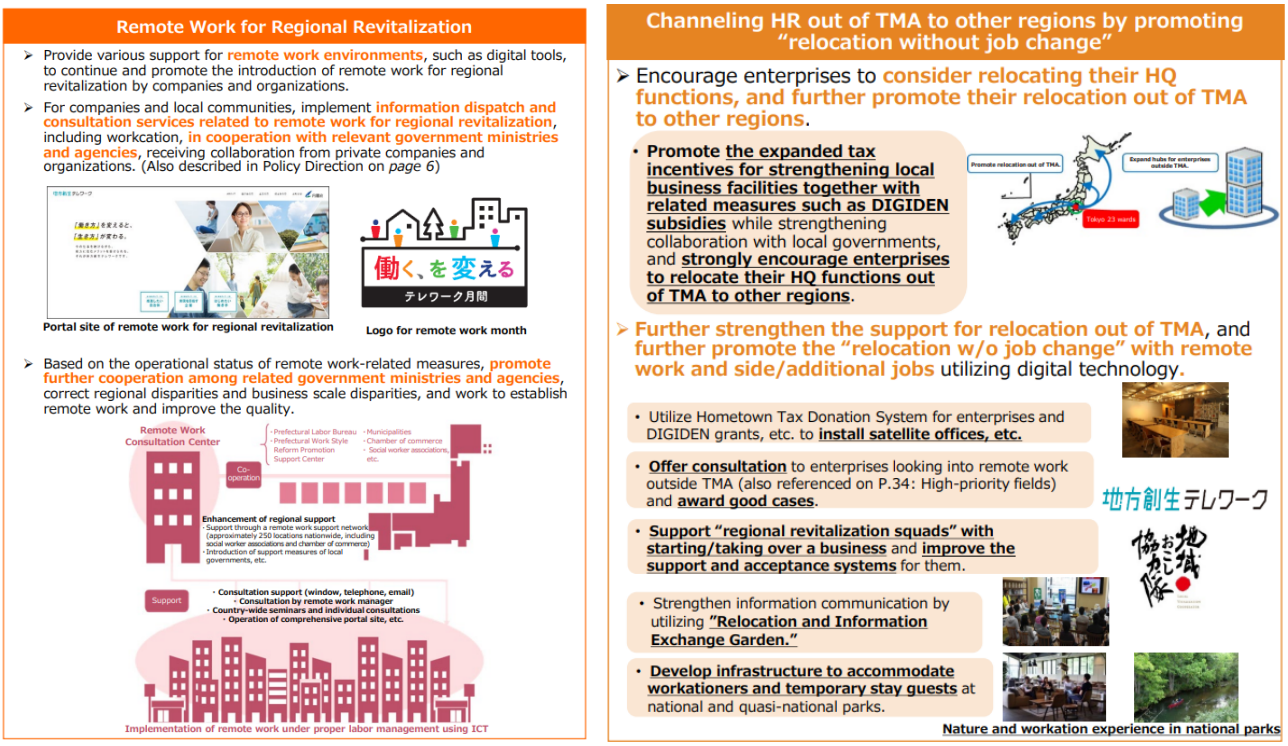


Figure 10: Aspects of promoting remote work in the Vision for a Digital Garden City Nation (Cabinet Secretariat Office - JP, 2022)

In 2023, Japan initiated relocation support programs. These programs include a subsidy of 1 million yen (approximately US$ 6.770) for individuals working in local rural areas and an additional 2 million yen for starting a new business (Kakegawa, 2024). This totals a 3-million-yen subsidy per participant, with an additional 1 million yen for each child in families who move from greater Tokyo to rural areas of Japan. These policies aim to encourage up to 10,000 people to move outside of the greater Tokyo area by 2027 (Kakegawa, 2024).

Through these strategies, the Digital Garden City Nation strategy aims to not only facilitate remote work but also to create a sustainable and attractive environment for individuals to live and work in rural Japan, ultimately contributing to the country's economic and social revitalization.

5.4 Conclusions

Although remote work is not a novel concept, the COVID-19 pandemic accelerated its adoption across various sectors, prompting the reevaluation of existing policies, their effectiveness, and the emergence of new ones. Policies referring to remote work can be categorized into six key areas: definitions and regulations, digital transition, the urban-rural divide, RW implications, and policies promoting NWSs and attracting remote workers. The focus here is on policies dealing with the spatial implications of remote work.

The potential spatial effects of remote work in different contexts are discussed, considering the likely increase of hybrid work. The spatial implications are examined through scenario-based approaches and place-based policy frameworks in regions like the G7 and Nordic countries. OECD suggests four potential scenarios: the business as usual, the doughnut effect, the rise of intermediate cities, and the city paradox scenario. The OECD place-based toolkit for local development is examined, identifying opportunities and threats of RW in urban and rural areas and providing a policy assessment strategy along with two examples of place-based policies in Trentino, Italy, and Ems-Achse, Germany.

The importance of adopting place-based policy frameworks that consider different geographic areas' unique characteristics and needs to promote sustainable development and improve quality of life in the context of increased remote work is emphasized. Moreover, various policies are being formulated to draw remote workers to less populated, rural, and remote areas. These policies take a holistic approach, integrating remote work into broader regional development strategies.

6. Case Studies

The regional typologies were utilized to ensure a comprehensive representation of diversity and varying characteristics in selecting the case studies. This approach aimed to encompass a wide array of contextual factors and regional specificities. By Including case studies from Europe's southern, central, and northern regions, the sample aimed to achieve a geographically balanced sample and reflect the distinct socio-economic and spatial dynamics of these areas within the constraint of only seven European case studies and one American.

The final selection of case studies was shaped by the responses received and the willingness of individuals and organizations to participate in interviews. This ensured the relevance and feasibility of the chosen case studies for the subsequent qualitative analysis. The eight selected case studies comprise cities/regions from Austria, Northern Italy, Central Greece, East Netherlands, West Portugal, East Spain, Southeastern Sweden, and the US East Coast.

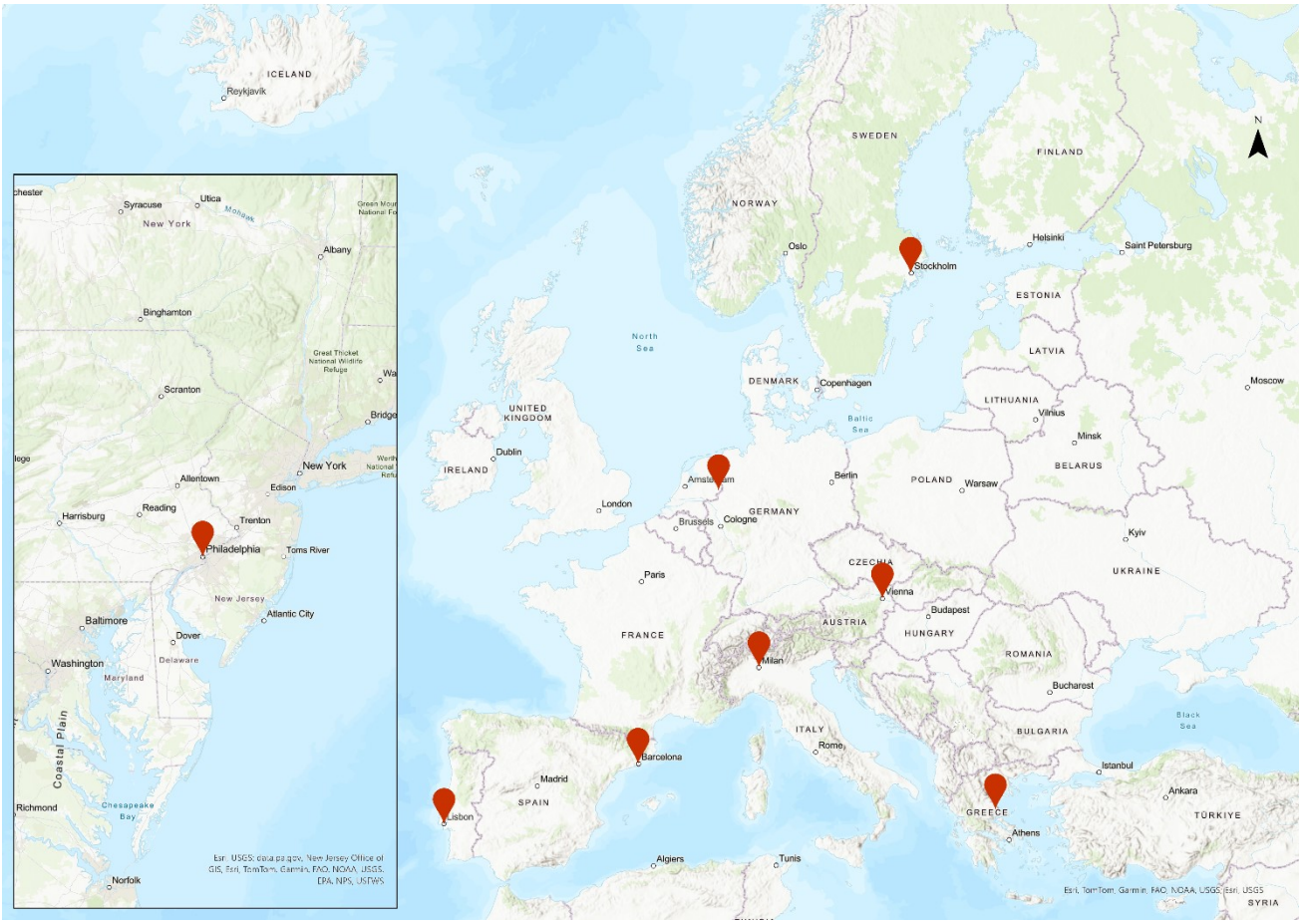


Figure 11: Map of the selected case studies

The individuals and organizations that were approached possessed both a comprehensive understanding of the RW phenomenon in their area and an awareness of urban development. In total, 21 semi-structured interviews were conducted, encompassing a diverse range of expertise. The participants consisted of six (6) researchers in various fields, five (5) representatives from regional authorities, five (5) planners, two (2) experts on real estate, two (2) CS experts – one is also a founder and one (1) remote work community facilitator. The results are presented in alphabetical order by case study.

Case Study	Number of interviewees	Expertise	Country
Barcelona	3	Researcher on urban planning and development	Spain
		Researcher on urban governance	
		Planner/Rural Development	
Lisbon	2	Researcher on NWS	Portugal
		Real estate and gentrification expert	
Lombardy & Trentino	3	Real estate expert	Italy
		Policy Analyst	
		Researcher on remote work	
Philadelphia	2	Urban Planner	USA
		Urban Transport Planner	
Stockholm	3	Planner in a Regional Authority	Sweden
		Researcher on remote work	
		Urban Transport Planner	
Twente	3	Regional policy advisors and researchers	Netherlands
Vienna	2	Planner for a Regional Authority	Austria
		Urban Planner	
Volos	3	Remote work community administrator	Greece
		Coworking space	
		Coworking space expert	

Table 8: Number of interviewees per case study and their field of expertise

6.1 Barcelona, Spain

Context

Barcelona NUTS3 is the center of the Barcelona Metropolitan Area in the Autonomous community of Catalonia, Spain. Catalonia is administratively divided into four provinces with a population of 7.5 million. Barcelona is the capital of Catalonia and the second most populous municipality in Spain. Spain's territorial structure gives rise to a distinctive urbanization pattern along its coastline, with a high concentration of population in coastal cities while the inland remains sparsely populated, with Madrid as the primary urban centre and the pole of monocentric development.

Barcelona is located on the country's northeastern coast in the Mediterranean Sea and occupies a strategic position in southern Europe in the middle of the Mediterranean corridor. This advantageous geographical location and the city's extensive history have enabled Barcelona to become the principal centre of Catalonia. The Barcelona Metropolitan Area has a dense urban core of the municipality of Barcelona, and several medium-sized cities and towns interconnected with Barcelona's central hub (Catalán et al., 2008). The famous grid, now perceived as the city's center, was originally designed to integrate nearby towns, creating a unified and compact urban area. Barcelona is one of the most important cultural and financial centres in the southwest of Europe.

The population within the city limits is 1.6 million inhabitants, and based on the Urban-Rural Typology employed by the European Commission (Eurostat, 2018), Barcelona is classified at the NUTS3 level as a capital metropolitan region and a predominantly urban, coastal, non-border region with > 50% of the surface in mountainous areas. According to (Eurostat, 2018), The Metropolitan Area of Barcelona has 5.6 million inhabitants.

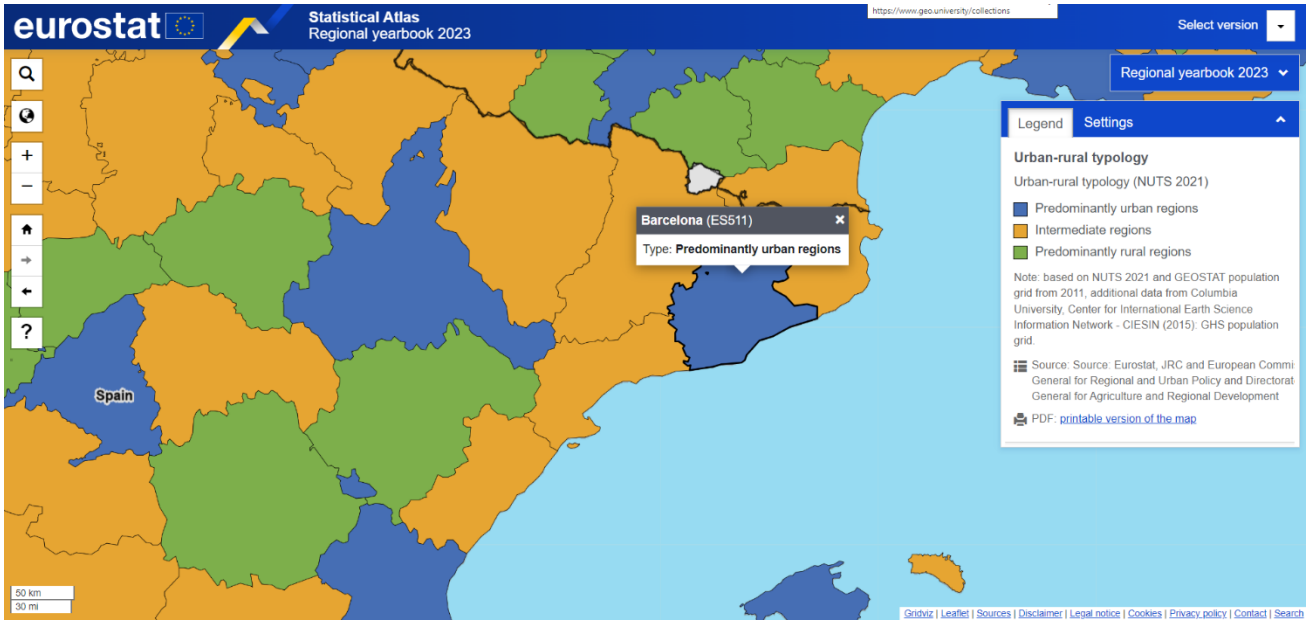


Figure 12: Urban-rural typology of the Barcelona Metropolitan Area, NUTS3, (Eurostat - Statistical Atlas, 2023)

According to the available data from Eurostat (2024), the percentage of remote work in Spain was 7,1% in 2023. This figure is relatively below the European average. Although there is no available data to estimate the number of remote workers at the city level, based on Eurostat (2021), the annual share of persons who usually work remotely in 2020 is 8% in Catalonia.

Key Findings

Barcelona's unique polycentric city structure and population dynamics attract remote workers locally and from abroad. The interviewees highlighted the importance of addressing disparities between big cities and smaller towns, providing support to rural communities, and incorporating the spatial impacts of remote work into urban and regional policies.

The city centre has undergone significant gentrification, with a notable influx of high-skilled individuals, such as ex-pats or digital nomads from around the world. These usually can afford to rent a property in the city centre for small periods of time. Consequently, from the short-lease arrangements, the affordable housing options in the center of Barcelona have decreased dramatically. The working class is dragged to the suburbs. The migration of residents to suburban or rural areas while maintaining daily activities in the city center has created what is referred to as a “sleeping rural nuclear” effect. This highlights an emerging urban-rural divide.

Despite the displacement of locals from the city centre, Barcelona is not losing population. This is mainly an effect of over-tourism, in combination with the increasing influx of remote workers. The city has not yet implemented policies to regulate the impact of digital nomads/expats. In particular, one interviewee commented, “We currently don’t know how many individuals are residing in this manner”.

It is worth mentioning that many locals own homes outside of the city, especially on the coastline, and they prefer to rent apartments in the center or commute when necessary. This conversion of second homes into primary residences puts pressure on existing suburban utility infrastructure. Nevertheless, this phenomenon is mainly driven by gentrification, and the remote working arrangement gives people greater flexibility in residential choices.

The first modality of remote work is the home-office in a hybrid model. However, the houses in Barcelona are not adapted to support this; they are small and lack sufficient infrastructure. The rise of third places like libraries and cafes offers an alternative for remote workers. Barcelona has a big network of libraries. There are not only large libraries but also smaller ones at a neighborhood scale to accommodate the needs on a local level. It is important to revalidate the zoning in land uses of the neighborhoods. If someone works from home, they organize their daily needs in the surrounding area rather than going to the city center. So, the density and mixture of services are rather important and need to be addressed by policies.

Regarding the transport infrastructure and mobility patterns, the metropolitan area has an integrated and multimodal public transport system that connects the municipalities. In addition, the regional train lines connect the periphery and smaller towns to Barcelona.

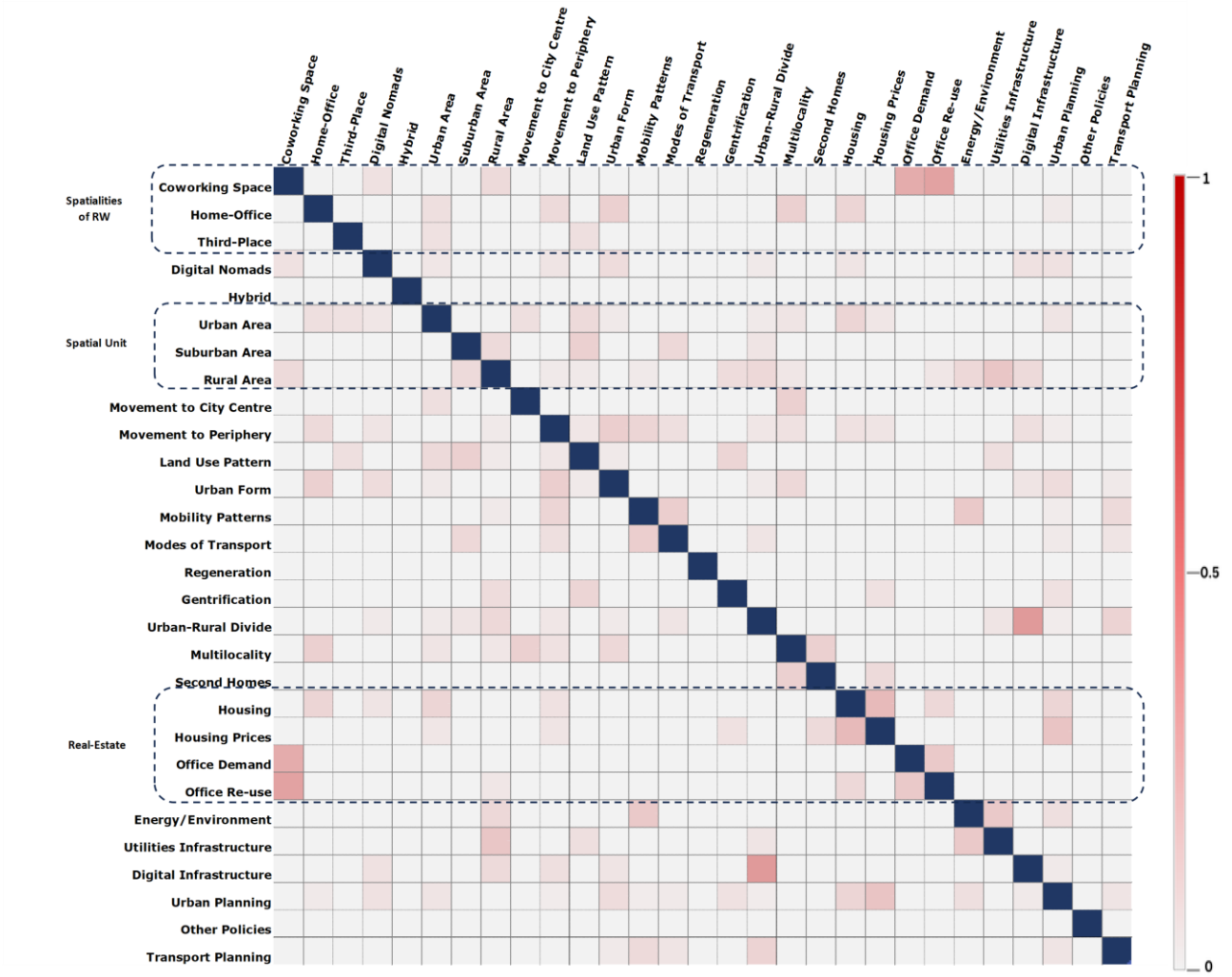


Table 9: Barcelona - Correlation matrix of variables measured correlation coefficient ranging from 0 to 1. The scaling corresponds to the strength of the correlation; white close to zero indicates no correlation and dark red strong correlation coefficients between variables

Three interviews were conducted in Barcelona to understand the spatial impact of telework better. A number of key themes emerged from the thematic analysis coding of the interview data, particularly at the local level for this case study. The key themes are the digital nomads' dynamic, the city's gentrification issues, and the urban-rural divide.

Discussion on the spatial implications of remote work in Barcelona

According to the insights of the interview participants, remote work has affected Barcelona. Following the research questions and the results of the correlation matrix, the findings are as follows:

- **Urban development trends:** The short lease arrangements accentuated gentrification and the loss of the local identity in many neighborhoods. The influx of high-skilled expats and digital nomads has accelerated this trend, pushing the working-class population to the suburbs.

- **Housing and Office Demand:** The housing prices in the city center force people to find alternative housing options in the suburbs or smaller towns a small distance from Barcelona. As illustrated in the matrix above, office buildings are increasingly being repurposed into coworking spaces as companies downsize their physical footprint and rent out excess space for coworking purposes.
- **Mobility Patterns and Transportation Infrastructure:** There are no significant implications of remote work in the mobility pattern and transport infrastructure in Barcelona. People's movement to the periphery increases the demand for public transport.
- **Digital/Utilities Infrastructure:** The isolated rural areas of the region suffer from a lack of digital infrastructure as well as other utilities such as electricity. This creates a gap between urban and rural opportunities for remote work.
- **Policies:** The factor of remote work is not incorporated into the processes of developing transportation plans or other strategies. There are no established strategies to support the changes and regulate the challenges due to remote work.

In conclusion, Barcelona is becoming an increasingly attractive location for remote workers, coupled with a significant process of gentrification. This is consequently leading to the displacement of local residents to the surrounding suburbs. The combination of high housing prices in the city centre and the rise of office reuse significantly impact real estate. The increased demand for public transport is driven by the migration of people from urban to suburban areas, while rural communities face gaps in digital and utility infrastructure. The city's current policies are insufficient to regulate the impact of remote work. This situation requires a re-evaluation and potential amendment to the current zoning, land use, and transportation plans in order to support both urban and rural communities.

6.2 Enschede, Netherlands

Context

The region of Twente belongs to the Overijssel providence (NUTS2) in the Eastern part of the Netherlands. The cities of Almelo, Hengelo, and Enschede form a triangle of three large cities, with Enschede being the region's primary urban centre with a population of 160.000 inhabitants (Twente region - NL, 2024). In total, Twente has 600.000 inhabitants, and based on the Urban-Rural Typology employed by the European Commission (Eurostat, 2018), it is classified in NUTS3 as a predominantly urban, border, and non-mountainous region.

Twente has a long history of industrial economy, with Enschede being the most thriving Dutch textile industry in the 19th century (More about the Twente region - Welcome to NL, n.d.). Nowadays, Twente hosts a high number of university students, and the center of Kennispark, the largest innovation campus in the country, is a hub for more than 380 companies and startups. Despite attracting students, the city has difficulty retaining talented young people after graduation. The city of Enschede and the rest of the region specialize in technology but also maintains clusters of industrial sites. Due to the city's industrial past, the average population is not highly educated.

The city of Enschede is relatively dense and urban planning strategies aim further to densify the areas around the public transport hubs, while prioritizing pedestrian-friendly mobility and emphasizing high-quality multimodal transport.

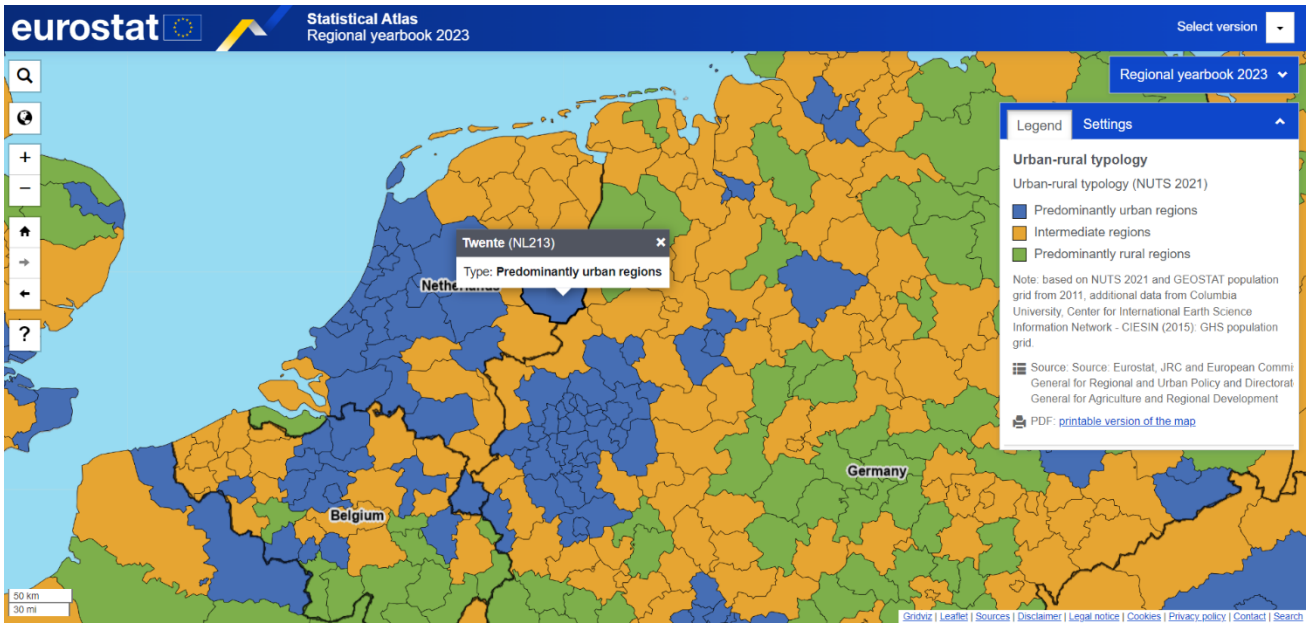


Figure 13: Urban-rural typology of the Twente Region, NUTS3, (Eurostat - Statistical Atlas, 2023)

According to the available data from Eurostat (2024), the percentage of employees working remotely in the Netherlands was 12,7% in 2023. The Netherlands is within the European countries with the higher rates of usually WFH. Although there is no available data to estimate the number of remote workers at the city level,

for the providence of Overijssel, the annual share of persons usually working remotely in 2020 was 4,5%, below the country's average (20,4%) at the same year (Eurostat, 2021).

Key Findings

For a better understanding of the spatial impact of telework, three interviews were conducted in the region of Twente. Several key themes emerged from the thematic analysis coding of the interview data, particularly concerning the local level and scale. The key themes are the spatialities of remote work (home-office) dynamics and the movement to the city from other regions.

The concept of remote work is not new; people in the Netherlands used to work from home or from a third place prior to COVID-19. Nowadays, the most common working arrangement is the hybrid model, and in most cases, remote work means working from a home-office. Third places like libraries are common, especially in the inner city, but coworking spaces are not very popular, and the demand is rather low. Especially in CBDs of cities like Amsterdam, the use of third places as workspace is a very common practice, mainly as an alternative to the high rental office spaces for freelancers.

Compared to other cities of the Netherlands, in Enschede, people do not work remotely as much. However, it is becoming popular for people working in The Hague, Utrecht, or other western regions to live in Enschede because of the comparatively lower cost of living, housing prices, and beautiful natural surroundings. The interviewees reported an influx of workers from Germany but not as much as from the western part of the country.

Regarding housing developments, new policies are being implemented to increase the number of apartments in the inner city, taking advantage of the wider range of amenities and high-quality transport connectivity. Gentrification has not yet been an issue, as housing affordability remains high.

The public transport system is quite integrated and multimodal. After the COVID-19 outbreak, commuting patterns have changed, presenting an increased use of bicycles and/or cars. In terms of mobility, the region of Twente does not promote residential or workplace development in areas with limited accessibility by transit as well as areas located farther away from the current urban tissue. They try to combine living and working in close proximity within the large urban centres, taking advantage of the public transport options provided.

It is hard to determine "rural" areas as most parts of the country are quite urbanized. These exurban and suburban areas face severe problems due to the aging population. Nevertheless, "rural" areas remain economically stronger than inner cities, and their residents prefer to use private cars for commuting since public transit options are of low service quality or non-existent.

Regarding land use patterns, initiatives such as buildings with multipurpose uses have already taken place in the city centre. This kind of building provides high-speed internet access, various types of meeting rooms and office spaces, as well as rental rooms. This relatively new concept of vertical mixed-use provides smart solutions for living, working, and learning in one creative location.

The digital infrastructure is sufficient all over the country, but public Wi-Fi access raised legal concerns regarding the privacy of data even though Enschede is one of the first cities in the Netherlands with a fiber network.

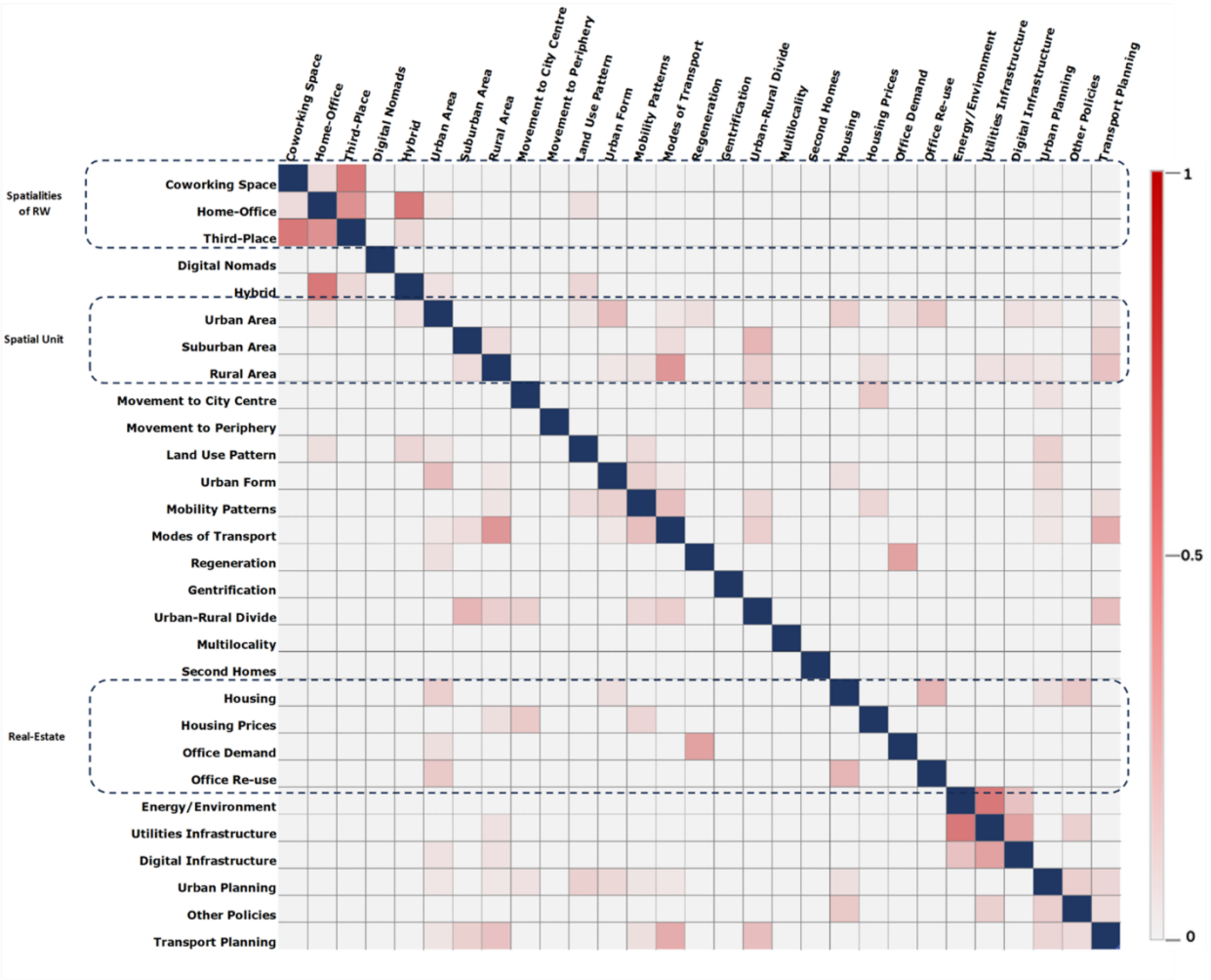


Table 10: Enschede- Correlation matrix of variables measured correlation coefficient ranging from 0 to 1. The scaling corresponds to the strength of the correlation; white close to zero indicates no correlation and dark red strong correlation coefficients between variables

Discussion on the spatial implications of remote work in Enschede, region of Twente

According to the insights of the interview participants, remote work has not significantly affected the region of Twente. Following the research questions and the results of the correlation matrix, the findings are as follows:

- **Urban development trends:** No significant changes have occurred in the urban form due to remote work; even during the pandemic, when remote work was higher, the city layout did not change. Smaller cities experience a shift in consumption patterns towards larger cities with more amenities. The general trend is towards the densification of living and working in the city centre. This effort lies in the idea of providing services and high-quality public transport, eliminating the use of private vehicles.

- **Housing and Office Demand:** Gentrification is not seen as a concern but rather as an opportunity for regeneration due to the need for a more diverse population. Housing prices have increased but at a stable rate, while social housing is an option in most city neighborhoods.
- **Mobility Patterns and Transportation Infrastructure:** After COVID-19, the mobility patterns shifted more to bicycles or private cars, the transport infrastructure is sufficient and evolves this transition.
- **Digital/Utilities Infrastructure:** The utilities and the digital connectivity are very well organized and sufficient in all parts of the country. Overall, the infrastructure is not an obstacle for someone telecommuting from rural areas.
- **Policies:** There are no policies directly related to remote working. However, some policies are based on implications due to changes in behavior due to remote working. Transport strategies for congestion management include policies on mobility and green spaces. In order to attract high-skilled workers but also prevent gentrification, housing plans include a mix of social, affordable, and luxury housing, with a policy of 30% social housing, 40% affordable housing, and 30% more expensive housing

In conclusion, remote work is common, particularly from home-office, while third places like libraries are popular, but coworking spaces remain limited. In Enschede, remote work is less prevalent compared to other Dutch cities, yet it attracts residents from western regions due to lower costs of living. Housing policies focus on increasing inner-city apartments, while commuting patterns show a rise in bicycle and car use, with policies discouraging car-dependent developments. No urban policies directly related to remote work exist.

6.3 Lisbon, Portugal

Context

Lisbon, the capital of Portugal and the center of the Lisbon Metropolitan Area (LMA), is the country's primary commercial, political, and tourist center. Covering 3% of the national territory, it consists of 18 municipalities on both sides of the river Tagus on the West Coast of the Iberian Peninsula (Padeiro, 2014). As the largest urban area in Portugal and the 10th largest in the European Union, the LMA had a population of approximately 2.9 million in 2021, accounting for about 28% of Portugal's population, with more than twice the population of Oporto, the second Portuguese conurbation (Área Metropolitana de Lisboa, 2024).

According to the Urban-Rural Typology of the European Commission (Eurostat, 2018), the LMA (which coincides with the NUTS 2 level), a capital metropolitan area, is also classified as a predominately urban region, with less than 20% of its total population residing in rural areas.

Economically, the LMA contributes to over 36% of the national gross domestic product (GDP) and hosts a significant number of critical economic activities such as tourism, consulting services, telecommunications, steel, and chemicals (Padeiro, 2014; Sousa and Pinho, 2014). The region's specialization in advanced services and its role as the most prominent tech hub in Portugal attract numerous multinational corporations and position it as a leading area for knowledge and innovation (Área Metropolitana de Lisboa, 2024; ESPON, 2022). Lisbon is considered the country's financial and administrative center. At the same time, the Port of Lisbon, one of the busiest on the European Atlantic coast, further underscores the region's economic significance (Sousa and Pinho, 2014).

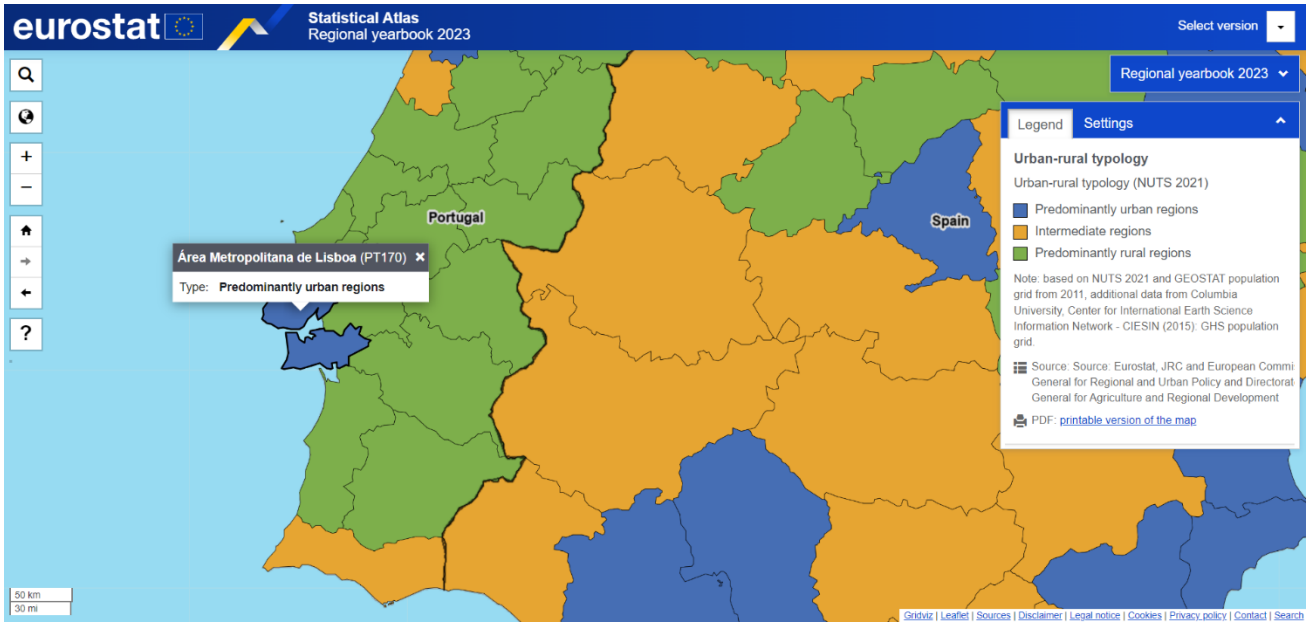


Figure 14: Urban-rural typology of the Lisbon Metropolitan Area, NUTS3, - (Eurostat - Statistical Atlas, 2023)

Since the 1990s, the urban structure of Metropolitan Lisbon has evolved from a radial to a more networked model, primarily facilitated by the development of highways and the existing railway network. This transformation has led to population dispersion and the growth of smaller towns, resulting in an increasingly polycentric model regarding residents and economic activities (Área Metropolitana de Lisboa, 2024). This urban evolution has introduced new mobility demands and challenges, while the continuous process of tertiarization and decentralizing of economic activities and residential areas has contributed to urban sprawl and intense daily commuting (Di Marino et al., 2023).

The percentage of telework at the national level before the COVID-19 pandemic was approximately 12%, and the share of people working from home rose in 2020 and 2021 to nearly 25% (Eurofound, 2022a). At the same time period, the Metropolitan Area of Lisbon recorded the highest proportion of remote workers (27.9%), concentrating 48% of the employed population in telework in the country (Instituto National de Estatistica, 2021). Data for 2023 suggest that 18%- 19% of the employed population work remotely, following different work arrangements, while 40% are in the greater Lisbon area. It is also roughly calculated (based on data from Nomad List) that for the same year, around 16.000 digital nomads lived in the area.

Key Findings

For the Lisbon case study, two interviews were conducted to examine the current state of remote work and its potential spatial implications. The participants raised the issues of existing remote work practices at the local level, a growth in population movement to the periphery, and gentrification.

Several themes, also identified through the coding process, were accentuated during the interviews. Housing was discussed in depth in relation to housing prices, as was the movement to the periphery, changes in urban form and gentrification, digital nomads, and coworking spaces.

The rise of remote work, especially after the COVID-19 pandemic, has created some multifaceted impacts on the urban and rural dynamics of the area. Evidently, the hybrid work model is getting established in many sectors, and Lisbon is preferred among digital nomads worldwide as incentives are offered, including specific visas and tax benefits. As a result, more and more companies are offering flexible work options.

However, the prevalence of remote work remains limited (<20%), influenced by the service-based economy. The pandemic is mentioned as a catalyst for a shift in residential preferences, with more residents moving to areas at the edge of the metropolitan region, seeking to benefit from reduced commuting times and enhanced quality of life. This trend underscores the need for robust digital infrastructure to support remote work, which is generally very good but still inadequate in many remote rural areas.

Even before the pandemic, coworking spaces were popular in Lisbon, but post-pandemic sustainability issues have led to closures and business model adjustments. The government has attempted to attract remote workers and digital nomads through various policies and incentives, though the effectiveness of these initiatives remains unclear without detailed data.

It is noted that the real estate market in Lisbon is significantly impacted by tourism and international investment. Gentrification, primarily driven by tourism rather than remote work in the area, is exacerbated by the influx of digital nomads and the rising popularity of short-term rentals. This phenomenon contributed to the distortion of housing prices, making it challenging to find affordable housing year-round. In a strong tourist destination such as Lisbon, it is difficult to differentiate the spatial implications of remote work from those of tourism since there are significant overlaps.

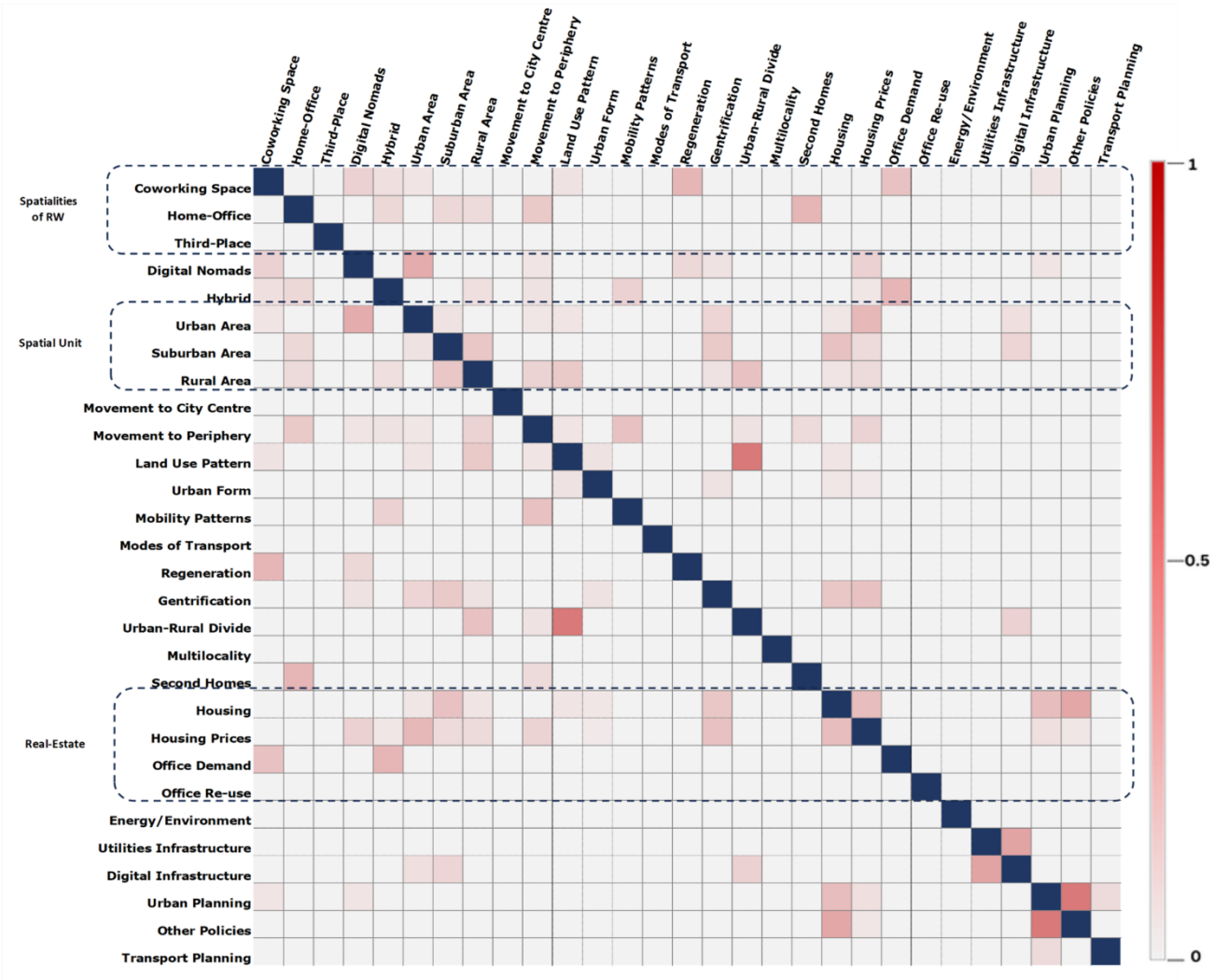


Table 11: Lisbon - Correlation matrix of variables measured correlation coefficient ranging from 0 to 1. The scaling corresponds to the strength of the correlation; white close to zero indicates no correlation and dark red strong correlation coefficients between variables

Discussion on the spatial implications of remote work in Lisbon

The spatial implications of remote work in Lisbon, although mild, are complex and versatile, encompassing urban growth, economic activities, real estate dynamics, and policy challenges. Following the research questions and the results of the correlation matrix, the findings are as follows:

- **Urban development trends:** a shift of population in the peri-urban areas and smaller cities around Lisbon is observed as a combined result of better and bigger houses, better quality of life, lower prices, and fewer commutes to work. People living in the city's core tend to prefer a third place/coworking place when working remotely for a better environment. On the other hand, people in suburban/rural areas tend to work from home, as they have more available space (low correlation between movement to the periphery and home offices). Digital nomads seem to prefer the city center, as shown by the low correlation with urban areas. Second homes, when used, also function as home

offices. Coworking spaces are often linked with regeneration projects featuring a low correlation in the matrix, as is common practice to reuse old buildings for this purpose. Additionally, remote work has led to shifts in popular residential areas, mainly driven by digital nomads and the changing nature of work post-pandemic. Gentrification affects urban development with changes in the retail landscape and the concentration of food/hospitality-related establishments and contributes to the beautification and privatization of public spaces.

- **Housing and Office Demand:** The real estate market is directly linked with gentrification in the case of Lisbon. Gentrification affects the housing stock and housing prices in the entire metropolitan area, where a ripple effect in prices is observed when moving from the center to peri-urban areas. This holds a thread of gentrification happening in smaller cities as they receive more population. The rise of short-term rentals has distorted housing prices, making it difficult to find affordable housing in Lisbon year-round. Hybrid models of work have changed the demand and size of office spaces, which is linked with a notable correlation. The shift towards remote work has also led to decreased demand for office spaces, with some being repurposed for housing or hotels.

- **Mobility Patterns/ Transport Infrastructure:** there is a change noted in the mobility patterns as more and more people work hybridly (weak correlation) and move to the outskirts of the metropolitan area of Lisbon. What is considered important is the rise in car use despite the good transport network, which cannot be linked directly to remote work. On the other hand, the evolution of transport networks is reducing the distances between the outskirts and the center of the city, and the road network is considered modern and functional. Pressures associated with tourism and remote work are evident with traffic and overbooking on public transport.

- **Digital/Utilities Infrastructure:** this aspect was not discussed in depth. Road connectivity, the transport system, and the digital infrastructure are deemed adequate. However, rural and remote areas face some issues. Access to infrastructure like schools and hospitals or a market is necessary, and the difference between urban and remote areas is noted with a moderate correlation between the urban-rural divide and land use patterns (meaning this type of facilities), although outside the metropolitan area of Lisbon.

- **Policies:** a significant correlation between urban and other policies is noted to regulate tourism and, by extension, remote work. Some measures are being taken, like setting quotas for houses available for short-term rental – they cannot surpass 20% per neighborhood -but they are not implemented. The government and municipalities also lead ventures to promote the creation and function of coworking spaces in rural areas. It is deemed important to have targeted policies on rent control and the rise in social housing. Inclusive zoning started being implemented in the last couple of years, meaning that a percentage of new real estate projects (like 20%) should be dedicated to affordable housing.

Remote work has lightly influenced urbanization patterns, leading to some fragmentation of urban areas and altering land use and planning strategies to a degree. One of the participants emphasized that "*Remote work is one of the causes of the fragmentation of the modern or postmodern metropolis*."

Effective policies are needed to regulate housing supply, such as rent control and the expansion of public and social housing, to mitigate market dependency and ensure affordable housing. Strategies from countries like Denmark and the Netherlands, focusing on urban renewal and inclusive zoning, could help create a socially

diverse residential fabric in Lisbon. Additionally, policies should aim to prevent urban sprawl and protect agricultural land, addressing the impact of remote work on commuting patterns and air pollution levels.

6.4 Lombardy & Trentino, Italy

Context

This case study focused on two adjacent provinces in northern Italy, Lombardy and Trentino Autonomous Province. Lombardy is situated in the northwest part of Italy, in the center of the Po Valley. It is bordered by the Alps to the north and the Po River to the south. The region extends for approximately 24,000 km^2 and is divided into twelve provinces (Regione Lombardia, 2020). The capital city of Lombardy is Milan, which is also the largest city in the region and serves as Italy's primary economic center, generating approximately 19.5% of the national GDP (Assolombarda, 2023). Moreover, Milan lies at the center of a series of significant motor and railway corridors crossing the Po Valley and connecting Italy to the rest of Europe. As a result, transport, logistics, and distribution substantially contribute to the overall economic activity (Cesarini, 2022).

The administrative area of Milan had a population of approximately 1.32 million as of 2013, resulting in a high population density of around 7,315 inh./km^2 (Cesarini, 2022). The metropolitan city of Milan had an estimated population of 3.2 million in 2015. The Milan metropolitan area, known as Grande Milano, which includes parts of the provinces of Monza e Brianza, Como, Lecco, and Varese, yields a population of nearly 8 million, making it the largest metropolitan area in Italy and one of the largest in the EU (Cesarini, 2022; Sanesi et al., 2016).

Lombardy is the first manufacturing region in Italy. While concentrating only 17% of the national population, it accounts for more than a fifth of Italian GDP and a fourth of exports (Assolombarda, 2023). Lombardy and Milan feature a solid and highly diversified economy (industry, trade, services, and finance). The territory is home to the main Italian research centers, 19 Institutes for Treatment and Research, and 13 universities. Lombardy is the top manufacturing region in Italy and second in Europe, following Southern Ireland. Milan is recognized as a global financial hub, hosting the Italian stock exchange and numerous national and international banks. Milan is a leading manufacturing center and is recognized as one of the four fashion capitals in the world, hosting fashion weeks.

The Autonomous Province of Trento, commonly known as Trentino, is a mountainous area with a relatively low population density (88 inh./km2 against a national mean of 196 inh./km2) (OECD, 2021b). Approximately 120.000 of its 540.000 residents live in the provincial capital, Trento. This city is a hub for teleworkable jobs due to its university, numerous research institutions, and a significant number of public administration roles, which are supported by the region’s special delegated powers. Trentino, situated in the Alps, is primarily made up of small towns. Together with the Autonomous Province of Bolzano/Bozen, known as South Tyrol, Trentino serves as a crucial link between southern Germany and Austria with northern Italy through its road and railway networks, creating a historically and currently well-integrated cross-border region. The region's economy is driven by trade, mainly exporting manufacturing components from northern Italy and servicing larger German companies, as well as the movement of people, including students and tourists (OECD, 2021b).

Lombardy and the Autonomous Province of Trento are among the non-coastal regions of Italy. According to the Urban-Rural Typology employed by the European Commission (Eurostat, 2018), Trento (NUTS 3) is classified as an intermediate region, with 20-50% of its total population residing in rural areas. Milan, Varese,

Monza, Como, Lecco, and Bergamo, at the NUTS 3 level, are considered predominantly urban regions. At the same time, Brescia and Sondrio are intermediate regions, and Mantova is predominantly rural, with >50 % of the total population being rural. Milan is also classified as a metropolitan region, and while it is not classified at the NUTS 3 level as a mountainous region, Como, Bergamo, and Brescia are regions with more than 50% of their surface covered by mountain areas. Lecco and Sombrio are classified as regions with more than 50% of their surface covered by mountain areas and more than 50% of their population living in mountain areas. The same applies to Trento.

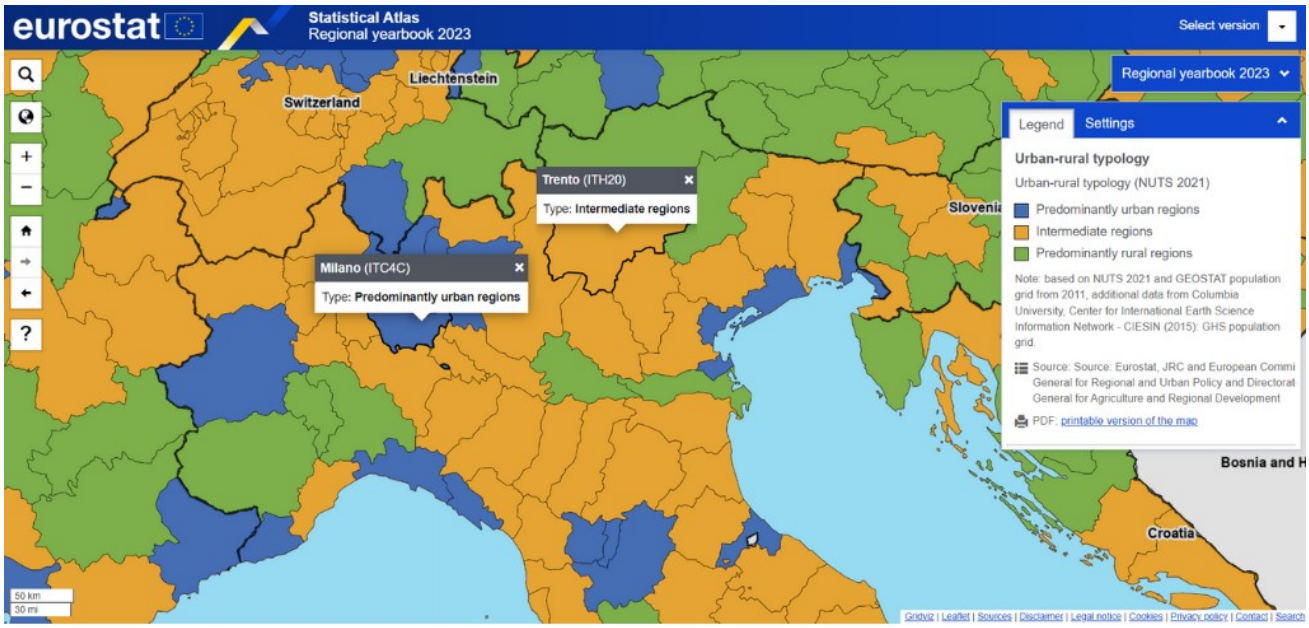


Figure 15: Urban-rural typologies of Milan Metropolitan Area & Trentino Region, NUTS3, (Eurostat - Statistical Atlas, 2023)

According to Eurostat, Italy was one of the countries with the lowest incidence of remote work before 2019, as this practice was marginal (the fifth in line, after Bulgaria, Romania, Lithuania, and Hungary) (EDJNet – Openpolis, 2023; Eurofound, 2022a). The situation has undoubtedly changed since, but there is a lack of data on the subject. The data suggest that the share of employees working from home rose from less than 5% in 2019 to over 12% in 2021, while at the peak of the lockdowns, more than 30% were working remotely (EDJNet – Openpolis, 2023; Eurofound, 2022a). According to the most recent data from Eurostat, in 2023, the percentage of employees working from home as a percentage of the total employment in Italy has returned to pre-pandemic levels, being slightly less than 5% (Eurostat, 2024).

While no data is available about the number of digital nomads in Northern Italy, specific policies at the national level, including a Digital Nomad Visa and tax benefits, aim to attract and support highly skilled remote workers and digital nomads.

It is noteworthy that coworking spaces gained popularity in Italy in the last decade, and Milan had the highest concentration of different types of coworking spaces in 2014 (59), followed by Rome (23) and Turin (16) (Mariotti et al., 2017).

Key Findings

This case study was approached a bit differently, with the discussion moving around northern Italy, specifically the Lombardy Region and the Autonomous Province of Trentino, focusing on the metropolitan area of Milan and Trento. Three interviews were conducted, each focusing on a slightly different scale, regarding remote work in the area and its potential spatial implications. The participants discussed existing remote work practices at the local level, the differences in population distribution, especially after the pandemic, the real estate market, the popularity of coworking spaces, and specific policies at the local level regarding aspects of remote work.

The primary themes identified through the thematic analysis (coding) of the interview data were the situation with housing and its affordability, coworking spaces, policies about remote work, the movement to the periphery, housing prices, and changing mobility patterns.

As a starting point, the spatial profile of Milan, which is characterized by a polycentric urban structure, was discussed, with new business hubs emerging in areas such as Garibaldi Republica and City Life. The ongoing shift towards remote work, accelerated by the COVID-19 pandemic, seems to have impacted office spaces, leading to the proliferation of coworking spaces. However, repurposing office spaces into housing presents challenges, particularly regarding real estate prices and potential gentrification.

The 15-minute city concept, which aims to reduce commuting by ensuring that essential services are accessible within a short radius, is gaining popularity in the area. Its adoption could be part of broader efforts to adapt urban development to the new realities of remote work. Near-working strategies are explored in the Region while emphasizing the need for investment in local public transportation to support these initiatives.

The impact of remote work on the real estate market in Lombardy includes trends in coworking spaces and residential developments. Prop tech startups are integrating digital solutions into real estate, offering workstations in various locations, including remote villages. The rise of Airbnb has led to increased rental prices in Milan, affecting students and middle-class individuals, with regulatory measures still under discussion.

Multilocality is becoming more prevalent, and challenges related to digital infrastructure are being faced, particularly in smaller villages. Remote work could present opportunities for rural areas and medium-sized cities, attracting investment and potentially leading to revitalization. At the same time, there are concerns about return on investment and risk management for property operators, especially in remote locations.

Innovative housing solutions are emerging in response to the needs of remote workers. Concepts such as the Student Hub, which combines elements of coworking spaces, hotels, and student dormitories, exemplify the trend toward mixed-use developments. There is also ongoing exploration into community-driven initiatives and flexible hotel/workspace concepts. Comprehensive policies are needed to address population shifts, infrastructure pressure, and potential competition between existing and new coworking spaces.

For Trentino, which is predominantly rural, with Trento as its main urban centre, remote work initiatives are being introduced to balance workforce distribution, enhance community life in rural areas, and reduce congestion. Various remote work models exist, including working from home and coworking spaces. The region hopes to retain talent through remote work opportunities. Remote work may positively impact smaller towns by increasing community engagement, while challenges include connectivity issues and limited

transport infrastructure in the region. Local policies promote remote work, and there are ongoing discussions on the environmental sustainability and spatial impacts of remote work.

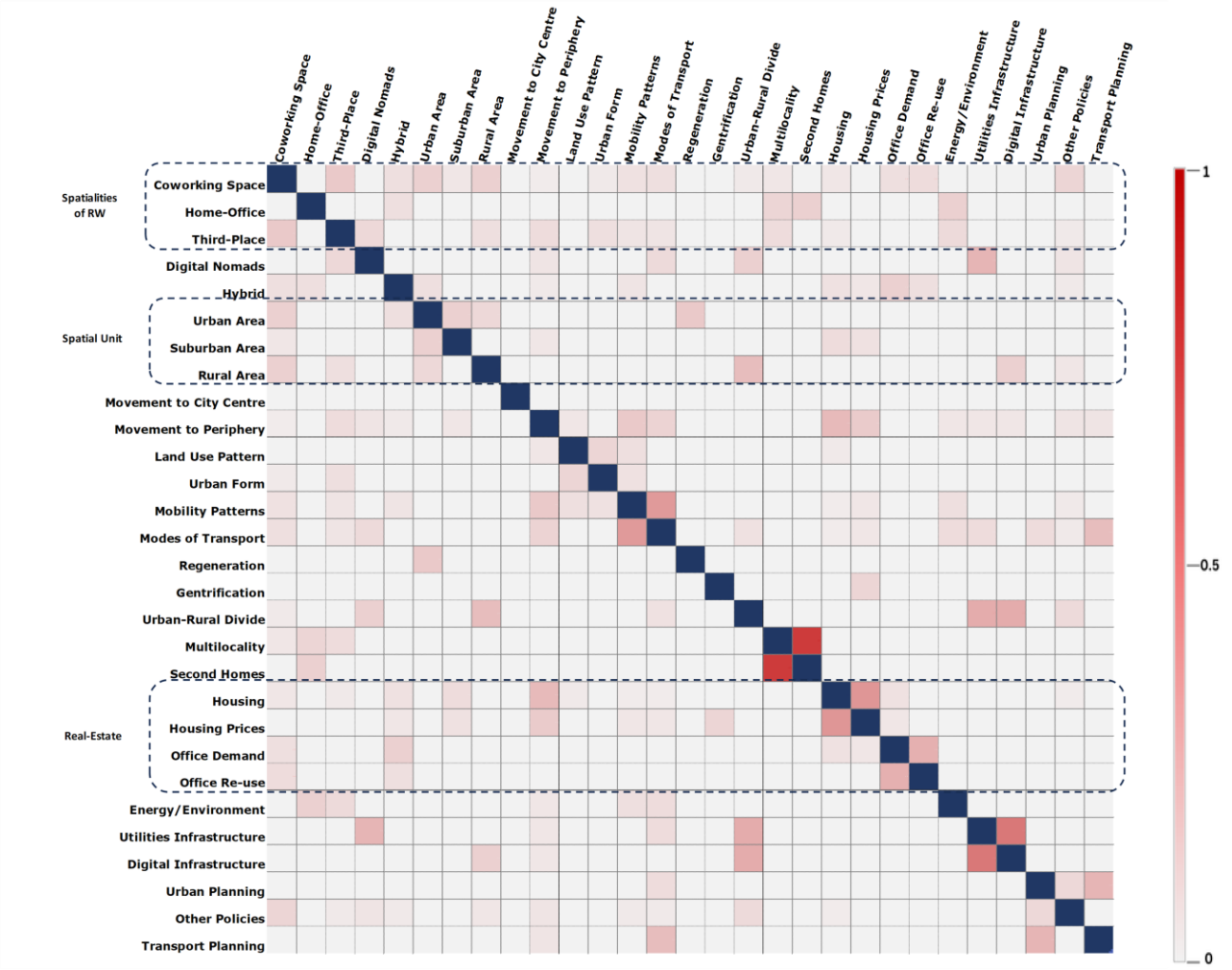


Table 12: Lombardy & Trentino - Correlation matrix of variables measured correlation coefficient ranging from 0 to 1. The scaling corresponds to the strength of the correlation; white close to zero indicates no correlation and dark red strong correlation coefficient between variables

Discussion on the spatial implications of remote work in Northern Italy

At this point, it is not clear precisely what the spatial impact of remote work is. Some changes have already been noted after COVID-19, but the phenomenon is still under development. Following the research questions and the results of the correlation matrix, the findings are as follows:

- **Urban development trends:** A pattern of people relocating to the suburbs or smaller towns was prominent during the pandemic. The transport infrastructure supports frequent commutes within a large area and the concept of near working (providing space to work remotely close to the place of residence) in collaboration with companies, coworking spaces, and municipality-owned buildings like

libraries. Coworking spaces are relatively popular in Milan. Many people work from third places, even in smaller towns and rural areas, to have access to ergonomic places of work and good infrastructure. The new development of coworking spaces is not limited to the CBD but is also widespread in the suburbs, while the preferred memberships change to shorter periods of time or daily passes. At the same time, there is a demand for third spaces in rural and peripheral rural areas. The matrix shows a significant correlation between multilocality and second homes. This is explained by the fact that Italians have one of the highest rates of residence ownership, and it's common to own more than one house. So many choose to spend part of their time working from their second home or alternate between their primary residence and other property.

- **Real-estate Market:** As prices rise in the large city centers, people move to the periphery for more affordable housing. Remote work impacted office spaces and seems to have led to a restructuring of their spaces and their partial modification to act as coworking spaces. Additionally, a tendency is detected to follow up-to-date trends regarding the interiors and the flexibility for greater sustainability. To date, there seems to be no evidence about repurposing office spaces for housing. Even before the pandemic, many new housing developments tend to provide common spaces for residents to accommodate work, for instance. From a real estate perspective and from large coworking space operators, there is an increased interest in middle-sized cities.

  Gentrification is linked to high housing prices, which compel people to search for affordable housing outside the city centers and in smaller towns connected by the railway. However, Milan has experienced gentrification for decades now, and it cannot be linked exclusively to remote work and not tourism or development projects. Prop techs, the intersection of the real estate industry with technology and software, have applications in Italy that turn functioning buildings in remote areas into accommodation and coworking spaces. New typologies of spaces are emerging, combining short- and mid-term rentals with working spaces and amenities like 21 House of Stories or The Social Hub. The concern here is the lack of legislation regarding their characteristics.

- **Mobility Patterns/ Transport Infrastructure:** Accessibility is very relevant. Transportation accessibility is described as good in the city with the underground but not so good outside the city. New railway connections, especially high-speed ones, allow commuters to choose smaller towns as residences. A change in mobility patterns was underlined as there are changes in peak hours and their predictability. Near-working apparently reduces commuting and car use and could potentially mitigate environmental pressure in the future.

- **Digital/Utilities Infrastructure:** This aspect was not discussed in depth, but there is an urban-rural divide enhanced by infrastructure, as is shown in the matrix with a moderate correlation. The quality of digital infrastructure and available services is considered adequate for a large part of the country. However, in the mountainous and remote areas of Lombardy and Trentino, connectivity issues still exist and are a main hurdle for remote workers and digital nomads (medium correlation in the matrix). Limited accessibility of transport infrastructure to remote areas is also noted as an issue.

- **Policies:** There are several local policies regarding remote work. Near working policies were mainly implemented by the municipalities of Milan and Bologna and cover many aspects: collaboration with companies to allow municipality and other employees to work from their premises, with coworking

spaces to provide space for employees near their homes or the use of public buildings such as libraries. In 2021, the provincial government of Trentino launched ongoing initiatives to promote remote working among civil servants and the private sector by establishing decentralized public offices and repurposing abandoned public and private buildings into coworking spaces. In 2022, the Autonomous Province of Trento launched a Strategic Plan for Promoting Agile Work. During the pandemic, policies for revitalizing rural/remote areas were implemented, such as the 1-euro houses and relocation grants for families. South working was also introduced, with remote workers moving to southern and inner areas of the country while working for employers based in the big cities of the North or even abroad. Coworking spaces were also opened in collaboration with municipalities. Another initiative concerns the Italian postal service provider Poste Italiane and its collaboration with a real estate company to convert part of its offices in different locations into coworking spaces.

All the participants agree that the adaptation of remote work is expected to continue reshaping the area's spatial and economic landscape. Urban planning policies and strategies will need to address the evolving needs of a more decentralized and flexible workforce, balancing development with financial constraints and ensuring equitable access to digital infrastructure, public services, and transportation networks.

6.5 Philadelphia, Pennsylvania, USA

Context

Philadelphia, located in the southeastern part of Pennsylvania, is the largest city in the state, and the sixth largest city in the United States. It is located in-between Delaware and Schuykill Rivers and serves as the county seat of Philadelphia County. Between New York and Washington DC, Philadelphia has a favorable location as part of the Northeast megalopolis corridor.

The city is renowned for its history, cultural institutions, and vibrant neighborhoods. The city is divided into 10 council districts, has a population of 1.603.797 inhabitants (Philadelphia city, Pennsylvania - US Census,2020) and constitutes the urban core of the wider Philadelphia Metropolitan Area with 6.245.00 million inhabitants. Since the 1990s, the city economy has been mainly based on sectors like education, healthcare, and technology. Philadelphia has a diverse, although complex, socioeconomic structure. The city has a longstanding struggle with high poverty rates and significant disparities by race and ethnicity. These disparities are depicted in the city's spatial structure, where the wealthy neighborhoods of Center City are surrounded by the economically challenged North and West Philadelphia.

The cityscape includes a mix of skyscrapers, raw houses, and extensive green spaces such as Fairmount Park. It has an extensive public transit system that is composed of the metro line, buses, and regional rail, and it is operated by SEPTA. The broader metropolitan area is characterized by sprawl that extends beyond the counties of Pennsylvania, New Jersey, and Delaware. The city's location along two major highways, the I-95 and Pennsylvania Turnpike, functions as the backbone of an extensive sprawling network of residential, commercial, recreational, and employment facilities (shopping centers, business parks, etc.). The suburban area is characterized by low-density housing and increased car dependency rates. The urban sprawl also resulted in socioeconomic segregation, with wealthier suburbs often enjoying more resources and urban amenities than the urban core or the inner ring suburbs.

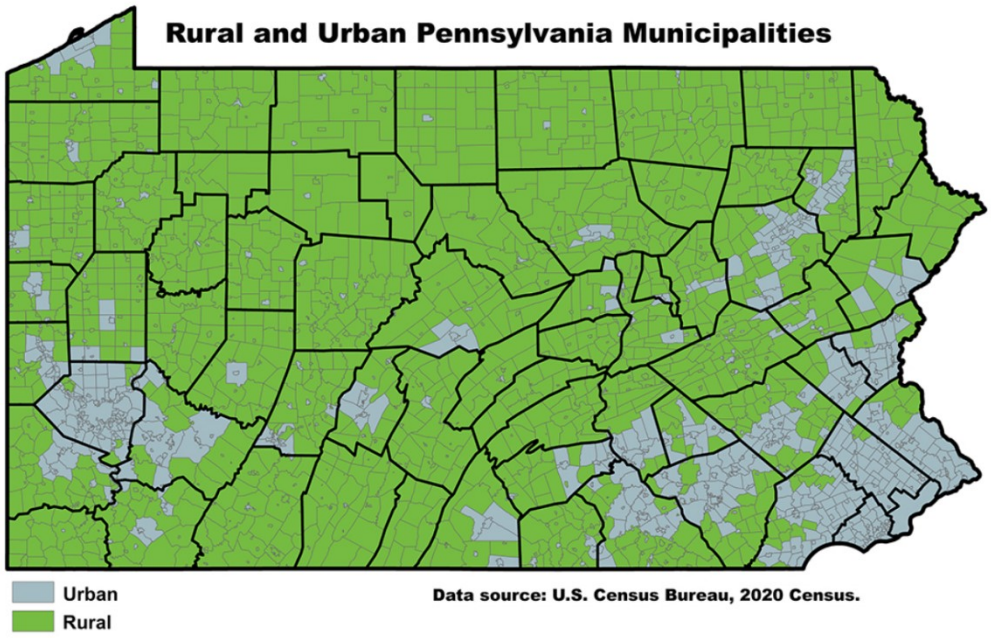


Figure 16: Urban-rural typologies of Pennsylvania, (Center for Rural PA, 2020)

Key Findings

In Philadelphia, the hybrid model is predominantly relevant to white collars, where the nature of their job allows remote work. The spatialities of work are mostly the home office, with coworking spaces and third places experiencing an increasing trend. New coworking spaces and other third places like cafes are developing, usually in residential neighborhoods to accommodate the locals. The rise of coworking spaces is also associated with renovations and reuse of existing building stock. In the suburban areas, coworking spaces or the so-called “fishbowl tanks” are gaining popularity as places to work and socialize.

Since people have the option of working remotely, there is a tendency to move to the inner ring suburbs in proximity to the center of Philadelphia. This has affected the housing prices in the periphery (second and third ring suburbs). Despite the extended US housing crisis, especially in areas like California or New York, Philadelphia still stands as an affordable housing market. However, Philadelphia's housing market has consistently offered more affordable housing options compared to other big cities in the NE Corridor, including New York, Washington, and Boston. Still, the city is considered gentrified, with the wealthier areas concentrated downtown and around the CBD. It is worth noting that there are still pleasant neighborhoods with affordable housing options near the CBD.

With the rise of remote work, Philadelphia has seen an influx of remote workers from New York. Usually, they reside in suburban areas along high-speed road corridors, enjoying Philadelphia’s city life benefits while earning New York city wages. This inevitably creates gentrification issues that the city will have to cope with in the near future. In addition, one interviewee commented that, during the pandemic, many people chose to buy houses in smaller towns or rural areas. However, they are now selling these houses and returning to cities. So, the inner city of Philadelphia, as well as other major US cities, managed to keep its vibrancy and is not

experiencing an exodus. Regarding the office spaces, one interviewee mentioned that the prices in the CBD have dropped, while the suburbs face great challenges with numerous vacant office and commercial spaces. These spaces in the suburban areas remain still empty without any plans for reuse. At the same time, the other interviewee referred to the reuse of empty office spaces in the city as high-end luxury apartments.

Regarding mobility patterns, car usage is predominant in the city centre and the suburbs or smaller towns. Traffic congestion in the suburbs has increased due to remote work, while the peak days/hours has shifted. Public transportation is now operating at a lower frequency than pre-pandemic levels, especially in the outer rings where the coverage is low. Timewise, this resulted in longer trips and increased walking between POIs, leading to increased car usage when affordable. The dropdown in public transit usage due to remote work has caused sustainability issues for the operating company.

The concept of multilocality is rising, with people owning second homes to extend their stay more than just a weekend. Second houses are usually located at the ocean, the mountains, and the lakes in the vicinity. People prefer staying in their second homes and working from there, combining vacation time with work. The digital coverage is sufficient even in the outer rings or the periphery. However, it is expensive.

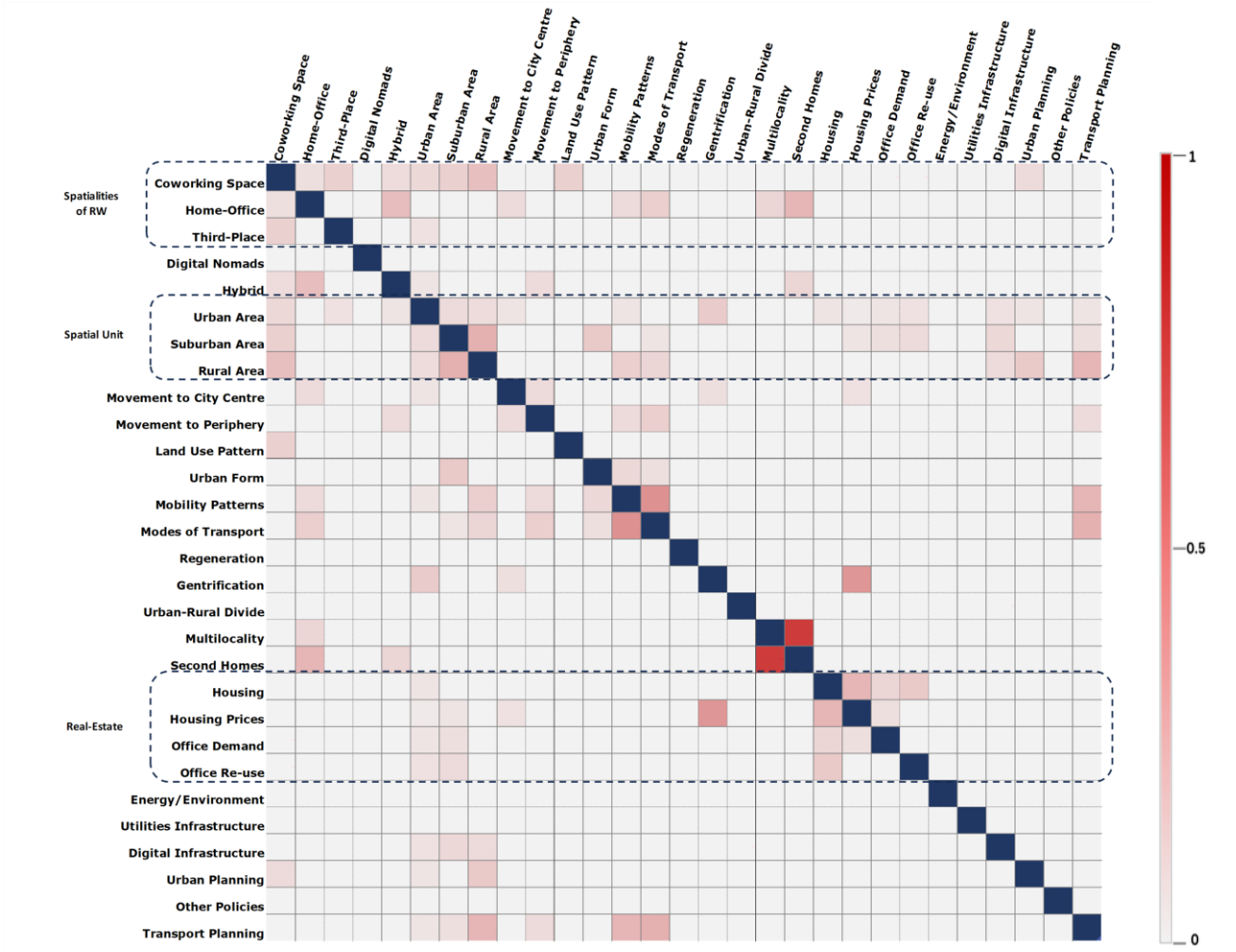


Table 13: Philadelphia- Correlation matrix of variables measured correlation coefficient ranging from 0 to 1. The scaling corresponds to the strength of the correlation; white close to zero indicates no correlation and dark red strong correlation coefficients between variables

Two interviews were conducted in Philadelphia to better understand the spatial impact of telework. A number of key themes emerged from the thematic analysis coding of the interview data, particularly at the local level for this case study. The key themes are multilocality, the influx of relatively high-income workers looking to reside in the area, and the spatialities of remote work.

Discussion on the spatial implications of remote work in Philadelphia

According to the insights of the interview participants, remote work has affected Philadelphia. Following the research questions and the results of the correlation matrix, the findings are as follows:

- **Urban development trends:** As remote work became more common, suburban areas, especially the first ring around Philadelphia, became popular as a residential area. New development along high-speed interstates that link these areas to other large urban centres like NYC, is expected to change the functionality of the city. At the same time, the constant influx of workers from other States in the

inner-city areas strengthened the city's viability and created a market for expensive high-end apartments. However, development in the rural areas remains stagnant.

- **Housing and Office Demand:** The influx of affluent workers towards the inner-ring suburbs has impacted housing prices. In the city center of Philadelphia, remote work has not significantly impacted housing prices, as these areas were already gentrified. Short-term leases like Airbnb are not well perceived by the locals because they contribute to the loss of local identity. Therefore, short-term leases are not a regulating factor of the local housing market. At the same time, office space demand in the city centre has decreased, while many office parks in the suburbs remain vacant.
- **Mobility Patterns and Transportation Infrastructure:** With the private car being the primary mode of transport, commuting to/from the suburban areas increased traffic congestion. Public infrastructure, particularly in peri-urban areas, needs improvements to accommodate residents' needs. Hybrid working arrangements reduce the difficulty of finding parking in the city center.
- **Digital/Utilities Infrastructure:** Digital connectivity is sufficient but expensive. Regarding utilities infrastructure, there were no implications reported.
- **Policies:** At the city or county level, Philadelphia does not yet have any policies regarding the RW and how this would affect the city. Existing policies are mainly related to the number of remote days per week.

6.6 Stockholm, Sweden

Context

Stockholm, the capital of Sweden, is the largest of the Nordic capitals, with approximately 980,000 inhabitants in the municipality, 1.6 million in the urban area, and 2.4 million in the metropolitan area (Dyvik, 2024). This metropolitan region comprises around 22% of Sweden's total population, making it the country's most significant urban centre.

Stockholm County covers 6,519 km² and includes 26 municipalities (Region Stockholm, 2018). Widely recognized for its innovation, Stockholm was designated the most innovative region in the EU in 2021. The region manages to grow its GDP while decreasing emissions, ranking highly in sustainable development. As a global tech and startup hub, it hosts one of Europe's major tech communities (Stockholm Region EU Office, n.d.).

The region exhibits higher population growth and productivity than the rest of Sweden and most other European metropolitan regions, accounting for nearly one-third of Sweden's GDP (Region Stockholm, 2018). As part of Eastern Middle Sweden, Stockholm plays a crucial role in national development and international competitiveness (Region Stockholm, 2018).

As Sweden's main economic center, Stockholm attracts businesses, administration, and finance. The city center and inner city host the financial sector and creative industries like gaming, music, and fashion, while Kista Science City is renowned for its ICT cluster. The region also boasts several high-ranking universities and is competitive in the ICT, Life Science, Finance, and Clean Tech sectors.

According to the Urban-Rural Typology employed by the European Commission (Eurostat, 2018), the metropolitan area of Stockholm - Stockholms Län (NUTS 3), a coastal region, is classified as a capital metropolitan region and a predominantly urban region with the rural population corresponding to less than 20% of the total population.

According to available data (Eurofound, 2022a), the percentage of telework in Sweden in 2019 was among EU27's highest, overcoming 30%. This figure increased about 10% until 2022, when over 40% of the employees were working from home. According to estimates, Sweden still has one of the highest shares of employed persons who report working either habitually or occasionally from home, followed by Luxembourg and Finland, with shares of over 40% (EDJNet – Openpolis, 2023). However, according to Eurostat (2024) for 2023, the percentage of employed persons working from home is roughly 15% in Sweden.

Although there is no available data to estimate the number of remote workers in the county of Stockholm, the city of Stockholm has a high share of jobs that can potentially be performed remotely (around 56%), while the corresponding figures for medium-sized cities and the smallest cities are approximately 20% and 15% (Eliasson, 2023).The share of payroll from jobs that can be performed remotely is 70 percent in Stockholm, suggesting the high number of people who work remotely.

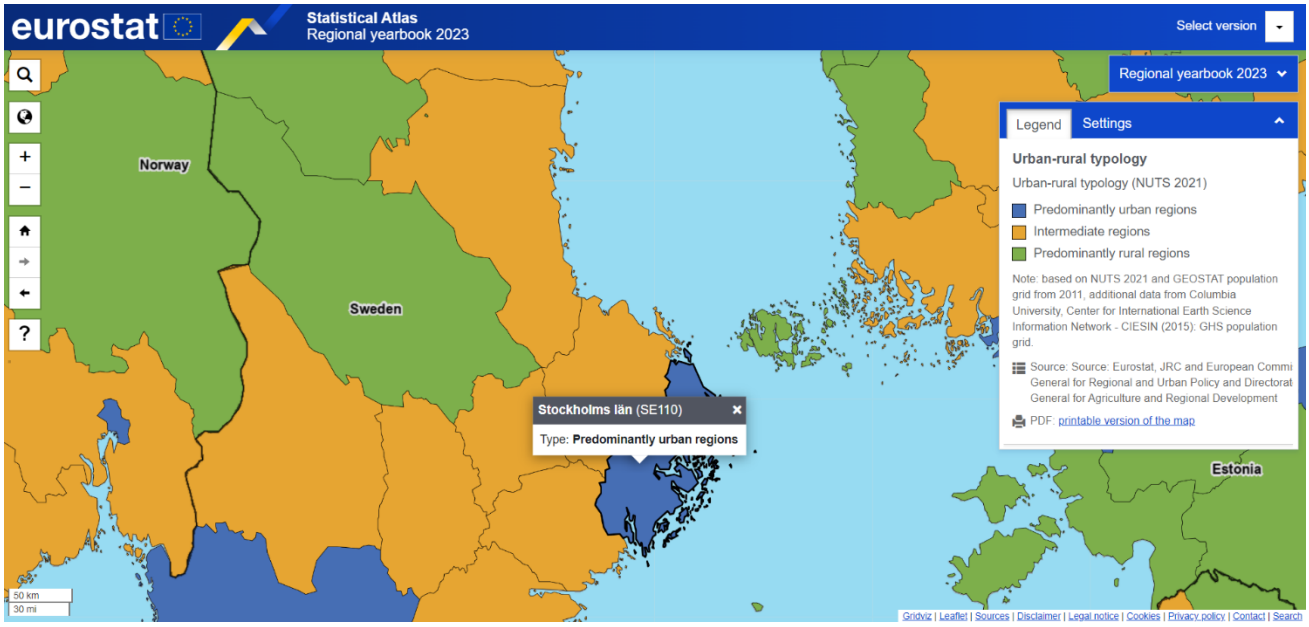


Figure 17: Urban-rural typology of the Stockholm Metropolitan Area, NUTS3, (Eurostat - Statistical Atlas, 2023)

Key Findings

Three interviews were conducted to understand better the spatial implications of remote work in the County of Stockholm. One of them did not focus specifically on the county but discussed the phenomenon throughout Sweden, giving interesting insights and allowing for comparisons. The interviewees brought up the current situation with the spatialities of remote work at the local level, the evident trend of moving to the suburbs and smaller towns, the unique system of real estate regulation, and the changes in mobility patterns concerning how remote work trends are participating in reshaping the city's urban and rural dynamics.

The thematic analysis coding of the interview data highlighted key themes, particularly mobility patterns, movement to the periphery, urban planning, housing, multilocality, the urban-rural divide, and second homes.

Stockholm's urban structure is characterized by a central area comprising of islands and adjacent mainland regions, which serve as central hubs for employment, cultural activities, and services. The city has developed a polycentric model over the years, though the central core remains dominant. Commuting patterns within Stockholm's metropolitan area reveal significant movements, particularly between Stockholm and nearby towns like Södertälje and Uppsala. It is observed that the establishment of remote work has led to increased home-based work and reduced commuting. This shift has encouraged some residents to relocate to suburban or rural areas, leveraging the flexibility of remote work to minimize the need for daily commuting. Remote work is seen as both a brain drain opportunity in rural areas and a brain gain in urban areas like Stockholm, attracting talent despite potential tax implications.

According to the available data, public transport ridership in Stockholm has not yet returned to pre-pandemic levels, stabilizing at approximately 85% of what it was in 2019, although not directly an outcome of remote work. Transportation networks may need to adapt in the future to cater to changing work trends and preferences for localized living. In contrast, infrastructure needs, such as public transport and digital connectivity, are highlighted as very important, particularly in rural areas.

The housing market in Stockholm has experienced changes, with some development projects paused due to economic uncertainties and shifting demands. Still, it is a very regulated market. Some companies in Stockholm chose to downsize their offices while implementing flexible work arrangements during the pandemic. Some offices seem to be relocating back to the CBD, leading to discussions on repurposing empty office spaces in suburban and peri-urban areas into housing.

Remote work during the pandemic produced some positive effects on local services, as people working from home spent money on food and other amenities locally. This highlights the importance of such observations for future policies and strategies for rural areas.

In Sweden, issues like sewage management and appropriate infrastructure for secondary homes are already being addressed through various measures. Beyond that, remote work could impact the environment by changing energy use and infrastructure needs; however, there are no indicators of this happening so far.

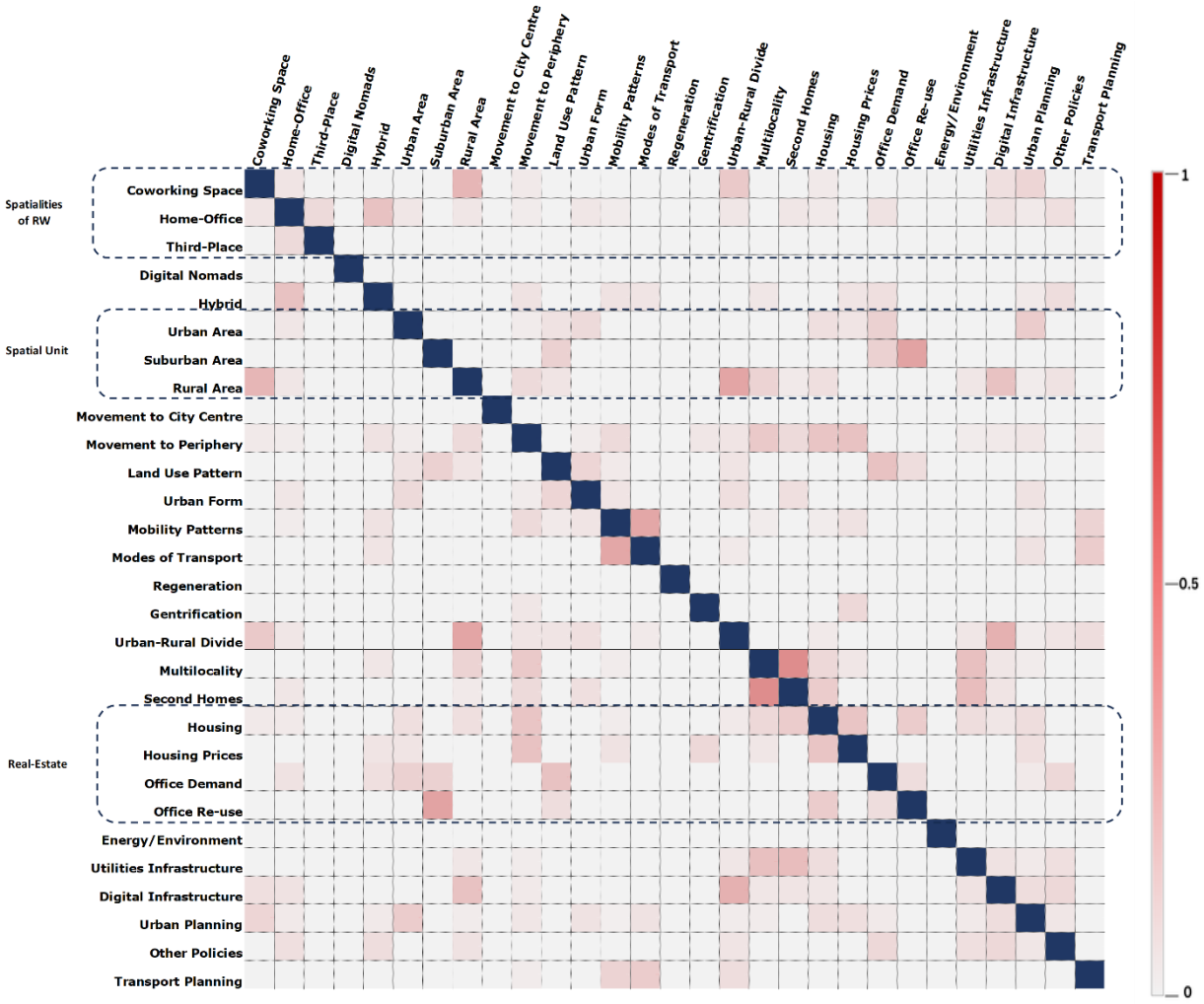


Table 14: Stockholm - Correlation matrix of variables measured correlation coefficient ranging from 0 to 1. The scaling corresponds to the strength of the correlation; white close to zero indicates no correlation and dark red strong correlation coefficients between variables

Discussion on the spatial implications of remote work in Stockholm

Although there are some spatial implications of remote work in Stockholm, the interviewees suggested that more data is needed to evaluate and understand them. Following the research questions and the results of the correlation matrix (Diagram X), the findings are as follows:

- **Urban development trends:** During the COVID-19 pandemic and in recent years, as more and more people work in a hybrid model, a movement outside the city toward the suburbs and smaller cities has been noticed. In most cases, people tend to move within a commuting radius of Stockholm. This is encouraged by housing availability and affordability outside the city of Stockholm. Along with this trend, gentrification is happening in smaller towns, especially those not impacted much by tourism. The impact of remote work on the revitalization of city centers is uncertain in the context of Sweden. There is an urban-rural divide, especially with the country's most remote and low-density areas, but not so much within the county of Stockholm, although there are extensive rural areas.

Regarding the spatialities of remote work, it is noted that people in urban/suburban areas prefer to work from home. In contrast, coworking spaces are more popular in rural areas, as shown by a low correlation in the matrix. Coworking spaces in rural areas act as community and collaboration hubs, gaining significance compared to urban areas. In Sweden, a large part of the population has access to second homes and chooses to spend part of their time there working remotely. Multilocality in this aspect is typical, showing a moderate correlation in the matrix, while it is observed that some of these houses are turned into primary residencies.

- **Housing and Office Demand:** during the pandemic, office spaces often were consolidated, leading to empty spaces in the city center and the outskirts. However, in recent years, many companies following this model have chosen to move their offices to the CBD, occupying smaller spaces and reversing a trend of previous years of companies creating office buildings outside the CBD. There is a discussion of repurposing these buildings mainly for residence, but it is costly and time-consuming. Capturing this phenomenon in the matrix, a moderate correlation exists between office reuse and suburban areas. In Sweden, the housing market is regulated along with rent controls and waiting periods regarding demand. Housing prices in Stockholm are very high, but with the hybrid working model, more affordable options in nearby towns seem to be becoming popular. This is also shown in the matrix, which shows a low correlation between movement to the periphery and housing/housing prices.

- **Mobility Patterns/Transport Infrastructure:** It is noted that public transport use has decreased significantly and is not at the same level as before the pandemic. This reduction in ridership has practical implications for public transport operators, who have had to reduce service frequency, particularly during off-peak hours, due to financial constraints. At the same time, the cost of using public transport less frequently might appear more significant to a once-a-week/few times-a-month commuter.

- **Digital/Utilities Infrastructure:** The Nordic countries are digital frontrunners in general. The digital infrastructure in the county is sufficient, but in remote and rural areas, issues are contributing to the urban-rural divide (low correlation). With multilocality and movement to the periphery, some municipalities experience a tax income drain since the permanent residents pay the taxes. At the same time, smaller towns face issues regarding sewage and garbage collection infrastructure and services with the temporary population rise. As shown in the matrix, low and moderate correlations are formed between these terms.

- **Policies:** There are no policies at the moment at a national and regional level. There was a consensus among the participants that, for the moment, it is essential to gather data and understand how remote work is changing urban and rural areas and then develop strategies accordingly. Rural municipalities were much more active, seeing the potential of remote workers and trying to attract them in different ways. The significance of investing in infrastructure in areas that are not populated to give people incentives to live there was highlighted, too.

All the participants agree that it is too early to draw definite conclusions about the spatial effects of remote work. Municipalities and regional authorities are collecting data; however, specific surveys need to circulate to pinpoint the implications of remote work. Moreover, it is difficult to separate the impact of remote work from that of tourism or the current economic downturn since they happen simultaneously.

6.7 Vienna, Austria

Context

The federal state of Wien (NUTS2) is one of the nine states in Austria and the biggest one in terms of population. It is located in the northeastern part of the country, close to the borders of Slovakia, Czech Republic and Hungary. In addition, the city is traversed by the Danube River, which flows in the northwestern side. Together with the city of Bratislava, it functions as a dipole for culture, economic, and political activity in Central Europe (Vienna, Austria - Image of the Week - Earth Watching, n.d.).

Vienna (Wien) is Austria's capital and the region's primary urban center, with a population of 1.7 million. The metropolitan area accounts for over 20% of the country's population, with a total of 3 million inhabitants (Vienna, Austria - Image of the Week - Earth Watching, n.d.). According to the Urban-Rural Typology employed by the European Commission (Eurostat, 2018), Vienna is classified as a predominantly urban and non-mountainous region.

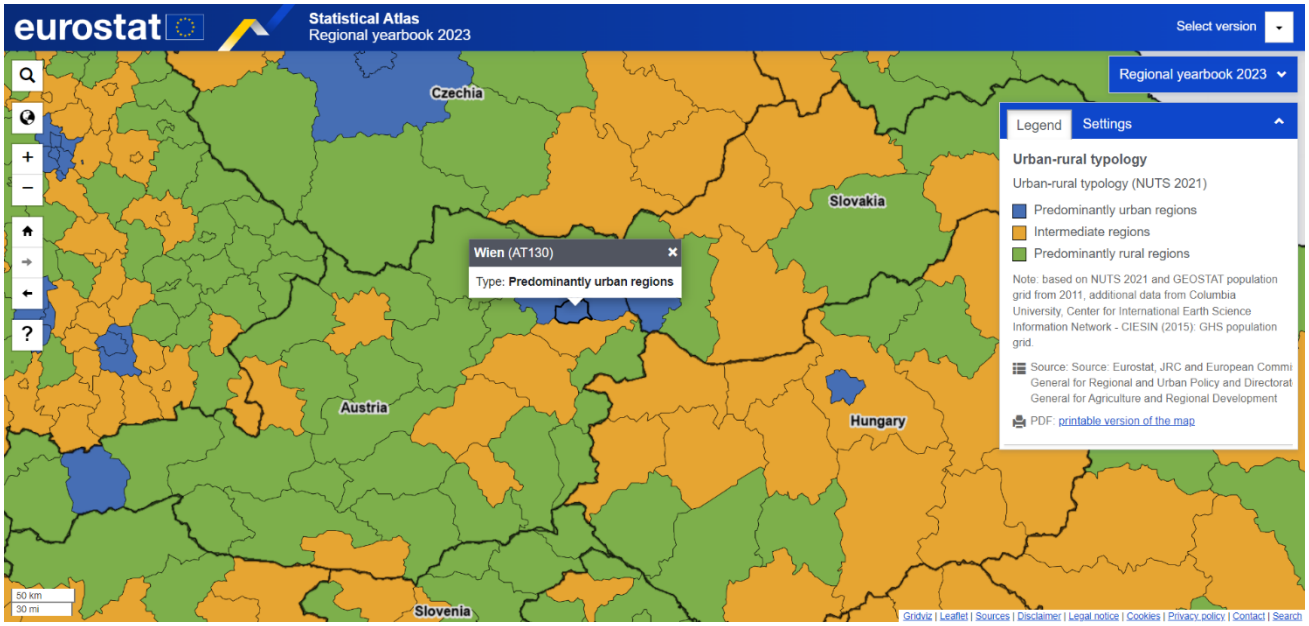


Figure 18: Urban-rural typology of Vienna, NUTS3, (Eurostat - Statistical Atlas, 2023)

In the last 20 years, Vienna has experienced increasing economic and urban growth after a stagnation period. The suburban areas around Vienna have also been growing, driven by factors such as low interest rates and the increased prevalence of remote work. The financial crisis and subsequent housing boom further accelerated this growth.

Vienna is a compact, radial city with well-organized public transportation. The city's public transport network comprises a comprehensive system of subways, high-speed railways, and interconnected major train stations, which collectively facilitate high levels of public transport usage.

According to the available data from Eurostat (2024), the percentage of RM in Austria was 10,9% in 2023. Austria is within the European countries with the higher rates of usually WFH. Although there is no available data to estimate the number of remote workers at the city level, for the Wien region, the annual share of

persons usually working remotely in 2020 was 15%. Wien is among the regions with the higher rates, compared to both the national 18,1% and European 12,3% average of the same year (Eurostat, 2021).

Key Findings

To gain insights into the spatial impacts of remote working arrangements, two interviews were conducted in the context of Vienna. Several key themes emerged from the thematic analysis coding of the interview data, specifically at the local level for this case study. The primary themes identified were the spatialities of remote work (home-office), the provision of common workspaces in new housing developments, the impacts on mobility patterns in the suburbs, the housing preferences in the suburbs, the concept of multilocality, the demand for office space, changes in commercial land use patterns and the inadequate digital infrastructure in isolated rural areas.

In light of the ongoing economic growth, the demand for office spaces remains high, so there are no vacant office spaces at the moment. Companies are restructuring their internal office layouts to accommodate a greater number of collective and coworking desk types. Overall, the demand for office space remains high, although companies have reduced the number of square meters required.

Additionally, remote work has increased due to COVID-19 and has become a commonplace aspect of the modern workplace. The predominant working contracts are of a hybrid model, with the majority of remote work performed from home-office on a weekly basis. Other arrangements, such as coworking spaces, are secondary and in low demand.

The prevalence of a hybrid model of office attendance is influencing residential preferences. The movement to the periphery is driven by the pursuit of a higher quality of life and greater proximity to nature rather than by the unaffordability of housing options in the city.

Despite Vienna's robust public transportation system, suburban areas face challenges such as land availability near public transport hubs and the need for sufficient parking spaces for park-and-ride systems. The shift in commuting patterns due to remote work, with peak commuting days now being mid-week, has also impacted traffic volumes and public transport usage.

The expansion of suburbs or smaller towns has resulted in significant infrastructure challenges, particularly in ensuring sufficient digital connectivity and managing land availability. The regional municipalities try to regulate the inflow of new residents in smaller towns because they believe that they are less engaged in community activities and less integrated into the social networks with the local population. Additionally, the pressure on the real estate and the existing utilities infrastructure system is high, and these towns usually cannot afford to improve them.

Regarding commercial land use, the CBD, as well as smaller centers in nearby towns, face challenges with vacant commercial spaces mostly because of the rapid development of the online shopping “e-commerce”. It requires innovative solutions like repurposing office ground floors to keep the city vibrant and attractive. In the smaller towns, such vacant commercial spaces have become a constant problem for the local community because this shrinking has a major impact on the viability of these towns and in the unemployment rates.

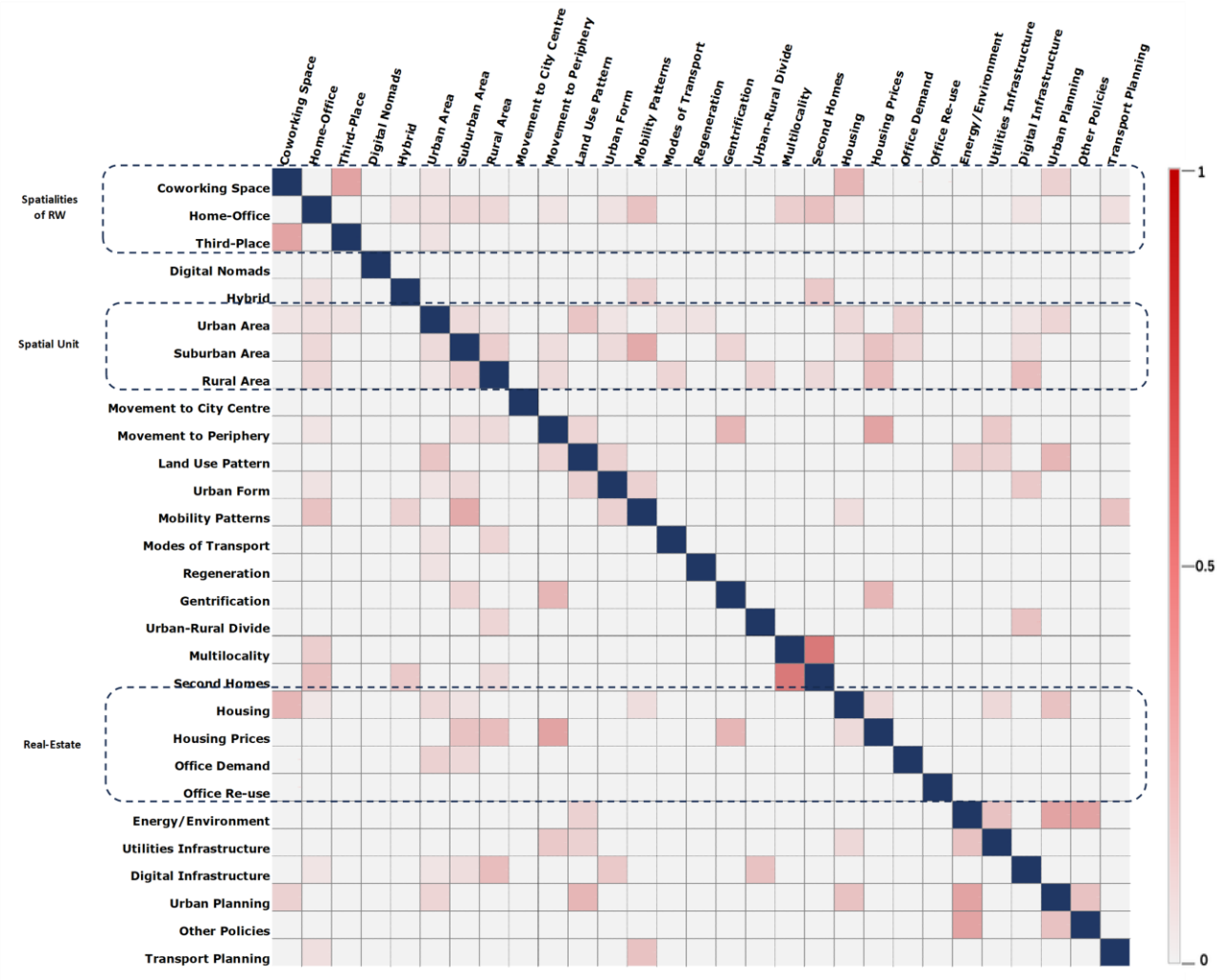


Table 15: Vienna- Correlation matrix of variables measured correlation coefficient ranging from 0 to 1. The scaling corresponds to the strength of the correlation; white close to zero indicates no correlation and dark red strong correlation coefficients between variables.

Discussion on the spatial implications of remote work in Vienna

According to the insights of the interview participants, remote work has become a factor in modifying urban features. Nevertheless, its implications are more pronounced in the suburban areas surrounding Vienna. Following the research questions and the results of the correlation matrix, the findings are as follows:

- **Urban development trends:** It is common for families to move to the periphery for bigger housing options, and this population growth creates pressure on the existing services and infrastructure. Yet this remains an option for people because housing availability in the city center remains regulated. Vienna has not experienced the phenomenon of gentrification, with a few exceptions. The phenomenon of multilocality is also very common among the residents of Vienna, as many of them own a second home outside the city limits, for example, in the Alpes region. This allows them to combine their leisure time with their professional obligations. As long as other commitments, such as those related to education, permit them to do so.

- **Housing and Office Demand:** There are no significant implications of remote work in the real estate market in Vienna. Housing prices are highly regulated by established land use policies that prevent overpriced properties. The issue is more prominent in the suburbs, especially around the transportation stations where the landowners do not sell their properties for new housing or infrastructure developments, leading to "empty" rings around the transport hubs and the development of new settlements farther away. In the matrix, there is a high correlation between housing and coworking spaces, which is explained by the fact that, in the last decade, large-scale housing developments have incorporated common spaces within the building blocks that can accommodate the needs of remote workers. For instance, they can work remotely from these common spaces with high-speed internet connection and available desks. These spaces have multiple uses, but they need to be regulated by a manager to prevent their misuse. Regarding office spaces, the correlation between office demand and urban or suburban areas is significant, and this is related to the constant economic growth.
- **Mobility Patterns and Transportation Infrastructure:** Hybrid work models have shifted peak commuting days and movement to the periphery, causing pressure on the road's infrastructure. The second interviewee mentioned that there is a slight decrease in overall commute distances, but there is no reliable data to support this. The correlation between mobility patterns and suburban areas is significant due to the reliance on private vehicles for commuting to work in the city. This phenomenon raises environmental concerns due to the increasing CO^2 emissions.
- **Digital/Utilities Infrastructure:** It was mentioned that the digital connection around Vienna is sufficient in a radius of an hour around the city, although in the matrix the cubit between the digital infrastructure and rural areas, highlights precisely this shortage of infrastructure in isolated remote areas.
- **Policies:** Due to the policies implemented to regulate migration, the phenomenon of digital nomads is not prominent in Vienna. Moreover, the city has not implemented measures to support or attract them. In addition, land use planning strives to facilitate the reuse of land in vacant commercial premises, into offices or short-lease houses, or other uses in order to maintain the city attractive.

In conclusion, Vienna has not been significantly affected by remote work. The housing market is sufficient for the local population, and affordable housing options are still available. The home-office provides the flexibility of working from a second home, extending the vacation period combined with work. The office demand in the CBD is still high, but this might become an issue in the future.

6.8 Volos, Greece

Context

The Region of Thessaly (NUTS2), one of Greece's largest regions in terms of size and population, is situated centrally on the Greek peninsula, bordered by the Aegean Sea to the east and the Pindos Range to the west. This region's main distinctive characteristic is that it contains two of Greece's largest mid-sized cities: Larissa

(Regional Unit of Larissa) and Volos (Regional Unit of Magnesia) that function as a dipole (Metaxas and Kallioras, 2004).

Volos is a medium-sized port city (the seventh largest in Greece), the capital of the Regional Unit of Magnesia, with nearly 86,000 residents out of the regional unit's total population of around 180,000 (ELSTAT, 2021). It is in close proximity to the Thessaly Plain and Mount Pelion. According to the Urban-Rural Typology employed by the European Commission (Eurostat, 2018), the Regional Unit of Magnesia (NUTS 3) is classified as an intermediate region, with 20-50% of its total population residing in rural areas. Also, it is a region with more than 50% of its surface covered by mountain areas.

Despite experiencing severe de-industrialization, the city successfully redefined its identity as a youthful hub following the establishment of the University of Thessaly in 1984. Additionally, it has emerged as a gateway to Mount Pelion and the nearby islands (Hastaoglou-Martinidis, 2023). Besides the University, it hosts several research institutions and numerous public administration jobs. Magnesia is well-connected via road and rail, linking central Greece with northern regions and serving as a transportation node. The local economy is supported by diverse agriculture, fishing, and tourism sectors. Volos, in particular, plays a significant role as a major port for trade and a popular tourist destination.

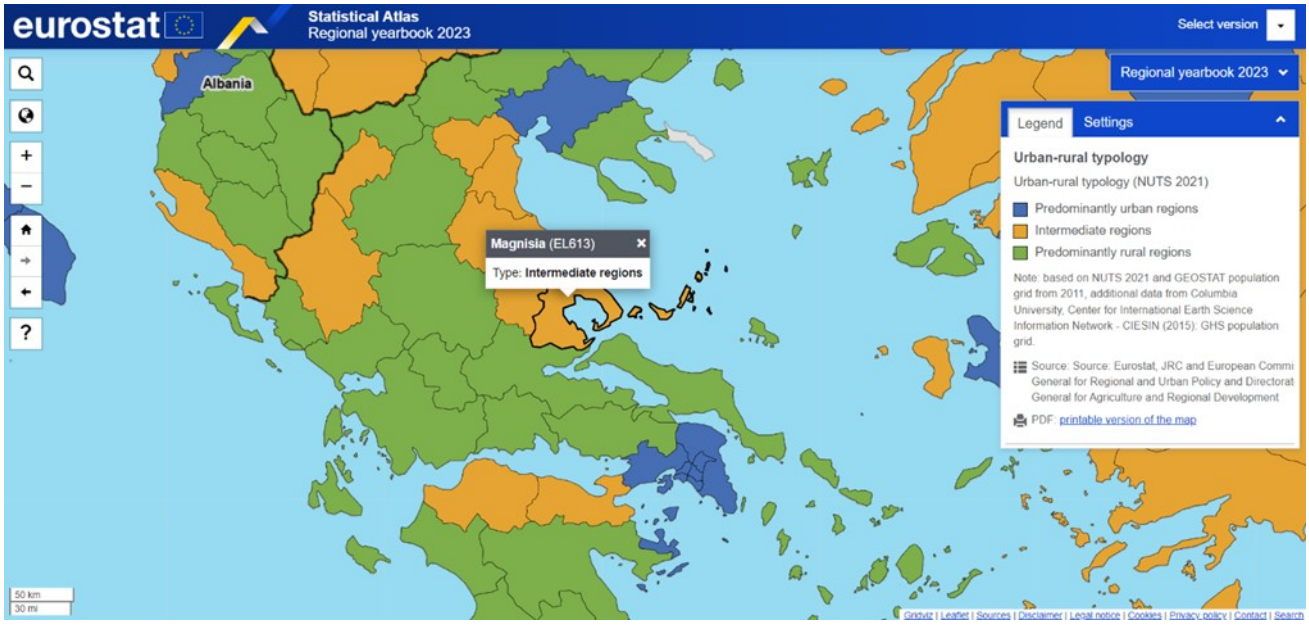


Figure 19: Urban-rural typology of the Regional Unit of Magnisia, NUTS3, (Eurostat - Statistical Atlas, 2023)

According to available data (European Foundation for the Improvement of Living and Working Conditions, 2022), the percentage of telework at the national level before the COVID-19 pandemic was approximately 7%. Although this figure increased to over 15% during the lockdowns, estimates indicate that the telework rate has reverted to pre-pandemic levels two years later. Although this figure increased to over 15% during the lockdowns, the newest Eurostat data (2024) indicate that the telework rate has reverted to pre-pandemic with the percentage of employees working from home approaching 2%. Notably, the prevalence of telework is even lower outside the major Greek cities.

Although no available data exists to estimate the number of remote workers in Volos, the percentage is considered low compared to traditional working arrangements. The majority of them work from home. The city has only one dedicated coworking space and attracts digital nomads and remote workers from within the country and abroad.

Key Findings

For the Volos case study, three interviews were conducted to explore the current state of remote work and its potential spatial implications. The participants shared their perspectives on existing remote work practices at the local level, the impact of coworking spaces, and the phenomenon of digital nomads. Additionally, the interviews offered a broader perspective on the new spatialities of work across Greece and the differences between larger cities and rural/remote areas.

Through qualitative thematic analysis (coding) of the interview data, several key themes emerged regarding this case study. The primary themes identified were the spatialities of remote work (coworking spaces), digital nomads, the concept of multilocality, the impacts on real estate and the housing market, the lack of specific policies, and the inadequate digital infrastructure outside the city.

The consensus was that it is too early to have significant spatial implications of remote work in Volos since the city's remote work landscape only underwent substantial changes during the COVID-19 pandemic. The hybrid work model is gaining popularity, and digital nomads from Greece and abroad choose to spend some months in the city.

As remote work gained acceptance and became more widespread, there was a notable increase in demand for professional spaces with reliable internet, especially from non-local professionals and from abroad. This trend was and still is particularly evident during the summer when tourists and remote workers seek suitable third places to work. The Greek public's acceptance of coworking spaces increased, leading the team behind the coworking space in Volos to expand their operations by establishing a new coworking space in a mountainous village nearby, further catering to the growing demand for flexible working environments in scenic locations. One of the interviewees suggested that the adoption of remote work and coworking spaces is gradually increasing in Greece despite the country's lack of supportive policies.

The concept of digital nomadism and its growing popularity were also highlighted, as well as its perceived relation with the tourist industry. Digital nomads, who often earn higher incomes than local workers, contribute to increased demand, higher prices for coworking spaces, and higher rents. Mature tourist markets like Crete seem to support digital nomad communities more effectively than less touristically developed areas like Volos and Pelion. The concept of "multilocality" was also discussed and linked with the practice of second homes, especially in regions like Pelion, where mountainous and coastal settlements tend to have temporary populations.

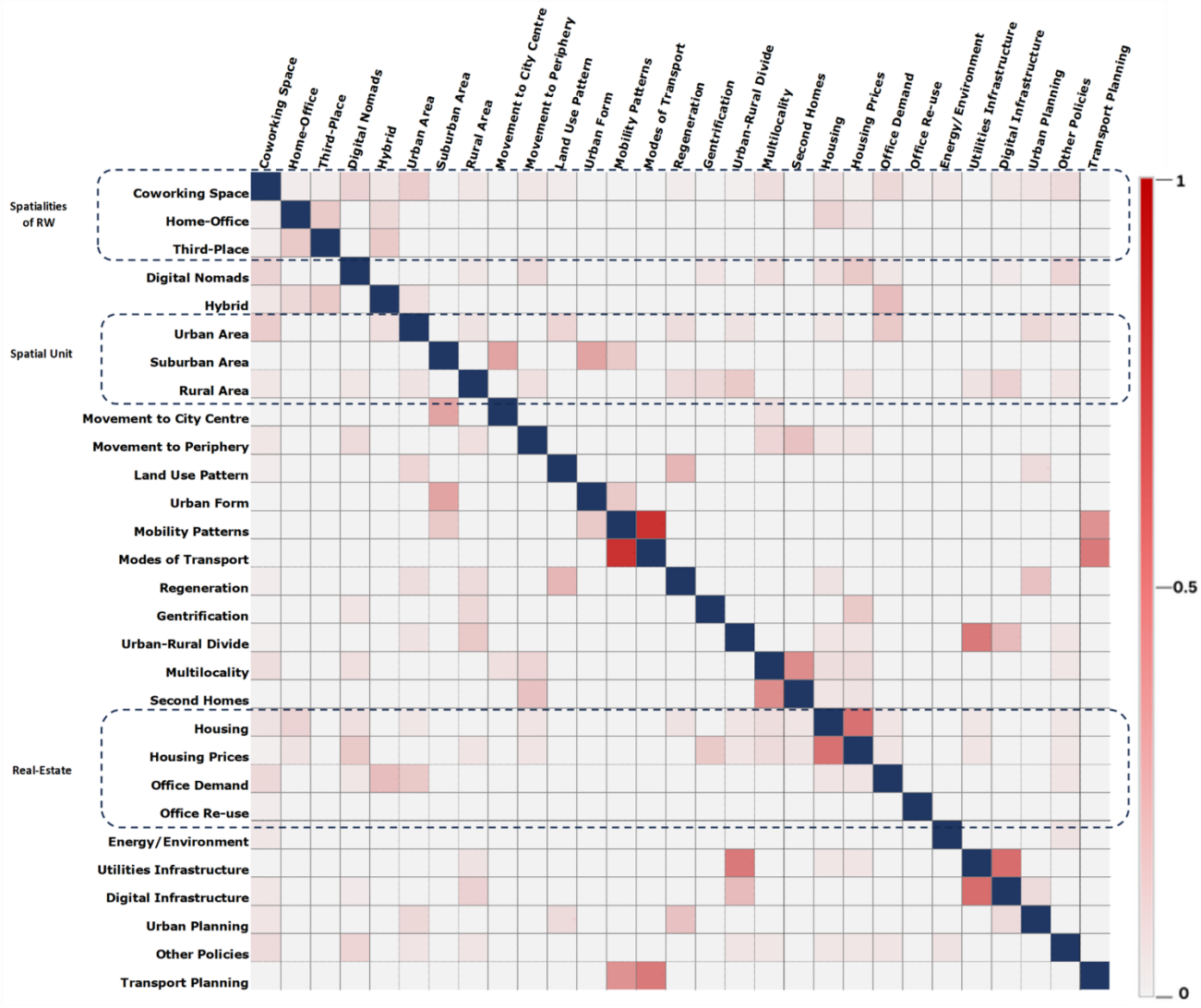


Table 16: Volos - Correlation matrix of variables measured correlation coefficient ranging from 0 to 1. The scaling corresponds to the strength of the correlation; white close to zero indicates no correlation and dark red strong correlation coefficients between variables.

Discussion on the spatial implications of remote work in Volos

It is noted that according to the insights of the interview participants, there are no significant spatial implications of remote work in Volos and Pelion. Following the research questions and the results of the correlation matrix, the findings are as follows:

- **Urban development trends:** Such a small share of the workers in Greece and Volos works hybridly or remotely that changes in the city's urban form are not yet apparent. The emergence of coworking spaces in cities and rural areas is growing. Especially in tourist destinations, their use is widespread, and their popularity is high. In Volos, there is only one designated coworking space. Another observation that cannot be entirely attributed to remote work is the rise in available residences for short-term and mid-term rental and the new residential and office buildings under construction all

over the city. A slight tendency to move to the periphery was noted. However, this is deemed temporary and only for the warmer months, as transport connectivity and digital infrastructure cannot support it. A significant correlation is observed between multilocality and second homes.

- **Housing and Office Demand:** According to one of the participants, coworking spaces are starting to become players in the real estate market, especially in Greece's larger cities. The growing demand and usage of available residences for short-term and mid-term rental have contributed to the rise of rents, specifically in the city center. The much higher incomes of digital nomads compared to those of local workers also play a role in shifting the prices. There is a significant correlation between housing prices and gentrification, with many people searching for more affordable housing just out of the city center. As a result, there is a notable link between movement to the city and the suburbs, as well as the urban-rural divide and housing prices.
- **Mobility Patterns/ Transport Infrastructure:** Remote work in the area does not noticeably change mobility patterns. Volos is a very walkable city, with everything within easy distance. However, as public transportation (bus) connections with the villages and settlements outside the city must be better established, car use prevails. At the same time, the need for better transport infrastructure, including railway, ferry, and plane connections, is recognized as very important.
- **Digital/Utilities Infrastructure:** Amenities and infrastructure are important for remote workers and digital nomads. High internet speed, activities, and hospitals with easy access are essential. The city of Volos provides all the amenities, but the mountainous and coastal settlements are not very well equipped. This is one of the parameters adding to the area's evident urban-rural divide. Digital and utility infrastructure show a moderate degree of correlation, as is the case with the urban-rural divide. There is an effort for initiatives outside the city to provide them with acknowledgment of their importance.
- **Policies:** There are no statistics regarding remote workers and digital nomads in Greece, which is considered to be the first and most important step in building policies. Apart from the Digital Nomad Visa, there seem to be no policies regarding the implications of remote work or even promoting specific destinations. It is mentioned that initiatives like Work from Greece can be beneficial for attracting remote workers from abroad. Still, each Municipality/Regional Unit/Region should be actively involved in planning and regulating remote work on different scales. Also, there is a lack of policies that regulate and provide incentives for coworking spaces in relation to entrepreneurial empowerment or are linked with regeneration projects.

In conclusion, remote work in the area is viewed as a positive force capable of boosting local economies, transforming urban landscapes, and revitalizing rural town centers in the future. The interviews also recognized the potential for the area's rural communities to attract remote workers, the importance of economic adaptability, and the crucial role policymakers could play in managing housing availability and over-tourism. Promoting Volos and Pelion as a destination for remote workers (including digital nomads) and the need for resource allocation were also discussed.

However, challenges such as inadequate transportation infrastructure, environmental impacts, housing market changes, and the necessity for policy interventions to address housing supply issues were highlighted.

7. Cross-case Comparative Analysis

Following the correlation matrices for each case study, a cross-case comparative analysis was performed to generate insights into the patterns of remote work spatial implications and identify variations and similarities across the eight case studies. Sometimes, the local insights were placed in the national context during the interviews, and some generalizations were made; hence, here, there is mention both to national, when applicable, and case study levels.

A crucial step toward the comparative analysis was to systematically document the interview material according to the key themes using deductive and inductive coding (see section 2.2.3), ensuring comparability and alignment with the literature review findings. Namely, the themes follow the spatialities of RM, the urban-rural divide, urban development trends, house and office demand, mobility patterns, policies, energy and environment, and infrastructure. For a comprehensive illustration of the results, the keywords were colored differently depending on whether they were a direct result of RW or could not be entirely attributed to RW. Blue indicates a clear effect or RW arrangements, while red refers to observations not entirely attributable to RW. The comparative analysis is presented in the table below (Table 17), outlining the main themes, keywords, and findings per case study.

As stated earlier, the degree of remote work implications depends on the portion of the workforce that works remotely and the degree of teleworkability of the jobs at a regional and local level. These case studies show a variation in these aspects, although the available data refer mostly to the national level.

In Greece and Italy, remote workers accounted for less than 5% of the employees in 2023 (Figure 20). Spain and Portugal accounted for approximately 8%. This percentage was nearly 12% in Austria, the Netherlands, and in Sweden almost 15%. In Philadelphia in 2022, this percentage was about 19% of the workforce. Therefore, the comparison attempted here should be viewed through the lens of these RW percentages and the bias of one case study per country.

Regarding the **spatialities of remote work**, working from home (home office) is very popular and predominant in all 8 case studies, especially when living in the suburbs or the city's outskirts. Preference for working in coworking spaces shows variations across case studies, with Portugal and Italy leading this relatively new type of workplace. In Southern Europe, in cities with historical centers, living spaces are often not spacious enough to accommodate home offices. In Sweden, CSs have increased in the rural areas as they act as community and cultural hubs. In Volos, the success of the one dedicated CS indicates a slowly changing dynamic of remote work in medium sized Greek cities, where working remotely is not rife. In contrast, in Vienna and Enschede, interviewees barely mentioned CSs. In Barcelona, Northern Italy, and Philadelphia, third places like libraries, cafes, etc., play an important role at the neighborhood level.

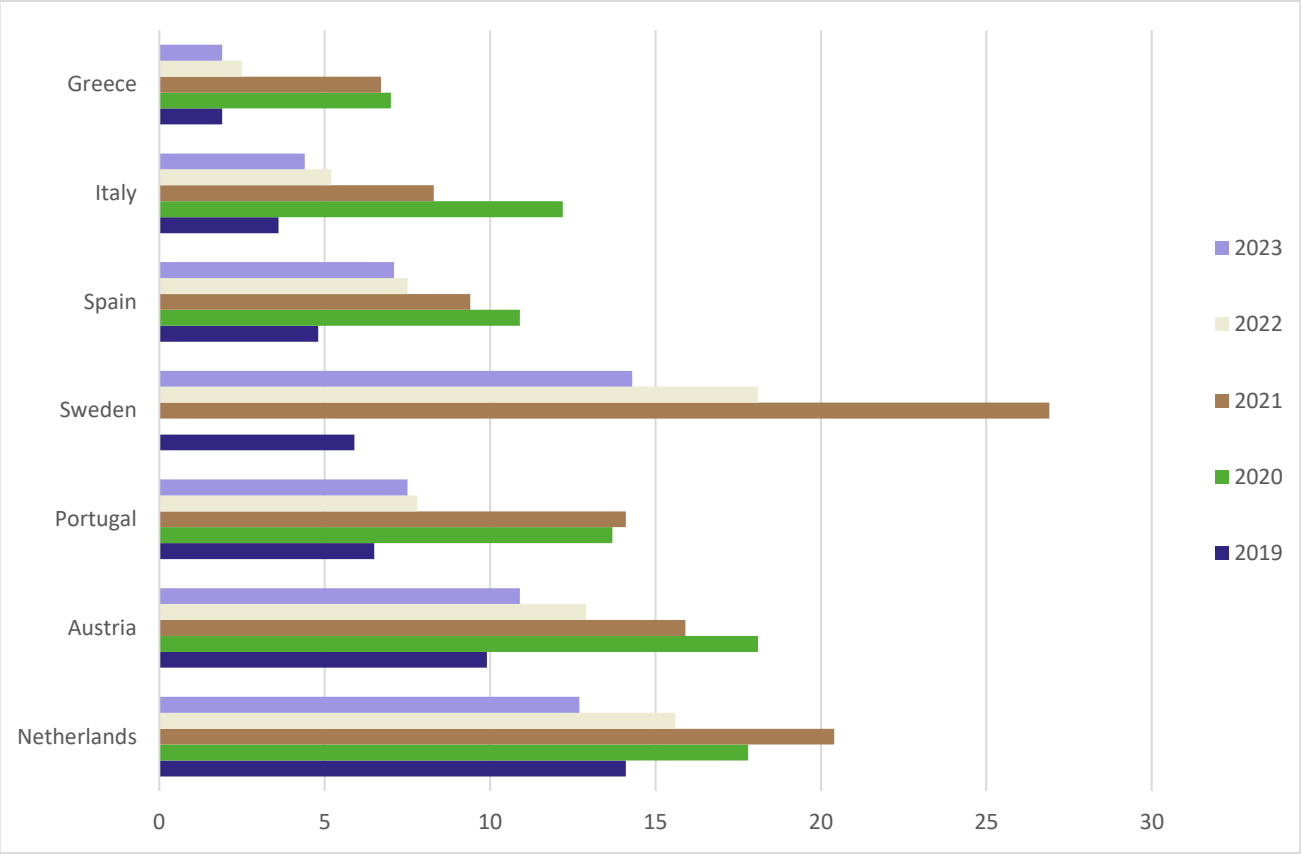


Figure 20: Employed persons usually working from home as a percentage of the total employment (%), (Eurostat, 2024)

The various degrees of the **urban-rural** divide in the case studies are linked with the digital, transportation, and utilities infrastructure. In Volos, public facilities and infrastructure quality drops outside the city. On the other hand, for the case studies of Enschede and Stockholm, the interviewees mentioned that both digital and utilities infrastructure adequately cover the larger parts of the country. In Barcelona, Lombardy, and Trentino, shortages are observed in the very rural/remote areas. As for the **transportation infrastructure,** the road network is deemed adequate in all the case studies apart from Greece, where issues were mentioned, especially in the rural and mountainous areas. However, regarding the public transport networks in Philadelphia, the daily needs of people living in the city's perimeter are not served. In Stockholm, public transport use has not yet returned to pre-pandemic levels.

Gentrification predated remote work. Especially in the case studies of Lisbon and Milan, gentrification is heavily related to over-tourism and rising real estate prices. In Lisbon, the presence of digital nomads in the city contributes to the gentrification of entire neighborhoods. Similarly, gentrification in Barcelona is endorsed by digital nomads and expats with higher income, who can afford higher prices and prefer short-term rentals. As a result, local populations, mainly low and middle-income blue-collar and location-depended workers, tend to move to the suburbs or smaller cities nearby, looking for affordable housing. Remote working or hybrid working arrangements facilitate this transition within commuting distance, enabling fewer commutes if needed, as observed in Lisbon and Milan. In Sweden, gentrification seems to have an impact on smaller and middle-sized towns, especially those not affected by tourism, as the population rises significantly with the

movement to the periphery. In Vienna and Enschede, gentrification was not mentioned as a significant issue concerning remote work.

Multilocality is becoming increasingly popular, with remote work being a contributing factor. However, in Lisbon, Volos, and Enschede, this trend is not predominantly associated with remote work. In contrast, individuals in Vienna, Philadelphia, Northern Italy, Stockholm, and Barcelona often spend extended periods of time in second homes while working remotely. An interesting aspect is that in the case of Barcelona, owners of a second property on the coastal line now use them as primary residences, commute to the city center, or even rent an apartment if necessary. In Stockholm, the rise of multilocality is combined with pressure on the existing infrastructure (sewage, garbage collection) as the temporary population outnumbers the permanent residents. Volos differs from all the other case studies since it is a relatively small city and attracts multilocals from Athens or Thessaloniki (Greece's largest cities). At the same time, the proximity to Mount Pelion and the coast fosters the practice of second homes. On the same page, the city of Enschede seems to attract remote workers from other regions of the Netherlands and occasionally from Germany, as the cost of living is relatively lower while the quality of life and the infrastructure access remains high. Similarly, Philadelphia attracts remote workers from neighboring States such as New York. Individuals in this demographic possess the economic means to afford high-cost apartments in the city center and immediate suburbs, as Philadelphia's housing market has historically been more affordable compared to cities like New York and Boston.

In all eight case studies, there are issues regarding **housing affordability** as well as availability, with remote work being one of the contributing parameters. This situation is particularly pronounced in the cases of Lisbon, Barcelona, and Milan, where it is primarily driven by the influx of digital nomads and tourists coupled with an unregulated short/mid-term rental market. In the remaining case studies, the interviewees mentioned that the housing market has not yet experienced severe issues. In Vienna and Stockholm, the housing market is highly regulated. However, it is easier to find affordable housing outside the city centers. In Philadelphia, there are still affordable housing options in different neighborhoods. Additionally, there are existing community efforts to eliminate short-term leases, which are perceived as a threat to the neighborhoods' identity.

From a macroscopic perspective, the variations in housing affordability can be explained partially by the fact that in Southern Europe, the market is seemingly influenced by tourism and foreign investment, while in Central and Northern European countries, the market is centrally regulated and follows higher living standards and sustainability goals.

Regarding office space demand and reuse, notable differences can be observed among the case studies. In Stockholm, following the consolidation of office spaces during the pandemic and the adoption of hybrid working arrangements, there is a trend of relocating from larger suburban offices to smaller spaces in the CBD. In Philadelphia, central offices are becoming increasingly unoccupied, a particularly pronounced trend in the suburbs. The demand has not been reduced in Lisbon, and some office spaces were turned into hotels or housing during the pandemic. However, in the cases of Vienna, Enschede, and Barcelona, office demand has not been affected, while there is a trend to reconfigure the internal layout of offices. In Milan, office spaces are being downsized or reconfigured to resemble coworking environments. In many cases, portions of the original offices have been converted into CSs. This growth of CSs in cities like Milan and Lisbon indicates a shift in demand away from traditional office spaces. It is partially attributed to smaller homes in city centers that cannot comfortably accommodate remote work. From the eight case studies, it seems that the larger cities,

such as Stockholm, Milan, and Philadelphia, experienced a significant impact of the pandemic on office space demand. Although medium-sized and smaller cities like Volos or Enschede appear unaffected, the ripple effects could be profound in the future, as these areas could either benefit from the decentralization of office spaces or struggle with reduced demand if businesses continue to gravitate toward larger urban centres or flexible, remote work models.

The changes in the **mobility patterns**, except for Volos and Enschede, primarily relate to variations in commuting times. In the remaining cases, the results indicate differentiated peak hours and unpredictable congested days of the week. In the cases of Philadelphia, Trento, and Volos, the use of private cars prevails. On the contrary, the cities of Barcelona, Lisbon, and Milan have adequate and multimodal public transport systems. Accordingly, in Vienna, Stockholm, and Enschede, public transport is well-connected and multimodal despite a decline in ridership after the pandemic. Connectivity issues often arise between metropolitan areas and smaller towns or surrounding regions, as seen in Vienna and Philadelphia. Conversely, smaller towns like Volos and Trento face challenges connecting to larger cities and their peripheries.

None of the case studies seem to have **active policies** regarding the spatial implications of remote work, possibly because it is too early to estimate the impact of remote work on urban development. Interestingly, only in the case of Italy policies were mentioned, promoting near-working in the concept of 15-minute cities or regional development via remote work, as in the case of Trento. Italy was one of the first countries to establish policies promoting collaborative working spaces (CSs, fab labs, maker spaces, incubators) more than a decade ago. Many policies were activated in Milan to boost business start-ups and local economic development.

In terms of **attraction policies**, the South European cases offer and promote Digital Nomad Visas and tax benefits to attract non-European remote workers. As a result, Barcelona and Lisbon are becoming attractive destinations. The Netherlands has no digital nomad framework, but some alternatives are offered. Sweden and Austria do not currently provide a digital nomad visa. Things for the USA are a bit different, but other types of visas can accommodate remote workers for a limited time.

The importance of **regulating policies** for the housing market was highlighted during the interviews. This aspect shows a significant difference between South Europe and central-northern Europe. In cities like Vienna and Stockholm, the state largely regulates the housing market, and short/mid-term rentals are under control. On the other hand, in cities like Lisbon or Barcelona, short/mid-term rentals cover a large percentage of the housing stock, fueling a housing crisis to a degree. Policies to confine these effects are being discussed but have yet to be actively implemented.

	Spatialities of RM	Urban-Rural Divide	Urban Development	Residential & Office Demand	Mobility Patterns	Policies	Infrastructure
Barcelona ES	**Home office:** people prefer to work from home but houses are not appropriate to support this **Coworking spaces:** they have not risen significantly **Third places:** their use has increased and they are mostly cafes and libraries	**Public Facilities:** remote or mountainous areas do not have easy access to public facilities **Infrastructure:** digital connectivity and infrastructure issues in rural areas	**Gentrification:** mostly linked to the combination of tourism and digital nomads/ expats in the centre **Multilocality:** has increased with RM especially in coastal areas **Movement to the periphery:** low income individuals are moving to the suburbs mostly due to housing prices	**Housing stock:** affordable housing in the city centre is low while short-term leases escalate this phenomenon **Housing prices:** the property value in the city centre is high **Office spaces:** The need for office spaces remains as the city attracts companies but most of them need less space with the layout of a co-working space **Second homes:** in the coastal area people turn their second homes to primary residence instead of renting an apartment in the city centre	**Commuting time:** differentiated peak hours and congested suburban road networks **Public transport/car use:** multimodal public transport	**Attraction Policies:** Digital Nomad Visa **Regulating Policies:** ongoing policies for mitigation of short-term leases	**Transport Infrastructure:** partially covers the needs with good connectivity in the metropolitan area **Digital Infrastructure:** some gaps in very rural and remote areas **Access to Services:** the transport network provides access to the smaller towns and the rural areas
Lisbon PT	**Home office:** preferred mostly in suburban and peri-urban areas **Coworking spaces:** popular in Portugal, used mostly in dense urban areas but also in rural for a sense of community **Third places:** N/A	**Public Facilities:** easier access with the transport infrastructure within the metropolitan area **Infrastructure:** some connectivity issues	**Gentrification:** mostly linked to tourism, the phenomenon is evident in the metropolitan area **Multilocality:** seemingly not widespread in relation to RW **Movement to the periphery:** People are moving to the suburbs and the perimeter of the metropolitan area taking advantage of RW arrangements	**Housing stock:** difficult to find affordable residence in the city, short and mid-term rentals are widespread **Housing prices:** rising, ripple effect from the center moving to the perimeter of the metropolitan area **Office spaces:** seemingly back to normal after the pandemic, easy transformations to hotels and residence happened **Second homes:** there are no data to link this with RW, it is happening to a degree	**Commuting time:** maybe extended a bit but happens less frequently **Public transport/car use:** overbooking in public transport, high car use but not directly linked with RM	**Attraction policies:** Digital Nomad Visa, tax benefits make Portugal very popular with digital nomads **Regulating policies:** regarding affordable housing and quotas in short/mid-term rentals, are not applied well	**Transport infrastructure:** adequate, good connections **Digital infrastructure:** some gaps in very rural and remote areas **Access to services:** the transport network provides easier access and reduces distances
Lombardy & Trentino, Italy	**Home office:** it is preferred outside the large cities **Coworking spaces:** very popular in Italy and especially in Milan, combined with near-working policies to provide a good working environment **Third places:** in Lombardy, especially public buildings in collaboration with municipalities	**Public Facilities:** remote or mountainous areas do not have easy access to public facilities **Infrastructure:** gaps exist mainly in very rural and remote areas	**Gentrification:** pre-existed in Milan, linked with development projects, enhanced by high costs **Multilocality:** common practice, linked with second homes **Movement to the periphery:** People are moving to the suburbs and smaller cities with good road/transport connectivity	**Housing stock:** difficult to find affordable housing in larger cities like Milan, short and mid-term rentals are widespread **Housing prices:** rising, people move to smaller cities to find affordable housing **Office spaces:** downsized a bit during the pandemic, some open parts of the office to be used as coworking spaces **Second homes:** widespread practice to use them periodically in combination for example with holiday periods	**Commuting time:** due to hybrid working models, it has been extended but happens sparsely, in Milan there are no predictable peak hours **Public transport/car use:** public transport and especially railway networks attract inhabitants in smaller cities with good connections to hubs.	**Attraction policies:** Digital Nomad Visa, tax benefits, and policies like 1-euro houses try to attract people in less populated areas. There is also the Strategic Plan for Agile Work in Trento **Regulating policies:** near-working policies, south-working during the pandemic, collaborations with different stakeholders for opening coworking spaces	**Transport infrastructure:** adequate without much overage of remote areas, good connections, a network that is expanding **Digital infrastructure:** some gaps in very rural and remote areas **Access to services:** the transport network provides easier access and reduces distances, it is difficult in rural and remote areas
Volos GR	**Home office:** common practice, it is deemed the most popular option **Coworking spaces:** the city has only 1 dedicated coworking space **Third places:** some cafes function as coworking spaces in and out of the city	**Public Facilities:** mainly available in Volos **Infrastructure:** not covering the needs, especially outside the city	**Gentrification:** not much data to suggest it, short and mid-term rentals boost rent prices **Multilocality:** common practice, linked with second homes in Pelion **Movement to the periphery:** people come to Volos from larger cities like Athens. There is a slight tendency to move to the suburbs	**Housing stock:** doesn't seem to be affected by RM **Housing prices:** maybe a small rise not directly linked with RW **Office spaces:** no data to suggest they are inflicted by RW **Second homes:** common practice during warmer months, especially in coastal and mountainous villages of Pelion	**Commuting time:** not affected at a local level **Public transport/car use:** public transport is not good after the recent natural disasters, car use out of the city prevails	**Attraction policies:** Digital Nomad Visa, tax benefits, nothing specific at the local level **Regulating policies:** N/A	**Transport infrastructure:** doesn't cover the needs **Digital infrastructure:** not good connectivity outside the city **Access to services:** only in and near the city, not adequate in the rest of the area

Table 17a: Cross-Case Comparative Analysis. The blue colour indicates direct implication of RM – The red colour indicates the current situation, not necessarily affected by RM.

	Spatialities of RM	Urban-Rural Divide	Urban Development	Residential & Office Demand	Mobility Patterns	Policies	Infrastructure
Vienna AT	**Home office:** People mostly work from home **Coworking spaces:** not that popular **Third places:** not that popular	**Public Facilities:** partial shortages, pressure to services and amenities in rural areas **Infrastructure:** need for improvements in the suburbs, the digital connectivity is good	**Gentrification:** pre-existed in specific areas of the city center **Multilocality:** common practice linked to the suburbs and smaller towns **Movement to the periphery:** the city is expanding in the suburbs but not far from the inner centre due to hybrid working arrangements	**Housing stock:** is regulated by housing policies that secure balanced housing options **Housing prices:** housing is expensive but whithin affordable range in the city, while have increased in the suburbs **Office spaces:** The office demand remains high because of the constant economic development **Second homes:** common practice during winter months, especially in mountainous villages of Alpes	**Communting time:** differentiated peak hours and congested suburban road networks **Public transport/car use:** car use prevails to commute from suburbs to the city	**Attraction Policies:** smaller towns do not want more incoming residents and try to regulate the influx. Due to migration policies, Digital Nomads do not appear that much **Regulating Policies:** housing and land use policies	**Transport Infrastructure:** the existing road network accommodates an increasing number of new residents, in the suburbs but public transport needs careful planning **Digital Infrastructure:** is sufficient **Access to Services:** lots of commercial vacant spaces due to online shopping, while services and utilities infrastructure in the suburbs need improvements
Enschede NL	**Home office:** common practice, it is deemed the most popular option **Coworking spaces:** not that popular **Third places:** common practice prior to Covid-19	**Public Facilities:** partial lack of services and amenities in rural areas **Infrastructure:** adequate in the whole country	**Gentrification:** not a significant poblem yet **Multilocality:** N/A **Movement to the periphery:** remote workers are moving to Enschede from other regions of the country because of the relatively cheaper living conditions	**Housing stock:** not affected **Housing prices:** not affected **Office spaces:** not affected **Second homes:** N/A	**Communting time:** not affected **Public transport/car use:** multimodal and well-connected public transport, use of car in the rural areas and increasing use of active transport in the city	**Attraction Policies:** New apartments are planned in the inner city to boost its densification for better accessibility **Regulating Policies:** Efforts to avoid residential expansion to areas with limited accessibility by public transport	**Transport Infrastructure:** adequate, good connections, multimodal **Digital Infrastructure:** The digital connectivity as well as utilities infrastructure are well developed in the country **Access to Services:** rural areas face issues regarding public amenities such as doctors, or other commercial services
Stockholm SE	**Home office:** common practice, it is deemed the most popular option **Coworking spaces:** preferred in rural areas as they act as community centers and collaboration hubs **Third places:** N/A	**Public Facilities:** N/A **Infrastructure:** adequate with some utilities issues in the very rural areas	**Gentrification:** happening particularly in smaller towns that were not affected by tourism before **Multilocality:** very common practice, linked with second homes, tends to create pressure on infrastructure or services in less populated areas **Movement to the periphery:** People are moving to the suburbs and smaller cities within a commuting distance	**Housing stock:** doesn't seem to be affected by RM, the market is regulated with rent controls and waiting lists. It is easier to find affordable housing outside of Stockholm **Housing prices:** not directly linked to RW in the city, in smaller cities and rural areas is observed **Office spaces:** consolidated during the pandemic, now there is a trend to open smaller offices in the CBD moving from the outskirts **Second homes:** a common practice in Sweden	**Communting time:** due to hybrid working models it has been extended given the fact that happens fewer times per week/month **Public transport/car use:** the use of public transport has not yet reached the pre-pandemic levels, maybe a rise in car use	**Attraction policies:** not at the national level, some municipalities try to attract permanent residents by taking advantage of RW arrangements **Regulating policies:** N/A	**Transport Infrastructure:** is struggling with less ridership and higher costs **Digital Infrastructure:** good connectivity except from remote areas **Access to Services:** smaller towns face issues regarding sewage and garbage collection infrastructure and services with the temporary population rise
Philadelphia US	**Home office:** common practice, it is deemed the most popular option, with hybrid model arrangements **Coworking spaces:** increased popularity both within neighborhoods in the center and in the suburbs **Third places:** increased both in the city center and the suburbs	**Public Facilities:** adequate with transportation issues, outside the city **Infrastructure:** adequate	**Gentrification:** occurs in the inner city **Multilocality:** very common practice for those who own a second home **Movement to the periphery:** remote workers are moving to Philadelphia from NY or NJ because of the relatively cheaper living conditions	**Housing stock:** doesn't seem to be affected by RM, there are still affordable options in different areas **Housing prices:** rising in the suburban area **Office spaces:** empty spaces occur in the city centre but the issue appears higher to the periphery **Second homes:** a common practice for longer periods	**Communting time:** differentiated peak hours and congested suburban road networks **Public transport/car use:** car use is predominant to commute, the use of public transport has not yet reached the pre-pandemic levels	**Attraction Policies:** The neighborhoods prevend the expand of short-term leases for securing the local identity **Regulating Policies:** only regarding hybrid model for at least 1day per week	**Transport Infrastructure:** operates with issues especially in the periphery **Digital Infrastructure:** adequate connectivity in all urbanized settlements **Access to Services:** N/A

Table 187b: Cross-Case Comparative Analysis. The blue colour indicates direct implication of RM – The red colour indicates the current situation, not necessarily affected by RM

8. Key Spatial effects of RW arrangements

Based on the extensive literature review and policy analysis and insights from the case studies several key trends and impacts have been identified, arising from the widespread adoption of remote working practices. These include changes in urban development trends and the wider urban-rural dynamics. This section summarizes the current research findings, focusing on 11 spatial implications, each elaborated upon to provide a comprehensive understanding.

It is important to note that the spatial effects of remote work, presented here, are found to be closely linked to the local context, as regional characteristics significantly affect the way these changes are manifested. Factors such as existing infrastructure, economic and development level, socio-spatial configuration, policy frameworks, and cultural norms shape the adoption and impact of remote working. For instance, urban regions with robust digital infrastructure can more easily accommodate remote workers' demands leading to changes in housing and office space dynamics. In contrast, rural areas with limited infrastructure may face challenges in attracting and retaining remote workers. Therefore, local contexts determine the extent and nature of spatial implications of remote work. Additionally, each implication does not exist in isolation but rather interconnects and coexists with others, reflecting the complex nature of the urban systems. Therefore, the 11 implications presented below should be seen as such.

1. **Urban Decentralization and the "Doughnut effect"**
   Remote working has contributed to the decline in the occupancy of CBDs as business and households move away from city centers. This phenomenon, often referred to as the "Doughnut effect", results in the hollowing out of urban cores while increasing the activity in suburban and peri-urban areas. The reduced need for everyday commuting and the more affordable housing options in suburban locations have made living in less densely populated areas an appealing choice, leading to urban sprawl and a shift of economic activities away from traditional urban centres.

2. **Suburbanization and Peri-Urban Growth**
   The desire for larger living spaces and better quality of life has driven many to relocate to suburban and peri-urban areas. This trend is characterized by increased demand for housing in suburban areas, where people seek more space, lower living costs, and a more comfortable living environment. This shift towards suburbanization has significant implications for land use, with more land being consumed for residential purposes and a corresponding need for infrastructure development, such as roads and public transport.

3. **Rise of small and medium-sized cities**
   Remote work has opened opportunities for smaller cities to attract residents who prefer less congested living environments. These cities offer a combination of affordability, less congestion, and proximity to nature, making them attractive to remote workers. The influx of new residents can lead to economic revitalization, increased fiscal revenues, and improved public services. However, it also requires careful planning to manage growth sustainably and maintain quality of life.

4. **Excessive land consumption and land take**

   Excessive land consumption, particularly in the context of remote work and multilocal lifestyles, has emerged as a significant concern. The new working arrangements have led to an increase in demand for more spacious housing units in suburban and rural areas, where individuals can maintain a comfortable environment for both working and living. This shift results in greater land consumption as new residential developments expand into previously undeveloped areas. Additionally, the phenomenon of multilocality, where individuals maintain multiple residences, exacerbates land consumption by increasing the number of vacant or intermittently occupied homes. These multilocal arrangements often lead to inefficient land use, as large areas remain unoccupied for extended periods, contributing to urban sprawl and the unsustainable expansion of residential zones. Moreover, the increased demand for infrastructure such as roads and utilities stresses local resources and leads to the fragmentation of natural habitats.

5. **Multilocality**

   The practice of maintaining residences and activities in multiple geographic locations has become increasingly prominent due to advancements in communication technologies and flexible working arrangements. The multilocal lifestyle, characterized by frequent travel between different homes and workspaces, has significant spatial implications. One of the primary effects is the increased demand for housing, particularly secondary residences. This trend can drive up property prices and exacerbate housing affordability issues, particularly in rural and tourist areas where demand for vacation homes is high. As multilocal individuals often own more than one property, this can lead to "underoccupancy", where homes are left vacant for extended periods of time, leading to insufficient use of land and increased stresses on local resources.

6. **Changes in land use patterns**

   The shift in RW has significantly impacted the land use patterns in urban and rural areas. One notable change is the increased prevalence of mixed-use developments that tend to combine residential, commercial, and recreational spaces. This trend is driven by the need to create more dynamic and flexible urban environments that accommodate the diverse needs of remote workers. For instance, the rise of coworking spaces in both city centers and suburban areas reflects a broader trend toward multifunctional spaces that blend work and leisure. These spaces often include amenities like cafes, gyms, and retail, creating vibrant hubs that attract a mix of activities and people. Additionally, the decentralization of business activities has contributed to more mixed land use patterns. As companies adopt hybrid work models, there is less demand for large office spaces in CBDs. This led to the repurposing of commercial buildings for residential or mixed purposes, diversifying the land use mix.

7. **Gentrification**

   The rise of remote work has a notable impact on the gentrification processes in urban, suburban, and rural areas. As RW becomes more prevalent, many individuals have opted to relocate from city centers to suburban and rural areas in search of more space, affordable housing and better quality of life. This migration led to increased demand for housing in these areas, driving up property prices making it difficult for low-income residents to stay.

In specific, inner ring suburbs, characterized by their proximity to central urban areas, have been significantly influenced by the rise of remote work, as they are attractive alternatives to dense urban centres. The influx of higher-income individuals results in the upscale of amenities and the shift in socio-economic profile of these areas. At the same time, city centers experience reverse gentrification where previously affluent areas become more affordable, potentially attracting different demographic groups (digital nomads, young professionals, etc.).

RW has played a significant role in accelerating gentrification in small cities and rural areas. Remote working arrangements permit individuals and families to seek more spacious and affordable living outside of major urban cores. The influx of new residents often leads to a rise in housing prices and an increased demand for local amenities. The arrival of higher-income residents can drive up the cost of living, making it challenging for long-time, lower-income residents to remain in the communities. As a result, gentrification can displace these residents leading to the transformation of the social and economic fabric of these areas. In addition, the influx of new amenities and services tailored to the preferences of newer, wealthier residents further exacerbates this dynamic, potentially marginalizing existing communities and altering the character of small cities and rural towns.

8. **Urban and Rural Divide**

Remote work has the potential to both bridge and exacerbate the urban-rural divide. The influx of remote workers into rural areas can boost local economies and create opportunities in rural areas by attracting new businesses and residents, which in turn can reduce depopulation. However, it also highlights existing disparities such as access to digital infrastructure, with rural areas often lacking the high-speed internet and technological resources available in urban centres. Other disparities include access to public and social services.

9. **Transportation and Road Infrastructure**

The shift in mobility patterns (i.e., daily commuting, peak time, etc) has resulted in changes in public transport usage, contributing to less congestion during peak hours. This change necessitates adjustments in transport infrastructure and planning as the demand for transport services may become less predictable and more spread out throughout the day, week, month and year.

Furthermore, remote work has significantly altered car usage patterns, with many individuals now residing further from the urban centres in suburban and rural areas. The shift has led to increased reliance on private vehicles, as public transportation options are often limited or less convenient. Hence, there is an increase in car usage heightening the demand for expanded road infrastructure, including development of new roads or widening of existing ones, to accommodate the growing suburban population and prevent bottlenecks. This demand for new road infrastructure could lead to more fragmentation of natural habitats, especially in rural areas.

10. **Energy demand and associated infrastructure**

Remote work has shifted the energy use patterns with more energy consumed in residential settings, coworking spaces, or third places rather than in the traditional office settings. This change has

increased the demand for heating, cooling and electricity in homes and other working locations, especially during work hours. As a result, energy consumption becomes more “decentralized,” challenging existing energy infrastructure. This shift requires upgrades in energy infrastructure within residential areas, which includes the enhancement of the network capacity and reliability to manage the increased load.

11. Stresses on local Infrastructure

The rise of remote work and the associated spatialities has led to an increased population in small towns and rural areas, straining local infrastructure systems like sewage, water supply and garbage collection and disposal. These areas, typically designed for smaller stable populations, are now experiencing higher usage levels, pushing the levels of existing capacity. On top of that, a multilocal lifestyle makes higher usage level periodical. This shift demands significant upgrades and expansion of infrastructure to handle new loads and their periodicity.

9. Conclusions

This report investigates the spatial implications of RW across Europe and beyond within the R-Map framework project. The primary objectives were to analyze the spatial effects of RW and assess how new working spatialities influence urban landscapes and the disparities between urban and rural areas. Specifically, the study sought to answer several key research questions, including how RW affects different spatial contexts, what the main challenges and opportunities are, and how policy interventions can shape the future of RW.

The research employed a mixed-methods approach, combining a systematic literature review, narrative review, and empirical research from multiple case studies across Europe and the USA. Case studies were selected based on specific criteria, allowing for a comparative cross-case analysis that provided insights into regional variations in the effects of RW. Interviews and correlation matrices further supported the data analysis, enabling a nuanced understanding of the spatial effects of RW.

The research highlighted that RW is associated with the emergence of NWSs such as coworking spaces, shared office hubs, and other hybrid models. The rise of these new spatialities of work reflects the changes in preference for flexible working locations, which blurs the boundaries between home, work, and community life. Additionally, the concept of multilocality - where individuals split their work between two or more locations - is also gaining prominence. These emerging spatial dynamics are expected to reshape both urban and rural landscapes.

Policy analysis underscored that the potential spatial effects of RW are usually explored in light of the anticipated growth of hybrid working models. Few policy documents are currently dedicated exclusively to the spatial implications of remote work. Beyond the various scenarios developed to portray the spatial effects of RW, there is an emphasized need for place-based policy frameworks that consider the unique characteristics and needs of different geographic areas. Such frameworks are essential to foster sustainable development and enhance the quality of life in the context of the growing prevalence of remote work. Various policies are being developed to attract RW to less populated, rural, and remote areas, integrating RW into broader regional development strategies.

Key findings from the study underline the significant changes in urban development trends, with a noticeable decline in CBDs in favor of suburban growth and the rise of small and medium-sized cities in rural and remote areas. This trend reflects a broader shift in housing preferences towards spacious, affordable living environments. The demand for office space has also shifted accordingly, influencing both urban regeneration and rural development. The mobility patterns have also undergone a substantial transformation, with reduced commuting leading to changes in transportation infrastructure demand. However, these trends pose significant challenges, such as excessive land consumption, gentrification, and the strain on local infrastructure. The multilocal lifestyle further complicates land use patterns, exacerbating housing affordability issues and underoccupancy in certain areas.

The urban-rural divide, a central focus of this research, is both bridged and widened by these trends, with disparities in infrastructure and services becoming more pronounced. Regions with robust digital infrastructure and supportive policy frameworks tend to experience more positive spatial outcomes from remote work. Conversely, areas with underdeveloped infrastructure or policies lag behind, experience limited

benefits and, in some cases, exacerbated spatial disparities. To this end, the analysis of case studies and the cross-case comparative analysis provided valuable insights into the diverse ways that NWSs and RW are influencing different regions, suggesting that tailored policies are necessary to manage the unique challenges and opportunities presented by remote work.

Finally, this report serves as a crucial step in understanding the evolving dynamics brought about by remote work. It provides the foundation for the subsequent work packages, especially with the conceptual design of the R-Map model in WP2, where key spatial factors are to be included for assessing the spatial impacts of RW arrangements at the European level.

10. Bibliography

Adobati, F., Debernardi, A., 2022. The Breath of the Metropolis: Smart Working and New Urban Geographies. Sustainability (Switzerland). https://doi.org/10.3390/su14021028

Akhavan, M., Di Vita, S., Mariotti, I., 2021. Introducing the Worldwide Phenomenon of Flexible Workplaces. Research for Development. https://doi.org/10.1007/978-3-030-63443-8_1

Akhavan, M., Mariotti, I., Astolfi, L., Canevari, A., 2019. Coworking Spaces and New Social Relations: A Focus on the Social Streets in Italy. Urban Science 3, 2. https://doi.org/10.3390/urbansci3010002

Alhusban, A.A., Alhusban, S.A., Alhusban, M.A., 2022. How the COVID 19 pandemic would change the future of architectural design. JEDT 20, 339–357. https://doi.org/10.1108/JEDT-03-2021-0148

Alizadeh, T., 2013. Planning implications of telework: a policy analysis of the Sydney metropolitan strategy. Australian Planner 50, 304–315. https://doi.org/10.1080/07293682.2013.764906

Alizadeh, T., 2012. Teleworkers' Characteristics in Live/Work Communities: Lessons from the United States and Australia. Journal of Urban Technology. https://doi.org/10.1080/10630732.2011.642569

Alizadeh, T., 2009. Urban design in the digital age: A literature review of telework and wired communities. Journal of Urbanism. https://doi.org/10.1080/17549170903056789

Althoff, L., Eckert, F., Ganapati, S., Walsh, C., 2020. The City Paradox: Skilled Services and Remote Work. https://doi.org/10.2139/ssrn.3744597

Ananian, P., Shearmur, R., Borde, M.-A., Lachapelle, U., Paulhiac, F., Tremblay, D.-G., Rodrigue, T., 2024. Coworking spaces in Montreal (Canada): Moving beyond classic location patterns. Geoforum 152, 104016. https://doi.org/10.1016/j.geoforum.2024.104016

Angel, S., Blei, A.M., Parent, J., Lamson-Hall, P., Galarza Sánchez, N., Civco, D.L., Qian Lei, R., Thom, K., 2016. Atlas of Urban Expansion - The 2016 Edition. the NYU Urban Expansion Program at New York University, UN-Habitat, and the Lincoln Institute of Land Policy.

Área Metropolitana de Lisboa, 2024. Investimento Territorial Integrado da Área Metropolitana de Lisboa 2030.

Asgari, H., Jin, X., 2018. An evaluation of part-day telecommute impacts on work trip departure times. Travel Behaviour and Society 12, 84–92. https://doi.org/10.1016/j.tbs.2017.04.002

Assolombarda, 2023. Italy, Lombardy and Milan.

Atlas of Urban Expansion [WWW Document], 2016. . Lincoln Institute of Land Policy. URL https://www.lincolninst.edu/publications/other/atlas-urban-expansion-2016-edition/ (accessed 8.28.24).

Babb, C., Curtis, C., McLeod, S., 2018. The Rise of Shared Work Spaces: A Disruption to Urban Planning Policy? Urban Policy and Research 36, 496–512. https://doi.org/10.1080/08111146.2018.1476230

Badia, A., Langemeyer, J., Codina, X., Gilabert, J., Guilera, N., Vidal, V., Segura, R., Vives, M., Villalba, G., 2021. A take-home message from COVID-19 on urban air pollution reduction through mobility limitations and teleworking. npj Urban Sustain 1, 1–10. https://doi.org/10.1038/s42949-021-00037-7

Basheer, A., 2022. The Art and Science of Writing Narrative Reviews. International Journal of Advanced Medical and Health Research 9, 124. https://doi.org/10.4103/ijamr.ijamr_234_22

Batty, M., 2021. Science and design in the age of COVID-19. Environment and Planning B: Urban Analytics and City Science 48, 3–8. https://doi.org/10.1177/2399808321989131

Batty, M., 2020. The Coronavirus crisis: What will the post-pandemic city look like? Environment and Planning B: Urban Analytics and City Science 47, 547–552. https://doi.org/10.1177/2399808320926912

Berube, A., Singer, A., Wilson, J.H., Frey, W.H., 2006. Finding Exurbia: America's Fast-Growing Communities at the Metropolitan Fringe. The Brookings Institution. Living Cities Census Series.

Biagetti, M., Croce, G., Mariotti, I., Rossi, F., Scicchitano, S., 2024. The call of nature. Three post-pandemic scenarios about remote working in Milan. Futures. https://doi.org/10.1016/j.futures.2024.103337

Bilandzic, M., Foth, M., 2017. Designing hubs for connected learning: social, spatial and technological insights from coworking spaces, hackerspaces, and meetup groups, in: de Laat, M., Carvalho, L., Goodyear, P. (Eds.), Place-Based Spaces for Networked Learning. Routledge, United States of America, pp. 191–206.

Bond-Smith, S., McCann, P., 2022. The work-from-home revolution and the performance of cities.

Buch, T., Hamann, S., Niebuhr, A., Rossen, A., 2014. What Makes Cities Attractive? The Determinants of Urban Labour Migration in Germany. Urban Studies 51, 1960–1978. https://doi.org/10.1177/0042098013499796

Büttner, L., Breitkreuz, A., 2020. Arbeiten nach Corona, IZT-Text. Institut fur Zukunftsstudien und Technologiebewertung, Berlin.

Byun, S., Meece, J.L., Irvin, M.J., 2012. Rural-Nonrural Disparities in Postsecondary Educational Attainment Revisited. American Educational Research Journal 49, 412–437. https://doi.org/10.3102/0002831211416344

Cabinet Secretariat Office - JP, 2022. Comprehensive Strategy for the Vision for a Digital Garden City Nation-DIGIDEN (FY2023–FY2027).

Catalán, B., Saurí, D., Serra, P., 2008. Urban sprawl in the Mediterranean?: Patterns of growth and change in the Barcelona Metropolitan Region 1993–2000. Landscape and Urban Planning 85, 174–184. https://doi.org/10.1016/j.landurbplan.2007.11.004

Cesarini, C., 2022. The Metropolitan City of Milan (MCM) and its Metropolitan Territorial Plan (PTM).

Chen, Y., Rosenthal, S.S., 2008. Local amenities and life-cycle migration: Do people move for jobs or fun? Journal of Urban Economics 64, 519–537. https://doi.org/10.1016/j.jue.2008.05.005

Cheshire, P., Sheppard, S., 1995. On the Price of Land and the Value of Amenities. Economica 62, 247–267. https://doi.org/10.2307/2554906

Choi, H.-Y., 2022. Working in the Metaverse: Does Telework in a Metaverse Office Have the Potential to Reduce Population Pressure in Megacities? Evidence from Young Adults in Seoul, South Korea. Sustainability (Switzerland). https://doi.org/10.3390/su14063629

Combes, P.-P., Lafourcade, M., Thisse, J.-F., Toutain, J.-C., 2011. The rise and fall of spatial inequalities in France: A long-run perspective. Explorations in Economic History 48, 243–271. https://doi.org/10.1016/j.eeh.2010.12.004

Danielzyk, R., Dittrich-Wesbuer, A., Duchêne-Lacroix, C., Fischer, T., Hilti, N., Perlik, M., Petzold, K., Ritzinger, A., Scheiner, J., Sturm, G., Tippel, C., Weiske, C., 2021. Multilocal living and spatial development. Positionspapier aus der ARL, Positionspapier aus der ARL.

Davoudi, S., Stead, D., 2002. Urban-Rural Relationships: An Introduction and Brief History. Built Environment (1978-) 28, 268–277. https://doi.org/10.2307/23287748

de Abreu e Silva, J., 2022. Residential preferences, telework perceptions, and the intention to telework: insights from the Lisbon Metropolitan Area during the COVID-19 pandemic. Regional Science Policy and Practice. https://doi.org/10.1111/rsp3.12558

de Abreu e Silva, J., Melo, P.C., 2018. Home telework, travel behavior, and land-use patterns: A path analysis of British single-worker households. Journal of Transport and Land Use 11. https://doi.org/10.5198/jtlu.2018.1134

de Vos, D., van Ham, M., Meijers, E.J. (Evert), 2019. Working from Home and Commuting: Heterogeneity Over Time, Space, and Occupations. https://doi.org/10.2139/ssrn.3449572

Delventhal, M., Parkhomenko, A., 2023. Spatial Implications of Telecommuting. https://doi.org/10.2139/ssrn.3746555

Di Marino, M., Lapintie, K., 2017. Emerging Workplaces in Post-Functionalist Cities. Journal of Urban Technology 24, 5–25. https://doi.org/10.1080/10630732.2017.1297520

Di Marino, M., Lilius, J., Lapintie, K., 2018. New forms of multi-local working: identifying multi-locality in planning as well as public and private organizations' strategies in the Helsinki region. European Planning Studies 26, 2015–2035. https://doi.org/10.1080/09654313.2018.1504896

Di Marino, M., Tiitu, M., Rehunen, A., Chavoshi, S.H., Lapintie, K., 2024. Multi-locality in the regions of Oslo and Helsinki: a regional planning perspective after the COVID-19 pandemic. Regional Studies 1–18. https://doi.org/10.1080/00343404.2024.2355290

Di Marino, M., Tomaz, E., Henriques, C., Chavoshi, S.H., 2023. The 15-minute city concept and new working spaces: a planning perspective from Oslo and Lisbon. European Planning Studies. https://doi.org/10.1080/09654313.2022.2082837

Dijkstra, L., Poelman, H., 2011. Regional typologies: a compilation (No. n° 01/2011), Regional Focus: A series of short papers on regional research and indicators produced by the Directorate-General for Regional Policy. Directorate-General for Regional Policy, European Union.

Directorate-General for Regional and Urban Policy, 2024. Forging a sustainable future together: cohesion for a competitive and inclusive Europe - report of the High Level Group on the Future of Cohesion Policy. Publications Office of the European Union, European Comission.

Dittrich-Wesbuer, A., Kramer, C., Duchêne-Lacroix, C., Rumpolt, P., 2015. Multi-Local Living Arrangements: Approaches to Quantification in German Language Official Statistics and Surveys. Tijdschrift voor Economische en Sociale Geografie 106, 409–424. https://doi.org/10.1111/tesg.12160

Dyvik, E., 2024. Stockholm - Statistics & Facts [WWW Document]. Statista. URL https://www.statista.com/topics/10420/stockholm/ (accessed 7.25.24).

ECA, 2006. The role of agriculture and rural development in revitalizing abandoned/depopulated areas (No. ECA/34/06/2). European Commission on Agriculture, Riga, Latvia.

EDJNet – Openpolis, 2023. Remote work in Europe before and after the pandemic [WWW Document]. European Data Journalism Network - EDJNet. URL https://www.europeandatajournalism.eu/cp_data_news/remote-work-in-europe-before-and-after-the-pandemic/ (accessed 7.25.24).

Eliasson, K., 2023. Work from home and big city out-migration before and after the pandemic (No. 5/2023). Growth Analysis. Swedish Agency for Growth Policy Analysis.

Elldér, E., 2020. Telework and daily travel: New evidence from Sweden. Journal of Transport Geography 86, 102777. https://doi.org/10.1016/j.jtrangeo.2020.102777

Ellen, I.G., Hempstead, K., 2002. Telecommuting and the Demand for Urban Living: A Preliminary Look at White-collar Workers. Urban Studies 39, 749–766. https://doi.org/10.1080/00420980220119552

ELSTAT, 2021. Αποτελέσματα Απογραφής 2021 [WWW Document]. Population-Housing Census 2021. Hellenic Statistical Authority. URL https://census2021results.statistics.gr/perifereies/thessalia

ESPON, 2022. METRO - "The role and future perspectives of Cohesion Policy in the planning of Metropolitan Areas and Cities" - Lisbon Metropolitan Area.

Ettema, D., 2010. The impact of telecommuting on residential relocation and residential preferences: A latent class modelling approach. Journal of Transport and Land Use 3. https://doi.org/10.5198/jtlu.v3i1.61

EU, 2020. Territorial Agenda 2030: A future for all places.

EUR-Lex, 2005. Teleworking [WWW Document]. URL https://eur-lex.europa.eu/EN/legal-content/summary/teleworking.html (accessed 6.22.24).

Eurofound, 2023. Bridging the rural–urban divide: addressing inequalities and empowering communities. Publications Office, LU.

Eurofound, 2022a. The rise in telework: impact on working conditions and regulations. Publications Office, LU.

Eurofound, 2022b. Telework in the EU: regulatory frameworks and recent updates. Publications Office of the European Union, Luxembourg.

Eurofound, 2020. Telework and ICT-based mobile work: flexible working in the digital age. Publications Office of the European Union, Luxembourg.

European Commission, n.d. Europe's digital decade: 2030 targets [WWW Document]. URL https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en (accessed 5.14.24).

European Environment Agency, Swiss Federal Office for the Environment (FOEN), 2016. Urban sprawl in Europe: joint EEA FOEN report. Publications Office of the European Union.

Eurostat, 2024. Employed persons working from home as a percentage of the total employment, by sex, age and professional status (%). https://doi.org/10.2908/LFSA_EHOMP

Eurostat, 2023. Eurostat - Statistical Atlas [WWW Document]. Statistical Atlas, Regional yearbook 2023. URL https://ec.europa.eu/statistical-atlas/viewer/?ch=TRC,TYP&mids=BKGCNT,C99M01,CNTOVL&o=1,1,0.7&center=38.72515,24.37971,5&lcis=C99M01& (accessed 8.22.24).

Eurostat, 2021. Working from home across EU regions in 2020 [WWW Document]. URL https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20210923-1 (accessed 8.27.24).

Eurostat, 2018. Methodological manual on territorial typologies.

Eurostat, 2013. Regions and cities glossary [WWW Document]. URL https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Category:Regions_and_cities_glossary (accessed 8.28.24).

Eurostat - Statistical Atlas [WWW Document], n.d. URL https://ec.europa.eu/statistical-atlas/viewer/?ch=TRC,TYP&mids=BKGCNT,C99M01,CNTOVL,CCNCNT&o=1,1,0.7,1&center=39.2466,-6.02126,6&lcis=C99M01&nutsId=PT170& (accessed 8.1.24).

Felton, E., Collis, C., Graham, P., 2010. Making Connections: creative industries networks in outer-suburban locations. Australian Geographer 41, 57–70. https://doi.org/10.1080/00049180903535576

Ferrari, R., 2015. Writing narrative style literature reviews. Medical Writing 24, 230–235. https://doi.org/10.1179/2047480615Z.000000000329

Fiorentino, S., Livingstone, N., 2021. Contemporary Coworking in Capital Cities: Evolving Geographies of Workspace Innovation in London and Rome, in: Mariotti, I., Di Vita, S., Akhavan, M. (Eds.), New Workplaces—Location Patterns, Urban Effects and Development Trajectories: A Worldwide Investigation. Springer International Publishing, Cham, pp. 149–167. https://doi.org/10.1007/978-3-030-63443-8_9

Flipo, A., Lejoux, P., Ovtracht, N., 2022. Remote and connected: Negotiating marginality in rural coworking spaces and “tiers-lieux” in France. REGION 9, 87–107. https://doi.org/10.18335/region.v9i2.405

Florida, R., Hathaway, I., et al., 2020. Building Newark’s Post-Pandemic Economy:

Florida, R., Rodríguez-Pose, A., Storper, M., 2023. Critical Commentary: Cities in a post-COVID world. Urban Studies 60, 1509–1531. https://doi.org/10.1177/00420980211018072

Folmer, E., Kloosterman, R.C., 2017. Emerging intra-urban geographies of the cognitive-cultural economy: Evidence from residential neighbourhoods in Dutch cities. Environ Plan A 49, 801–818. https://doi.org/10.1177/0308518X16684826

Forde, A., 2021. Our Rural Future: Rural Development Policy 2021-2025.

Gandini, A., 2015. The rise of coworking spaces: a literature review.

Garrett, L.E., Spreitzer, G.M., Bacevice, P.A., 2017. Co-constructing a Sense of Community at Work: The Emergence of Community in Coworking Spaces. Organization Studies 38, 821–842. https://doi.org/10.1177/0170840616685354

Ge, J., Polhill, J.G., Craig, T.P., 2018. Too much of a good thing? Using a spatial agent-based model to evaluate “unconventional” workplace sharing programmes. Journal of Transport Geography 69, 83–97.

Glaeser, E.L., 2022. Urban resilience. Urban Studies 59, 3–35. https://doi.org/10.1177/00420980211052230

Government of Ireland, 2021. Our Rural Future: Rural Development Policy 2021-2025.

Greinke, L., Lange, L., 2022. Multi-locality in rural areas – an underestimated phenomenon. Regional Studies, Regional Science 9, 67–81. https://doi.org/10.1080/21681376.2021.2025417

Guaralda, M., Hearn, G., Foth, M., Yigitcanlar, T., Mayere, S., Law, L., 2020. Towards Australian Regional Turnaround: Insights into Sustainably Accommodating Post-Pandemic Urban Growth in Regional Towns and Cities. Sustainability 12, 10492. https://doi.org/10.3390/su122410492

Gupta, A., Mittal, V., Van Nieuwerburgh, S., 2023. Work From Home and the Office Real Estate Apocalypse. https://doi.org/10.2139/ssrn.4124698

Hanley, C., 2010. A Spatial Perspective on Rising Inequality in the United States. International Journal of Sociology 40, 6–30. https://doi.org/10.2307/25822488

Hartley, D., 2004. Rural Health Disparities, Population Health, and Rural Culture. Am J Public Health 94, 1675–1678. https://doi.org/10.2105/AJPH.94.10.1675

Hastaoglou-Martinidis, V., 2023. Volos in the Network of Mediterranean Cities: Comparative Mapping of the City's Spatial Evolution Through the Nineteenth and Twentieth Centuries, in: Özveren, E., Yenişehirlioğlu, F., Selvi Ünlü, T. (Eds.), Mediterranean Port Cities: Connectivity in Modern Times. Springer Nature Switzerland, Cham, pp. 185–203. https://doi.org/10.1007/978-3-031-32326-3_7

Hedman, L., van Ham, M., 2012. Understanding Neighbourhood Effects: Selection Bias and Residential Mobility, in: van Ham, M., Manley, D., Bailey, N., Simpson, L., Maclennan, D. (Eds.), Neighbourhood Effects Research: New Perspectives. Springer Netherlands, Dordrecht, pp. 79–99. https://doi.org/10.1007/978-94-007-2309-2_4

Helminen, V., Ristimäki, M., 2007. Relationships between commuting distance, frequency and telework in Finland. Journal of Transport Geography 15, 331–342. https://doi.org/10.1016/j.jtrangeo.2006.12.004

Hermelin, B., Trygg, K., 2012. New geographies of work : a case study from Sweden. Urbani Izziv 23, S126–S134.

Hölzel, M., Akhavan, M., Leducq, D., 2023. Concluding Remarks: European Narratives About the Effects of the COVID-19 Pandemic on Coworking. SpringerBriefs in Applied Sciences and Technology. https://doi.org/10.1007/978-3-031-26018-6_15

Hölzel, M., de Vries, W.T., 2023. Rural Development Policy in Germany Regarding Coworking Spaces and Effects on Vitality and Versatility of Rural Towns. Urban Science. https://doi.org/10.3390/urbansci7030086

Hölzel, M., de Vries, W.T., 2021. Digitization as a driver fur rural development—an indicative description of german coworking space users. Land. https://doi.org/10.3390/land10030326

Hölzel, M., Kolsch, K.-H., de Vries, W.T., 2022. Location of Coworking Spaces (CWSs) Regarding Vicinity, Land Use and Points of Interest (POIs). Land 11, 354. https://doi.org/10.3390/land11030354

Hynes, M., 2017. At a Crossroads: Investigating Automobility and Its Implications for Local Urban Transport Policy Design. Urban Science 1, 14. https://doi.org/10.3390/urbansci1020014

ILO, 2020. COVID-19: Guidance for labour statistics data collection: Defining and measuring remote work, telework, work at home and home-based work. International Labour Organization.

Instituto National de Estatistica, 2021. Context indicators for the COVID-19 pandemic in Portugal. Instituto National de Estatistica.

Irlacher, M., Koch, M., 2021. Working from Home, Wages, and Regional Inequality in the Light of COVID-19. Jahrbucher fur Nationalokonomie und Statistik. https://doi.org/10.1515/jbnst-2020-0030

Joint Research Centre (European Commission), Scipioni, M., Tintori, G., 2021. A rural-urban divide in Europe?: an analysis of political attitudes and behaviour. Publications Office of the European Union.

Kakegawa, U., 2024. Tokyo residents require more motivation to relocate | East Asia Forum. URL https://eastasiaforum.org/2024/02/10/tokyo-residents-require-more-motivation-to-relocate/ (accessed 7.30.24).

Kim, S.-W., 1997. Impact of telecommuting policies on urban spatial structure and the environment: Home-based and center-based telecommuting - ProQuest [WWW Document]. URL https://www.proquest.com/openview/6138638213f993ec4d9b586dfc52a4a1/1?pq-origsite=gscholar&cbl=18750&diss=y (accessed 8.29.24).

Kim, T.-K., Horner, M.W., Marans, R.W., 2005. Life Cycle and Environmental Factors in Selecting Residential and Job Locations. Housing Studies 20, 457–473. https://doi.org/10.1080/02673030500062335

Korelina, M., Zheleznyak, O., 2019. Co-working: Gentrification method, "third place" and/or new form of educational environment organization. IOP Conference Series: Materials Science and Engineering. https://doi.org/10.1088/1757-899X/667/1/012043

Krasilnikova, N., Levin-Keitel, M., 2022. Telework as a Game-Changer for Sustainability? Transitions in Work, Workplace and Socio-Spatial Arrangements. Sustainability (Switzerland). https://doi.org/10.3390/su14116765

Larson, W., Zhao, W., 2017. Telework: Urban Form, Energy Consumption, And Greenhouse Gas Implications. Economic Inquiry 55, 714–735.

Lee, Y., Lee, B., Shubho, M.T.H., 2019. Urban revival by Millennials? Intraurban net migration patterns of young adults, 1980–2010. Journal of Regional Science 59, 538–566. https://doi.org/10.1111/jors.12445

Letdin, M., Shim, H.S., 2019. Location choice, life cycle and amenities. Journal of Regional Science 59, 567–585. https://doi.org/10.1111/jors.12441

Li, W., Zhang, E., Long, Y., 2024. Unveiling fine-scale urban third places for remote work using mobile phone big data. Sustainable Cities and Society. https://doi.org/10.1016/j.scs.2024.105258

Liu, X., de Sherbinin, A., Zhan, Y., 2019. Mapping Urban Extent at Large Spatial Scales Using Machine Learning Methods with VIIRS Nighttime Light and MODIS Daytime NDVI Data. Remote Sensing 11, 1247. https://doi.org/10.3390/rs11101247

Lund, J., Mokhtarian, P., 1994. TELECOMMUTING AND RESIDENTIAL LOCATION: THEORY AND IMPLICATIONS FOR COMMUTE TRAVEL IN MONOCENTRIC METROPOLIS. Transportation Research Record.

Mariotti, I., Akhavan, M., 2020. Exploring Proximities in Coworking Spaces: Evidence from Italy. European Spatial Research and Policy 27, 37–52. https://doi.org/10.18778/1231-1952.27.1.02

Mariotti, I., Akhavan, M., Rossi, F., 2023. The preferred location of coworking spaces in Italy: an empirical investigation in urban and peripheral areas. European Planning Studies 31, 467–489. https://doi.org/10.1080/09654313.2021.1895080

Mariotti, I., Di Matteo, D., Rossi, F., 2022. Who were the losers and winners during the Covid-19 pandemic? The rise of remote working in suburban areas. Regional Studies, Regional Science 9, 685–708. https://doi.org/10.1080/21681376.2022.2139194

Mariotti, I., Pacchi, C., Di Vita, S., 2017. Co-working Spaces in Milan: Location Patterns and Urban Effects. Journal of Urban Technology 24, 47–66. https://doi.org/10.1080/10630732.2017.1311556

Mariotti, I., Riganti, P., 2021. Valuing urban regeneration projects: The case of the Navigli, Milan. City, Culture and Society, Recent developments in urban heritage valuation: Concepts, methods and policy application 26, 100415. https://doi.org/10.1016/j.ccs.2021.100415

Martin, D., Grodach, C., 2023. RESILIENCE AND ADAPTATION IN GENTRIFYING URBAN INDUSTRIAL DISTRICTS: The Experience of Cultural Manufacturers in San Francisco and Melbourne. International Journal of Urban and Regional Research. https://doi.org/10.1111/1468-2427.13175

Merkel, J., 2017. Coworking and Innovation. pp. 570–588. https://doi.org/10.4337/9781782548522

Metaxas, T., Kallioras, D., 2004. Medium size cities economic development and regional competitiveness: the case of Larissa – Volos dipole in Thessaly region of Greece. Discussion Paper Series 10, 161–200.

Moeckel, R., 2017. Working from Home: Modeling the Impact of Telework on Transportation and Land Use. Transportation Research Procedia, Emerging technologies and models for transport and mobility 26, 207–214. https://doi.org/10.1016/j.trpro.2017.07.021

More about the Twente region - Welcome to NL [WWW Document], n.d. URL https://www.welcome-to-nl.nl/about-nl/twente (accessed 7.22.24).

Muhammad, S., Ottens, H.F.L., Ettema, D., de Jong, T., 2007. Telecommuting and residential locational preferences: a case study of the Netherlands. J Hous and the Built Environ 22, 339–358. https://doi.org/10.1007/s10901-007-9088-3

Nakano, D., Shiach, M., Koria, M., Vasques, R., Santos, E.G. dos, Virani, T., 2020. Coworking spaces in urban settings: Prospective roles? Geoforum 115, 135–137. https://doi.org/10.1016/j.geoforum.2020.04.014

Nordregio, 2022. Remote work: Effects on Nordic people, places and planning 2021-2024. Nordregio.

OECD, 2023. Unlocking the potential of teleworking to address labour shortages in the Ems-Achse, Germany (OECD Local Economic and Employment Development (LEED) Papers No. 18/2023). OECD, Paris. https://doi.org/10.1787/ea8dc114-en

OECD, 2022. Assessing teleworking strategies for local development: a framework proposal.

OECD, 2021a. Implications of Remote Working Adoption on Place Based Policies: A Focus on G7 Countries, OECD Regional Development Studies. OECD. https://doi.org/10.1787/b12f6b85-en

OECD, 2021b. The future of remote work: Opportunities and policy options for Trentino (OECD Local Economic and Employment Development (LEED) Papers No. No. 2021/07). OECD, Paris. https://doi.org/10.1787/35f78ced-en

OECD, 2020. Exploring policy options on teleworking: Steering local economic and employment development in the time of remote work. OECD, Paris. https://doi.org/10.1787/5738b561-en

OECD, n.d. The future of teleworking: A place-based toolkit for local development [WWW Document]. OECD. URL https://www.oecd.org/en/about/projects/the-future-of-teleworking-a-place-based-toolkit-for-local-development.html (accessed 7.30.24).

Ormstrup Vestergård, L. (Ed.), 2022. Strengthening Nordic cooperation on remote work and multilocality.

Özgüzel, C., Luca, D., Wei, Z., 2023. The new geography of remote jobs? Evidence from Europe. OECD, Paris. https://doi.org/10.1787/29f94cd0-en

Padeiro, M., 2014. The influence of transport infrastructures on land-use conversion decisions within municipal plans. Journal of Transport and Land Use 7, 79–93. https://doi.org/10.5198/jtlu.v7i1.373

Page, M.J., McKenzie, J.E., Bossuyt, P.M., Boutron, I., Hoffmann, T.C., Mulrow, C.D., Shamseer, L., Tetzlaff, J.M., Akl, E.A., Brennan, S.E., Chou, R., Glanville, J., Grimshaw, J.M., Hróbjartsson, A., Lalu, M.M., Li, T., Loder, E.W., Mayo-Wilson, E., McDonald, S., McGuinness, L.A., Stewart, L.A., Thomas, J., Tricco, A.C., Welch, V.A., Whiting, P., Moher, D., 2021. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 372, n71. https://doi.org/10.1136/bmj.n71

Pajević, F., 2021. The Tetris office: Flexwork, real estate and city planning in Silicon Valley North, Canada. Cities. https://doi.org/10.1016/j.cities.2020.103060

Pajević, F., Shearmur, R., 2021. Where Are the Knowledge Workers? The Case of Silicon Valley North in Ontario, Canada, in: Mariotti, I., Di Vita, S., Akhavan, M. (Eds.), New Workplaces—Location Patterns, Urban Effects and Development Trajectories: A Worldwide Investigation. Springer International Publishing, Cham, pp. 233–250. https://doi.org/10.1007/978-3-030-63443-8_13

PBL Netherlands Environmental Assessment Agency [WWW Document], 2024. URL https://www.pbl.nl/en/latest (accessed 8.29.24).

Philadelphia city, Pennsylvania - Census Bureau Search [WWW Document], n.d. URL https://data.census.gov/all?q=Philadelphia%20city,%20Pennsylvania (accessed 8.25.24).

Pigalle, E., 2024. What are the impacts of teleworking on activity-travel behaviour? A text mining study. Articulo - Journal of Urban Research. https://doi.org/10.4000/articulo.5601

Pozoukidou, G., Angelidou, M., 2022. Urban Planning in the 15-Minute City: Revisited under Sustainable and Smart City Developments until 2030. Smart Cities 5, 1356–1375. https://doi.org/10.3390/smartcities5040069

Pozoukidou, G., Chatziyiannaki, Z., 2021. 15-Minute City: Decomposing the New Urban Planning Eutopia. Sustainability 13, 928. https://doi.org/10.3390/su13020928

Provincia autonoma di Trento, 2021. Piano Strategico di promozione del lavoro agile nella provincia di Trento.

Ramani, A., Bloom, N., 2021. The donut effect: How COVID-19 shapes real estate. Stanford Institute for Economic Policy Research (SIEPR).

Randall, L., Ormstrup Vestergård, L., Rohrer, L., Huynh, D., Lidmo, J., Stjernberg, M., Weber, R., Sigurjonsdottir, H.R., Guðmundsdóttir, H., Kivi, L., 2022. Remote work: Effects on Nordic people, places and planning 2021-2024 (Nordregio report No. 2022:3). Nordregio.

Ravalet, E., Rerat, P., 2019. Teleworking: Decreasing Mobility or Increasing Tolerance of Commuting Distances? Built Environment 45, 582–602. https://doi.org/10.2148/benv.45.4.582

Region Stockholm, 2018. RUFS 2050: Regional Development Plan for the Stockholm Region.
Regione Lombardia, 2020. Territory and population [WWW Document]. Lombardy. In the north of Italy, in the heart of Europe. URL https://www.en.regione.lombardia.it/wps/portal/site/en-regione-lombardia/discover-lombardy/territory-and-population (accessed 7.24.24).
Reuschke, D., Houston, D., 2016. The importance of housing and neighbourhood resources for urban microbusinesses. European Planning Studies 24, 1216–1235. https://doi.org/10.1080/09654313.2016.1168364
Rhee, H.-J., 2009. Telecommuting and urban sprawl. Transportation Research Part D: Transport and Environment. https://doi.org/10.1016/j.trd.2009.05.004
Richardson, L., 2017. Sharing as a postwork style: digital work and the co-working office. Cambridge Journal of Regions, Economy and Society 10, 297–310. https://doi.org/10.1093/cjres/rsx002
Ross, P.K., Ressia, S., 2015. Neither office nor home: Coworking as an emerging workplace choice. Employment relations record.
Rural Urban Definitions - Center for Rural PA [WWW Document], n.d. URL https://www.rural.pa.gov/data/rural-urban-definitions (accessed 8.26.24).
Sargent, K., Cooper, J., Mellwig, B., Mcdonald, M., 2018. Coworking and the disruption of the current corporate real estate model. Corporate Real Estate Journal 7, 267–276.
Sawagi, O., 2019. Regional Revitalization Paves the Way for the Future of Japan [WWW Document]. Public Relations Office, Government of Japan. URL https://www.gov-online.go.jp/eng/publicity/book/hlj/html/201905/201905_01_en.html (accessed 7.29.24).
Säynäjoki, E.-S., Inkeri, V., Heinonen, J., Junnila, S., 2014. How central business district developments facilitate environmental sustainability – A multiple case study in Finland. Cities 41, 101–113. https://doi.org/10.1016/j.cities.2014.05.010
Schneider, A., Friedl, M.A., Potere, D., 2010. Mapping global urban areas using MODIS 500-m data: New methods and datasets based on 'urban ecoregions.' Remote Sensing of Environment 114, 1733–1746. https://doi.org/10.1016/j.rse.2010.03.003
Shearmur, R., Ananian, P., Lachapelle, U., Parra-Lokhorst, M., Paulhiac, F., Tremblay, D.-G., Wycliffe-Jones, A., 2022. Towards a post-COVID geography of economic activity: Using probability spaces to decipher Montreal's changing workscapes. Urban Studies. https://doi.org/10.1177/00420980211022895
Sieverts, T., 2003. Cities Without Cities: An Interpretation of the Zwischenstadt. Routledge, London. https://doi.org/10.4324/9780203380581
Simon, D., 2008. Urban Environments: Issues on the Peri-Urban Fringe. Annual Review of Environment and Resources 33, 167–185. https://doi.org/10.1146/annurev.environ.33.021407.093240
Small, C., Pozzi, F., Elvidge, C.D., 2005. Spatial analysis of global urban extent from DMSP-OLS night lights. Remote Sensing of Environment 96, 277–291. https://doi.org/10.1016/j.rse.2005.02.002
Sousa, S., Pinho, P., 2014. Shrinkage in Portuguese National Policy and Regional Spatial Plans: Concern or Unspoken Word? Journal of Tourism, Sustainability and Well-being 2, 260–275.
Spinuzzi, C., 2012. Working Alone Together: Coworking as Emergent Collaborative Activity. Journal of Business and Technical Communication 26, 399–441. https://doi.org/10.1177/1050651912444070
Stockholm Region EU Office, n.d. Stockholm Region [WWW Document]. Stockholm Region EU Office. URL https://stockholmregion.org/ (accessed 8.24.24).
Storper, M., Scott, A.J., 2009. Rethinking human capital, creativity and urban growth. Journal of Economic Geography 9, 147–167. https://doi.org/10.1093/jeg/lbn052
Storper, M., Venables, A.J., 2004. Buzz: face-to-face contact and the urban economy. Journal of Economic Geography 4, 351–370. https://doi.org/10.1093/jnlecg/lbh027
Tayyaran, M.R., Khan, A.M., 2007. Telecommuting and residential location decisions: combined stated and revealed preferences model. Can. J. Civ. Eng. 34, 1324–1333. https://doi.org/10.1139/l07-052

Tayyaran, M.R., Khan, A.M., Anderson, D.A., 2003. Impact of telecommuting and intelligent transportation systems on residential location choice. Transportation Planning and Technology 26, 171–193. https://doi.org/10.1080/715020598

The Government of Japan, 2021. Vision for a Digital Garden City Nation: Achieving Rural-Urban Digital Integration and Transformation.

Tomaz, E., Gato, M., Haubrich, G., 2023. Dynamics of Change at Work and Reactions of Coworking Spaces in the Aftermath of the Pandemic: Notes on Portugal, in: Akhavan, M., Hölzel, M., Leducq, D. (Eds.), European Narratives on Remote Working and Coworking During the COVID-19 Pandemic: A Multidisciplinary Perspective. Springer Nature Switzerland, Cham, pp. 133–142. https://doi.org/10.1007/978-3-031-26018-6_14

UN-Habitat, 2018. SDG Indicator 11.3.1 Training Module: Land Use Efficiency.

United Nations, 2015. Transforming our world: the 2030 Agenda for Sustainable Development (No. A/RES/70/1). United Nations.

Vallicelli, M., 2018. Smart cities and digital workplace culture in the global European context: Amsterdam, London and Paris. City, Culture and Society, Innovation and identity in next generation smart cities 12, 25–34. https://doi.org/10.1016/j.ccs.2017.10.001

Van Nieuwerburgh, S., 2022. The Remote Work Revolution: Impact on Real Estate Values and the Urban Environment. Working Paper Series. https://doi.org/10.3386/w30662

Vienna, Austria - Image of the Week - Earth Watching [WWW Document], n.d. URL https://earth.esa.int/web/earth-watching/image-of-the-week/content/-/asset_publisher/roJg1USfhDm3/content/vienna-austria/index4f37e9f1fa08d9d8d31c8cd13929cd2d9ecb9d66d485912e5c98ac1c9877c1a7.html#top (accessed 7.22.24).

Voith, R., Wachter, S., Stanek, D., Lee, H., 2024. Doom Loop or Boom Loop: Work from Home and the Challenges Facing America's Big Cities.

Wachstumsregion Ems-Achse e.V., 2022. Wachstumsregion Ems-Achse e.V. - Teleworking strategies for local development.

Weck, S., Madanipour, A., Schmitt, P., 2022. Place-based development and spatial justice. European Planning Studies 30, 791–806. https://doi.org/10.1080/09654313.2021.1928038

Weichhart, P., 2015. Residential Multi-Locality: In Search of Theoretical Frameworks. Tijdschrift voor Economische en Sociale Geografie 106, 378–391. https://doi.org/10.1111/tesg.12156

Weisbrod, G., Ben-Akiva, M., Lerman, S., 1980. Tradeoffs in residential location decisions: Transportation versus other factors 1.

Yang, J., 2013. Strategies for Low-Carbon Green Growth and Urban Management in Korea. Journal of Urban Management 2, 85–101. https://doi.org/10.1016/S2226-5856(18)30066-9

Yu, R., Burke, M., Raad, N., 2019. Exploring impact of future flexible working model evolution on urban environment, economy and planning. Journal of Urban Management 8, 447–457. https://doi.org/10.1016/j.jum.2019.05.002

Zenkteler, M., Foth, M., Hearn, G., 2022a. Lifestyle cities, remote work and implications for urban planning. Australian Planner. https://doi.org/10.1080/07293682.2022.2096086

Zenkteler, M., Foth, M., Hearn, G., 2021. The role of residential suburbs in the knowledge economy: insights from a design charrette into nomadic and remote work practices. Journal of Urban Design. https://doi.org/10.1080/13574809.2020.1860673

Zenkteler, M., Hearn, G., Foth, M., McCutcheon, M., 2022b. DISTRIBUTION OF HOME-BASED WORK IN CITIES: IMPLICATIONS FOR PLANNING AND POLICY IN THE PANDEMIC ERA. Journal of Urban and Regional Analysis. https://doi.org/10.37043/JURA.2022.14.2.2

Zenkteler, M., Leonard, F.R., Cushing, D., Hearn, G., Foth, M., Hansen, V.G., Caldwell, G., 2023. Implications of Working from Home for the Design of Healthy Work Environments in the Post-Pandemic City. Built Environment. https://doi.org/10.2148/benv.49.3.423

Zhao, F., Prentice, C., Wallis, J., Patel, A., Waxin, M.-F., 2020. An integrative study of the implications of the rise of coworking spaces in smart cities. JESI 8, 467–486. https://doi.org/10.9770/jesi.2020.8.2(28)

11. Annexes

11.1 Summary table of studies included for the systematic literature review

First author, Year, Journal	Title	DOI
ADOBATI F, 2022, SUSTAINABILITY	THE BREATH OF THE METROPOLIS SMART WORKING AND NEW URBAN GEOGRAPHIES	10.3390/su14021028
AKHAVAN M, 2021, RES DEV	INTRODUCING THE WORLDWIDE PHENOMENON OF FLEXIBLE WORKPLACES	10.1007/978-3-030-63443-8_1
ALHUSBAN AA, 2022, J ENG DES TECHNOL	HOW THE COVID 19 PANDEMIC WOULD CHANGE THE FUTURE OF ARCHITECTURAL DESIGN	10.1108/JEDT-03-2021-0148
ALIZADEH T, 2009, J URBAN	URBAN DESIGN IN THE DIGITAL AGE A LITERATURE REVIEW OF TELEWORK AND WIRED COMMUNITIES	10.1080/17549170903056789
ALIZADEH T, 2012, J URBAN TECHNOL	TELEWORKERS CHARACTERISTICS IN LIVEWORK COMMUNITIES LESSONS FROM THE UNITED STATES AND AUSTRALIA	10.1080/10630732.2011.642569
ANANIAN P, 2024, GEOFORUM	COWORKING SPACES IN MONTREAL CANADA MOVING BEYOND CLASSIC LOCATION PATTERNS	10.1016/j.geoforum.2024.104016
BIAGETTI M, 2024, FUTURES	THE CALL OF NATURE THREE POSTPANDEMIC SCENARIOS ABOUT REMOTE WORKING IN MILAN	10.1016/j.futures.2024.103337
CHOI HY, 2022, SUSTAINABILITY	WORKING IN THE METAVERSE DOES TELEWORK IN A METAVERSE OFFICE HAVE THE POTENTIAL TO REDUCE POPULATION PRESSURE IN MEGACITIES EVIDENCE FROM YOUNG ADULTS IN SEOUL SOUTH KOREA	10.3390/su14063629
DE ABREU E SILVA J, 2022, REG SCI POLICY PRACT	RESIDENTIAL PREFERENCES TELEWORK PERCEPTIONS AND THE INTENTION TO TELEWORK INSIGHTS FROM THE LISBON METROPOLITAN AREA DURING THE COVID19 PANDEMIC	10.1111/rsp3.12558
DI MARINO M, 2023, EUR PLAN STUD	THE 15MINUTE CITY CONCEPT AND NEW WORKING SPACES A PLANNING PERSPECTIVE FROM OSLO AND LISBON	10.1080/09654313.2022.2082837
FLIPO A, 2022, REG	REMOTE AND CONNECTED NEGOTIATING MARGINALITY IN RURAL COWORKING SPACES AND TIERSLIEUX IN FRANCE	10.18335/REGION.V9I2.405
HOELZEL M, 2021, LAND-BASEL	DIGITIZATION AS A DRIVER FUR RURAL DEVELOPMENTAN INDICATIVE	10.3390/land10030326

	DESCRIPTION OF GERMAN COWORKING SPACE USERS	
HÖLZEL M, 2023, SPRINGERBRIEFS APPL SCI TECHNOL	CONCLUDING REMARKS EUROPEAN NARRATIVES ABOUT THE EFFECTS OF THE COVID19 PANDEMIC ON COWORKING	10.1007/978-3-031-26018-6_15
HÖLZEL M, 2023, URBAN SCI	RURAL DEVELOPMENT POLICY IN GERMANY REGARDING COWORKING SPACES AND EFFECTS ON VITALITY AND VERSATILITY OF RURAL TOWNS	10.3390/urbansci7030086
IRLACHER M, 2021, JAHRB NATL STAT	WORKING FROM HOME WAGES AND REGIONAL INEQUALITY IN THE LIGHT OF COVID19	10.1515/jbnst-2020-0030
KORELINA M, 2019, IOP CONF SER MATER SCI ENG	COWORKING GENTRIFICATION METHOD THIRD PLACE ANDOR NEW FORM OF EDUCATIONAL ENVIRONMENT ORGANIZATION	10.1088/1757-899X/667/1/012043
KRASILNIKOVA N, 2022, SUSTAINABILITY	TELEWORK AS A GAMECHANGER FOR SUSTAINABILITY TRANSITIONS IN WORK WORKPLACE AND SOCIOSPATIAL ARRANGEMENTS	10.3390/su14116765
LI W, 2024, SUSTAINABLE CITIES SOC	UNVEILING FINESCALE URBAN THIRD PLACES FOR REMOTE WORK USING MOBILE PHONE BIG DATA	10.1016/j.scs.2024.105258
MARTIN D, 2023, INT J URBAN REG RES	RESILIENCE AND ADAPTATION IN GENTRIFYING URBAN INDUSTRIAL DISTRICTS THE EXPERIENCE OF CULTURAL MANUFACTURERS IN SAN FRANCISCO AND MELBOURNE	10.1111/1468-2427.13175
PAJEVIC F, 2021, CITIES	THE TETRIS OFFICE FLEXWORK REAL ESTATE AND CITY PLANNING IN SILICON VALLEY NORTH CANADA	10.1016/j.cities.2020.103060
RHEE HJ, 2009, TRANSP RES PART D TRANSP ENVIRON	TELECOMMUTING AND URBAN SPRAWL	10.1016/j.trd.2009.05.004
SHEARMUR R, 2022, URBAN STUD	TOWARDS A POSTCOVID GEOGRAPHY OF ECONOMIC ACTIVITY USING PROBABILITY SPACES TO DECIPHER MONTREALS CHANGING WORKSCAPES	10.1177/00420980211022895
YU RR, 2019, J URBAN MANAG	EXPLORING IMPACT OF FUTURE FLEXIBLE WORKING MODEL EVOLUTION ON URBAN ENVIRONMENT ECONOMY AND PLANNING	10.1016/j.jum.2019.05.002
ZENKTELER M, 2021, J URBAN DES	THE ROLE OF RESIDENTIAL SUBURBS IN THE KNOWLEDGE ECONOMY INSIGHTS FROM A DESIGN CHARRETTE INTO NOMADIC AND REMOTE WORK PRACTICES	10.1080/13574809.2020.1860673
ZENKTELER M, 2022, AUST PLANN	LIFESTYLE CITIES REMOTE WORK AND IMPLICATIONS FOR URBAN PLANNING	10.1080/07293682.2022.2096086

ZENKTELER M, 2022, J URBAN REG ANAL	DISTRIBUTION OF HOMEBASED WORK IN CITIES IMPLICATIONS FOR PLANNING AND POLICY IN THE PANDEMIC ERA	10.37043/JURA.2022.14.2.2
ZENKTELER M, 2023, BUILT ENVIRON	IMPLICATIONS OF WORKING FROM HOME FOR THE DESIGN OF HEALTHY WORK ENVIRONMENTS IN THE POSTPANDEMIC CITY	10.2148/benv.49.3.423
ZHAO F, 2020, ENTREP SUSTAIN ISS	AN INTEGRATIVE STUDY OF THE IMPLICATIONS OF THE RISE OF COWORKING SPACES IN SMART CITIES	10.9770/jesi.2020.8.2(28)
Extra Manually Added		
BADIA A, 2021, SUSTAIN	A take-home message from COVID-19 on urban air pollution reduction through mobility limitations and teleworking	10.1038/s42949-021-00037-7
BÜTTNER L., 2020	Arbeiten nach Corona, IZT-Text	
DE ABREU E SILVA J., 2018 J TRANSP LAND	Home telework, travel behavior, and land-use patterns: A path analysis of British single-worker households.	10.5198/jtlu.2018.1134
DE VOS D., 2019	Working from Home and Commuting: Heterogeneity Over Time, Space, and Occupations	10.2139/ssrn.3449572
DI MARINO M., 2018 PLANN STU	New forms of multi-local working: identifying multi-locality in planning as well as public and private organizations' strategies in the Helsinki region	10.1080/09654313.2018.1504896
DI MARINO M., 2024 REG STU	Multi-locality in the regions of Oslo and Helsinki: a regional planning perspective after the COVID-19 pandemic	10.1080/00343404.2024.2355290
ELLDER E.,2020 J TRANSP GEO	Telework and daily travel: New evidence from Sweden	10.1016/j.jtrangeo.2020.102777
FIORENTINO S.,2021 SPR INTERN PUB	Contemporary Coworking in Capital Cities: Evolving Geographies of Workspace Innovation in London and Rome	10.1007/978-3- 030-63443-8_9
GANDINI A.,2015	The rise of coworking spaces: a literature review	
GREINKE L.,2022 REG STU REG SCI	Multi-locality in rural areas – an underestimated phenomenon	10.1080/21681376.2021.2025417
HÖLZEL M, 2022 LAND	Location of Coworking Spaces (CWSs) Regarding Vicinity, Land Use and Points of Interest (POIs)	10.3390/ land11030354
MARIOTTI I., 2022 REG STU	Who were the losers and winners during the Covid-19 pandemic? The rise of remote working in suburban areas	10.1080/21681376.2022.2139194

MARIOTTI I., 2017 J URBAN TECHN	Co-working Spaces in Milan: Location Patterns and Urban Effects	doi.org/10.1080/10630732.2017.1311556
NAKANO D., 2020 GEOFORUM	Coworking spaces in urban settings: Prospective roles?	10.1016/j.geoforum.2020.04.014
PAJEVIC F., 2021 SPR INTER PUB	Where Are the Knowledge Workers? The Case of Silicon Valley North in Ontario, Canada	10.1007/978-3-030-63443-8_13
TOMAZ E., 2023 NATURE SWI	Dynamics of Change at Work and Reactions of Coworking Spaces in the Aftermath of the Pandemic: Notes on Portugal	10.1007/978-3-031-26018-6_14

11.2 Interviews' Questionnaires

The questions aimed to capture the spatial implications of remote working arrangements through interviews with urban planners, regional authorities' representatives, real estate experts, researchers, and experts in coworking spaces. The interviews covered four thematic areas. The questions per theme are listed below.

Questions intended for Urban Planners

1. **What is the spatial profile of your city?** (Please describe the spatial pattern of the geographic, demographic and socioeconomic characteristics i.e. dense urban centre with extended suburbs, clusters (if any) of economy within the city, distribution of high/medium/low-income households etc.)
2. **Is your city considered the primary urban centre in your region?** (describe the functional structure of the urban system that your city is part of i.e., polycentric, monocentric, dipole, urban, rural etc.)
3. **Which model(s) of remote work arrangements do you identify in your area/city?** (work from home/home office, third place i.e. co working spaces, library, cafes etc.)
4. **How has RW affected the spatial development of your city?** (i.e. urban expansion with sprawling characteristics, degradation of the urban Centre and CBD, rise of multiple subcentres in the periphery of the city, etc.).
5. **How does RW affect the** nearby smaller towns? Do you recognize opportunities or threats?
6. **What are the potential impacts of RW on office space utilization in the core of the city/main city center/office parks**?
7. **Do you see any implications of RW on land use patterns in:**
    i. Residential areas, if so in which ones and how have they changed? i.e. emergence of new urban amenities to cater the needs of remote workers at place of residence.
    ii. Central Business Districts within the municipal/city boundary i.e., repurposing of commercial and office spaces to other uses such as Airbnbs.
8. **Has RW affected positively or negatively the suburban, peri urban area and ex urban areas in your region**?
9. **Do you think RW will affect or hinder the revitalization of your City Centre?**
10. **Do you think RW will affect or hinder the revitalization of rural and/or remote town centers?**
11. **Do you see gentrification occurring in your city because of RW?**
12. **How are transportation networks and mobility solutions evolving in response to remote work trends, and what spatial planning considerations are necessary to support these changes?**
13. **How does RW change commuting patterns** (peak hours, duration, means of transport, bottleneck)?
14. **Is your telecommunication infrastructure sufficient for bridging the urban-rural digital divide and enhance connectivity for remote workers and businesses?**

15. **What are the environmental impacts of increased RW, particularly concerning energy and resource consumption in both urban and rural areas?** *(i.e. increased use of energy in the household, water & sewerage infrastructure, adequacy of energy distribution networks etc.)*
16. **How has RW changed the housing market and housing stock in your area?** (Be specific about the spatialities of the changes. i.e. rise in demand of certain neighborhood)
17. **What is the role of developers or policy in provisioning of housing supply?**
18. How do you incorporate potential spatial impacts of RW into your urban/regional strategy i.e. population shifts, pressure on urban infrastructure, utilities.
19. **What are the challenges and opportunities for rural communities in attracting remote workers and digital nomads, and how can spatial planning strategies support this transition** in i.e. transportation, energy, land use etc.

Questions intended for Policy Makers/Regional Authorities

1. **Is your city considered the primary urban centre in your region?** (describe the functional structure of the urban system that your city is part of i.e., polycentric, monocentric, dipole, urban, rural etc.)
2. How RW has affected the demographic distribution between urban and rural areas in your area/region?
3. **Which model(s) of remote work arrangements do you identify in your area/city?** (work from home/home office, third place i.e. co working spaces, library, cafes etc.)
4. **In recent years there has been a rise of multilocality*. Do you identify this in your region?** (*Multilocality refers to the practice of carrying out active everyday life in multiple places. This generally implies access to, but not necessarily ownership of, more than one residence).
5. **Do you see remote work as a brain drain or gain opportunity in your area?**
6. **How does RW affect the nearby smaller towns?** Do you recognize opportunities or threats?
7. **Has RW affected positively or negatively the suburban, peri urban area and ex urban areas in your region?**
8. **Do you think RW will affect or hinder the revitalization of your City Centre?**
9. **Do you think RW will affect or hinder the revitalization of rural and/or remote town centers?**
10. **Do you see gentrification occurring in your city because of RW?**
11. **How do you think RW aligns environmental sustainability and why**? What are the environmental impacts of increased RW, particularly concerning energy and resource consumption in both urban and rural areas? *(i.e. increased use of energy in the household, water & sewerage infrastructure, adequacy of energy distribution networks etc.)*
12. **Are there any strategies and policies for RW in your city/region/country?**
13. **How do you incorporate potential spatial impacts of RW into your urban/regional strategy** i.e. population shifts, pressure on urban infrastructure, utilities.

14. **What are the challenges and opportunities for rural communities in attracting remote workers and digital nomads, and how can development strategies support this transition** in i.e. transportation, energy, land use etc.
15. **How can spatial planning and policies incorporate strategies on the fair access to remote work facilities?**
16. **How are transportation networks and mobility solutions evolving in response to remote work trends, and what strategies are necessary to support these changes?**

Questions intended for Real Estate Agents

1. **Is your city considered the primary urban centre in your region?** (describe the functional structure of the urban system that your city is part of i.e., polycentric, monocentric, dipole, urban, rural etc.)
2. **How RW has affected the demographic distribution between urban and rural areas in your area/region?**
3. **Which model(s) of remote work arrangements do you identify in your area/city?** (work from home/home office, third place i.e. co working spaces, library, cafes etc.)
4. **In recent years there has been a rise of multilocality*. Do you identify this in your region?** (*Multilocality refers to the practice of carrying out active everyday life in multiple places. This generally implies access to, but not necessarily ownership of, more than one residence).
5. **How has RW affected the spatial development of your city?** (i.e. urban expansion with sprawling characteristics, degradation of the urban Centre and CBD, rise of multiple subcenters in the periphery of the city, etc.).
6. **How does RW affect the** nearby smaller towns? Do you recognize opportunities or threats?
7. What are the potential impacts of RW on office space utilization in the core of the city/main city center/office parks?
8. **Do you see any implications of RW on land use patterns in:**

iii. Residential areas, if so in which ones and how have they changed? i.e. emergence of new urban amenities to cater the needs of remote workers at place of residence.

iv. Central Business Districts within the municipal/city boundary i.e., repurposing of commercial and office spaces to other uses such as Airbnbs.

9. **How has RW changed the housing market and housing stock in:** (i.e. rise in demand of certain neighborhood, transportation options)

a. suburban, peri urban area and ex urban areas in your region?

b. City Centre?

10. **Do you think RW will affect or hinder the revitalization of your City Centre?**
11. **Do you see gentrification occurring in your city because of RW?**

12. **Are there any RW friendly housing options?** *(Need to know what an interviewee considers a RW friendly housing option, i.e.* telecommunication infrastructure*).*
13. **How is the housing stock affected by seasonal conditions** i.e. how the housing market changes during the touristic period or the academic period?
14. **What is the role of developers or policy in provisioning of housing supply?**

Questions intended for Coworking Space Owners

1. **Which model(s) of remote work arrangements do you identify in your area/city?** (work from home/home office, third place i.e. co working spaces, library, cafes etc.)
2. **In recent years there has been a rise of multilocality*. Do you identify this in your region?** (*Multilocality refers to the practice of carrying out active everyday life in multiple places. This generally implies access to, but not necessarily ownership of, more than one residence).
3. **How many coworking spaces operate in** ... (name of city/town)?
4. **What is the type of your coworking space?** Public/private, for profit/non-profit
5. **In how many locations are you currently operating?**
6. **What are your future expansion plans?**
7. **What type of memberships do you offer?**
8. **How many members do you have? Do you see a rise in terms of your memberships in the last year?**
9. **Do you see a seasonal fluctuation in your memberships?**
10. **What type of services do you offer?**
    - infrastructure provider
    - community host/social events
    - knowledge disseminators
    - reference places
    - global pipeline Connectors
11. **Does your coworking space act also as a hotspot attracting nearby amenities?** (allocation of new amenities i.e. ATM, coffee shops, bakery, groceries, restaurants, etc.)
12. **What means of transport do your members use to access your facilities?** *(i.e. bike, car, metro, etc.).*
13. **Are your members mostly within walking distance (15 minutes) of the coworking space?**
14. **How did you decide on the location of your co working space?**
    i. Did you consider existing public transportation or parking space availability?
    ii. Are there any policies regulating the location and development of the coworking spaces?

15. **What are the potential impacts of RW on office space utilization in the core of the city/main city center/office parks?**
16. **Are there any RW friendly housing options?** *(Need to know what an interviewee considers a RW friendly housing option, and then ask the question).*
17. **Is there any support for the public or private sector to facilitate RW in collaborative spaces?** If yes, how? *i.e. coupons, vouchers*

R-Map

MAPPING THE EFFECTS OF REMOTE WORKING ARRANGEMENTS IN URBAN AND RURAL AREAS

GA 101132497

Partners

ARISTOTLE UNIVERSITY OF THESSALONIKI

arx.net MOBILE INNOVATIONS

KOÇ ÜNİVERSİTESİ

METREX The Network of European Metropolitan Regions and Areas

UNIVERSITY OF SURREY

REMOTE WORKERS WORLDWIDE

SEERC SOUTH-EAST EUROPEAN RESEARCH CENTRE

UNIVERSITY OF TWENTE.

R!M

Università Bocconi MILANO

Q-PLAN INTERNATIONAL

WHITE

Visit: www.r-map.eu
Contact us: email: info@rmap.eu
Follow us: R-Map Project EU

Funded by the European Union

The R-MAP project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101132497.