MICAD

Metropolitan Inclusivity in Climate and Digital Transitions

Toolkit prototype for local authorities on how to do digital and climate transition with a metropolitan inclusive perspective

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Disclaimer

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Glossary

Actions - Concrete measures included in a metropolitan transition roadmap. Actions translate strategic priorities into implementable activities, with assigned responsibilities, resources, timelines, indicators and risks.

Diagnostic baseline - The shared starting point for the roadmap. It summarises the metropolitan territory, governance arrangements, climate and digital challenges, gaps, needs and available capacities.

Co-creation – A collaborative process through which metropolitan actors jointly define challenges, priorities, solutions and actions, ensuring that the roadmap reflects diverse knowledge, needs and capacities.

Hard governance spaces - Formal governance arrangements with legal mandates, defined competences, stable resources and decision-making powers, such as statutory metropolitan authorities or formal inter-municipal bodies.

Implementation mechanisms – The governance, coordination, funding, capacity and reporting arrangements that allow roadmap actions to be delivered in practice.

Living Labs - Structured co-creation processes where public authorities, stakeholders and users jointly test, refine and learn from solutions in real-life settings.

Metropolitan area - A functional urban territory made up of multiple municipalities connected through daily mobility, economic activity, services, infrastructure, environmental systems and shared challenges.

Metropolitan governance - The way metropolitan actors coordinate decisions, responsibilities, resources and actions across municipal and sectoral boundaries.

Metropolitan transition roadmap – A practical planning document that translates shared metropolitan priorities into coordinated climate and/or digital transition actions, including responsibilities, timelines, resources, monitoring arrangements and implementation mechanisms.

Soft governance spaces - Flexible cooperation arrangements based on voluntary participation, working groups, projects, networks or thematic partnerships. They can support coordination even when no formal metropolitan authority exists.

Stakeholder engagement – The structured involvement of public authorities, civil society, private actors, academia and communities throughout the roadmap process, from diagnosis to implementation and learning.

Strategic orientations – High-level directions agreed after the diagnostic phase, used to guide the structure of the roadmap and the selection of priority actions.

Twin transition – The coordinated development of climate and digital transitions, ensuring that digital tools support climate action and that digital transformation is guided by sustainability, inclusion and public value.

1.Introduction

This document is part of the **MICAD Toolkit**, developed under the MICAD project to support local and metropolitan authorities in designing and implementing inclusive climate and digital transition processes at metropolitan scale.

The Toolkit is composed of four interlinked modules that together guide metropolitan actors through the process of developing inclusive climate and digital transition roadmaps:

- **Module 1 – Analyse & Define**: establishes the territorial, governance, needs, and funding baseline for metropolitan transition planning.
- **Module 2 – Collaborate & Engage**: supports cooperation, stakeholder engagement, social inclusion, open innovation, and Living Lab processes.
- **Module 3 – Develop & Measure**: guides the development of transition roadmap components, implementation mechanisms, monitoring, and testing.
- **Module 4 – Communicate & Disseminate**: supports communication, dissemination, replication, scaling, and advocacy.

Each module can be used independently, depending on the specific needs and challenges faced by a metropolitan area. However, the modules are designed to be complementary. Together, they provide a coherent methodological pathway from diagnosis and cooperation to roadmap development, implementation, learning, and dissemination.

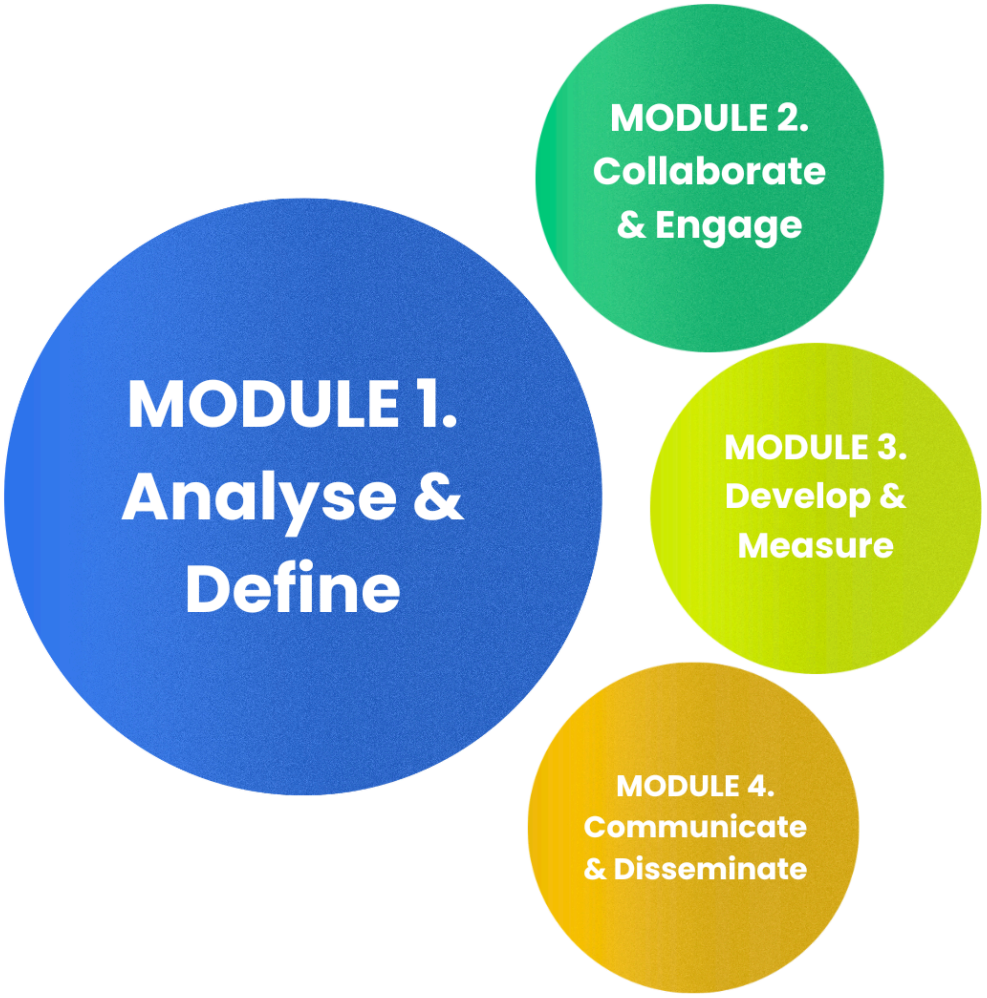
The Toolkit does not prescribe a single governance model or policy solution. Instead, it offers a flexible and adaptable framework that can be tailored to different metropolitan realities, capacities, and priorities.

The use of the Toolkit follows four simple steps:

1. **Identify the metropolitan challenge or question** - Start from a concrete issue, barrier, or planning need (e.g. governance coordination, stakeholder engagement, implementation, or monitoring).
2. **Locate the question in the Toolkit navigation table** - Use the navigation table below (Table 1) to find the question that best matches your challenge.
3. **Identify the corresponding module and topic** - Each question is linked to a specific module and topic within the Toolkit, guiding you to the most relevant section.
4. **Follow the step-by-step methodological guidance provided in the tool** - Each topic includes a structured tool with guiding questions, implementation steps, and practical examples to support action.

Questions that can emerge in the process of developing a roadmap	Where to find guidance
• Which metropolitan perimeter should serve as the shared spatial baseline for designing and delivering the roadmap?	Topic 1.1 (module 1)
• How are roles, responsibilities, and decision-making organised across the metropolitan area to deliver this roadmap?	Topic 1.2 (module 1)
• What are the priority metropolitan challenges and needs that this roadmap must address?	Topic 1.3 (module 1)
• How will this roadmap be financed in a coordinated and sustainable way?	Topic 1.4 (module 1)
• How will metropolitan actors cooperate in practice to co-create and deliver this roadmap?	Topic 2.1 (module 2)
• How can this roadmap be co-designed through open, inclusive, and transparent innovation processes?	Topic 2.2 (module 2)
• How can social inclusion be embedded into the design and implementation of this roadmap?	Topic 2.3 (module 2)
• How can Living Labs structure and anchor the co-creation of this roadmap?	Topic 2.4 (module 2)
• How should stakeholders be strategically engaged throughout the co-creation of this roadmap?	Topic 2.5 (module 2)
• How should the roadmap plan be structured to translate strategy into coordinated and actionable components?	Topic 3.1 (module 3)
• How can agreed objectives be translated into coordinated, sequenced and operational roadmap components?	Topic 3.2 (module 3)
• How will this roadmap be implemented in a coordinated, accountable and sustainable way?	Topic 3.3 (module 3)
• How will progress and impact of this roadmap be measured and used to inform adaptive decision-making?	Topic 3.4 (module 3)
• Which actions of the roadmap should be tested before full-scale implementation, and how?	Topic 3.5 (module 3)
• How should this roadmap be communicated to ensure trust, clarity and engagement?	Topic 4.1 (module 4)
• How can roadmap outputs be translated into reusable assets for peer metropolitan areas and professional ecosystems?	Topic 4.2 (module 4)
• Which roadmap actions are intended for scaling, and under what conditions can they be replicated across municipalities?	Topic 4.3 (module 4)
• How can this metropolitan roadmap be strategically advocated to influence policies, resources and institutional support across governance levels?	Topic 4.4 (module 4)

MODULE 1. Analyse & Define



Understanding the Module

The Analyse & Define module helps metropolitan areas assess their governance, territorial organisation, institutional capacity, and thematic readiness for digital and climate transitions. Before setting strategic directions or implementing actions, metropolitan authorities need to map their governance framework, identify coordination gaps, and assess how existing plans, data systems, and policies enable or constrain transformation.

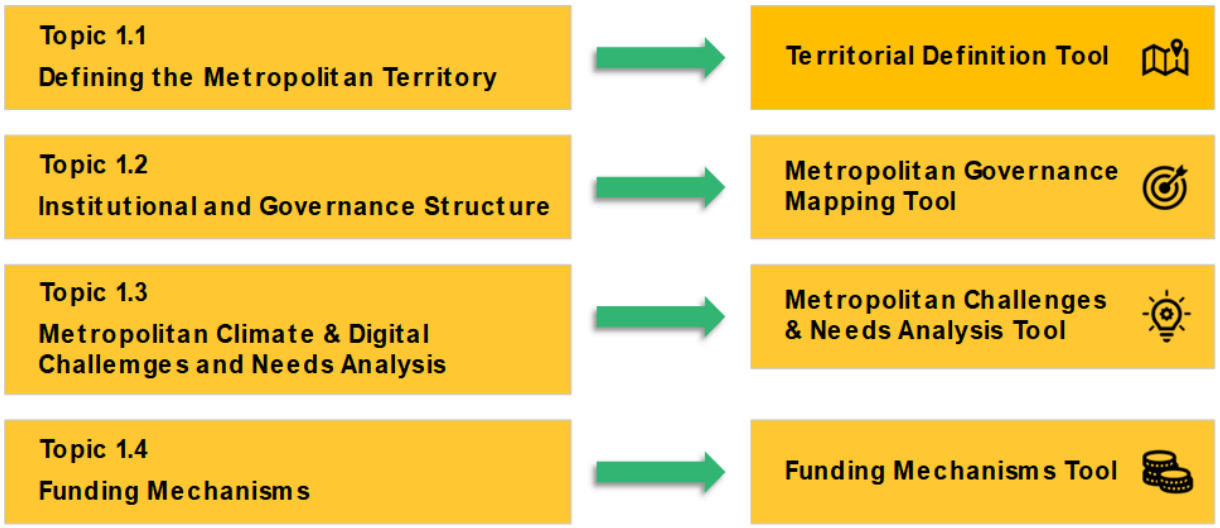
While Module 1 does not aim to define detailed strategies or actions, it is expected to lead to a set of shared strategic orientations that provide a clear starting point for roadmap structuring in Module 3. By the end of Module 1, metropolitan authorities should be able to jointly agree on:

- **Overall transition focus of the metropolitan roadmap.** Confirmation of whether the primary emphasis is climate-led with digital as an enabler, digital-led with climate co-benefits, or a balanced twin-transition approach.
- **Priority metropolitan challenges to be addressed.** A short, prioritised list of climate and digital challenges that require metropolitan-level coordination, derived from the Metropolitan Challenges & Needs Analysis (Topic 1.3).
- **Key metropolitan needs and strategic orientations.** High-level statements on what is needed to address priority challenges (e.g. shared governance arrangements, joint data infrastructure, pooled capacity, funding approaches).

These strategic orientations constitute the main handover from Module 1 to Module 3 and directly inform Topic 3.1 (Structuring the Metropolitan Transition Roadmap).

List of Topics

Topic 1.1 Defining the Metropolitan Territory
Topic 1.2 Institutional and Governance Structure
Topic 1.3 Metropolitan Climate & Digital Challenges and Needs Analysis
Topic 1.4 Funding mechanisms



Topic 1.1 Defining the Metropolitan Territory

CHALLENGE

Most metropolitan areas operate across administrative boundaries that do not match functional realities. Commuting flows, housing markets, environmental systems, and digital infrastructures extend beyond administrative borders – yet planning, budgeting, and governance remain tied to municipal or regional limits. For climate and digital transitions an unclear metropolitan definition makes coordinated action difficult. A shared understanding of "what the metropolitan area is" becomes the first essential step toward coherent governance, joint investments, and inclusive transition planning.

BENEFITS OF THE ACTION

A shared and functionally grounded definition of the metropolitan territory strengthens coherence, efficiency, and equity across the entire transition process. It creates a common spatial reference for planning, enabling municipalities to coordinate climate, mobility, housing, and digital investments. Clear territorial boundaries improve data comparability, support joint funding applications, and reduce duplication of efforts. They also help identify where vulnerabilities and opportunities are concentrated, allowing for targeted and inclusive action. Ultimately, defining the metropolitan territory clarifies interdependencies and supports long-term cooperation and integrated governance. It also stabilises the diagnostic baseline, making metropolitan assessments more reliable and comparable over time.

SOLUTIONS/TOOLS

Develop a shared, functional definition of the metropolitan territory, supported by data and inter-municipal dialogue and agreement. The aim is to create a common territorial frame for planning and cooperation.

A **Territorial Definition Tool** is a structured analytical instrument that delineates the metropolitan area based on functional relationships rather than administrative borders. It draws on data and inter-municipal inputs to assess commuting patterns, service areas, economic and digital linkages, and environmental systems, supporting the definition of a coherent metropolitan perimeter for coordinated transition planning.

Metropolitan governance has no one-size-fits-all definition. The development of a common metropolitan definition can be illustrated by different approaches, showing how governance arrangements, legal frameworks, and functional realities shape each process – ranging from formal legal recognition to functional coordination and informal cooperation. One possible reference point is the OECD definition of Functional Urban Areas, which provides a data-based approach to delineating metropolitan territories.

Guiding questions

- Where do people live, work, and travel across municipal borders, and which infrastructures or services are shared among municipalities?
- Which territories are most affected by climate risks and therefore require cross-boundary coordination?
- Which territorial perimeter should serve as the shared baseline for population, mobility, service coverage, and key indicators in the diagnosis?

Step-by-step process

Step 1: Map functional linkages. Commuting patterns, labour markets, public transport networks, digital infrastructure coverage, environmental systems.

Step 2: Analyse administrative and sectoral boundaries. Compare legal/administrative borders with functional realities.

Step 3: Identify territorial gaps. Areas where functional interdependencies are high but institutional cooperation is weak by systematically comparing functional data with existing administrative boundaries, mandates, and coordination mechanisms.

Step 4: Engage municipalities and agencies. Validate the functional map, discuss overlaps, negotiate inclusion/exclusion through facilitated workshops and bilateral or multilateral coordination meetings.

Step 5: Agree on a shared metropolitan perimeter. Define the "core", "functional belt", and "extended cooperation area".

Step 6: Align strategic planning and data systems. Ensure climate, mobility, housing, and digital policies use the same spatial frame, and document this perimeter as the official baseline for indicators and reporting

ILLUSTRATIONS

Legal-institutional definition (Àrea Metropolitana de Barcelona - AMB, Spain)

Barcelona's metropolitan territory is formally established by Catalan law (Law 31/2010) and covers 36 municipalities, with competences in mobility, urban planning, waste management, and climate action. However, the broader functional metropolitan region involves over 160 municipalities, where coordination largely relies on soft, non-binding mechanisms. In this context, the PEMB – Metropolitan Strategic Plan of Barcelona plays a role as a strategic reference and monitoring platform, dedicated to the preparation and follow-up of metropolitan strategic plans and to fostering dialogue among metropolitan actors, rather than exercising formal functional coordination powers.

- ***Steps illustrated:*** *2, 6*.
- ***Lesson****: A legal definition brings stability and might mean financial autonomy, but functional coordination still needs complementary networks beyond the formal perimeters as functional patterns evolve.*

Functional definition with legal backing (Górnośląsko-Zagłębiowska Metropolia – GZM, Poland)

Established in 2017 by national legislation, GZM's boundaries were based on functional analysis of commuting and service connections across 41 municipalities. The process combined data-driven delineation (based on population and mobility indicators) with political negotiation among municipalities. The result is a legal structure reflecting real functional linkages and supported by mechanisms such as the ZTM transport authority, which even extends beyond the formal area.

- ***Steps illustrated:*** *1, 3, 4, 5*.
- ***Lesson****: Combining data analysis with inter-municipal dialogue helps ensure legitimacy and functionality at the same time.*

Informal functional cooperation (Tirana Metropolitan Area, Albania)

Tirana's functional area extends beyond its municipal borders. Without a formal metropolitan authority, cooperation has gradually emerged through shared projects in mobility, waste management, and spatial planning. Mapping exercises supported by donor programmes (EU, UNDP, GIZ) have helped build a shared evidence base and advance discussions on a possible formal metropolitan framework.

- ***Steps illustrated:*** *1, 3, 4.*
- **Lesson**: Even without formal mandates, mapping and dialogue can pave the way toward future institutionalisation.

Functional expansion through inter-municipal coordination (San Salvador – OPAMSS, El Salvador)

San Salvador illustrates how a metropolitan territory can be redefined in response to urban growth and expanding functional dynamics. Facing rapid urban expansion, OPAMSS coordinated a shift in the understanding of the metropolitan area, recognising that housing, mobility and economic flows now extend across nearly 1,400 km², far beyond the original 110 km². Through the Council of Mayors (COAMSS), 14 municipalities agreed on a shared perimeter to support coordinated action in areas such as waste management and infrastructure.

- ***Steps illustrated:*** *1, 4, 5.*
- ***Lesson:*** *When urban growth expands beyond original administrative limits, inter-municipal agreement can help define an extended cooperation area for shared planning and service delivery.*

Data-based metropolitan coordination (Guadalajara – IMEPLAN, Mexico)

Guadalajara illustrates how shared data systems can support a common metropolitan baseline across municipalities. IMEPLAN acts as the technical backbone for nine municipalities, helping to align strategic planning and territorial information. Through tools such as the Metropolitan Viewer and Zoom Metropolitano, IMEPLAN provides more than 100 geospatial data layers, including land use, demographics and hydrology. The Unique Flood Map also provides a shared reference for identifying climate-related risks across municipal boundaries.

- ***Steps illustrated:*** *2, 3, 6.*
- ***Lesson:*** *Shared metropolitan data platforms can help municipalities work with the same territorial baseline, improving coordination, comparability and evidence-based planning.*

Functional mapping for metropolitan-scale planning (Addis Ababa, Ethiopia)

Addis Ababa illustrates the importance of mapping functional linkages between population dynamics, land use, infrastructure and environmental systems. With around 7 million residents and significant daily commuter flows from surrounding areas, the city faces planning challenges that extend beyond its administrative boundaries. To address this, Addis Ababa is developing an Urban Data Centre that consolidates information on land use and climate risks to support the Corridor Rehabilitation Programme. This helps coordinate city and federal action and align infrastructure planning with the functional reality of the wider metropolitan region.

- ***Steps illustrated:*** *1, 2, 6.*

- ***Lesson:*** *Mapping population flows, environmental systems and land-use dynamics helps align infrastructure and climate planning with the real functional scale of the metropolitan area.*

Topic 1.2 Institutional and Governance Structure

CHALLENGE

Even within a clearly defined metropolitan territory, there is often fragmentation across municipalities and agencies with different mandates, budgets, and planning cycles. This fragmentation leads to overlapping responsibilities, gaps in decision-making authority, inconsistent policies, limited capacity for cross-boundary investment, and unequal participation of smaller municipalities. In practice, this fragmentation is often compounded by political turnover, ambiguous mandates, and limited administrative capacity, which disrupt policy continuity and weaken coordination over time.

The challenge is therefore not only who is included in the metropolitan area, but how these actors work together. Effective metropolitan transitions require governance systems that are legitimate, capable, inclusive, and sufficiently empowered – whether formally institutionalised or operating through flexible, functional cooperation. Metropolitan governance structures evolve over time, often alternating between institutional ("hard spaces") and procedural ("soft spaces") arrangements. Without clear architecture, transitions risk becoming fragmented, uncoordinated, and inequitable.

Characteristics of different governance models

Governance option	Core characteristics	Typical features	When it is most suitable
Formal institutionalisation (legal metropolitan authority)	High level of institutionalisation based on a legally established metropolitan body	Statutory metropolitan authority· Clearly defined mandates and competences· Stable staffing and dedicated budget· Binding decision-making powers	Where strong political consensus exists and long-term, integrated metropolitan coordination is required
Hybrid governance (formal core + functional cooperation zones)	Combination of a formal institutional core with flexible, function-based cooperation arrangements	Legally established core institution· Thematic or territorial cooperation zones· Differentiated levels of commitment· Mix of binding and voluntary mechanisms	Where full institutionalisation is not politically feasible but coordination is needed across multiple functions
Soft coordination (voluntary networks, task forces, inter-municipal agreements)	Low level of institutionalisation relying on procedural and voluntary cooperation	Informal or semi-formal networks· Project-based or thematic task forces· Voluntary inter-municipal agreements· High flexibility, limited binding power	In early stages of cooperation, experimental settings, or politically sensitive contexts
Sectoral metropolitan agencies (transport, data, innovation ,etc.)	Functional institutionalisation organised by policy sector rather than territory	Separate agencies with sector-specific mandates· Clear operational responsibilities· Limited cross-sector coordination by default· Strong technical focus	Where coordination needs are concentrated in specific sectors and political agreement exists for targeted institutionalisation

BENEFITS OF THE ACTION

A clear, functional governance architecture enables coordinated metropolitan-scale planning, reduces duplication of efforts, and clarifies who is responsible for what. Strong governance systems improve the ability to negotiate funding, manage joint infrastructures, and integrate climate, digital, and social priorities into a single strategic pathway.

SOLUTIONS/TOOLS

The **Metropolitan Governance Mapping Tool** is an analytical instrument used to understand how decision-making, coordination, and implementation are organised across the metropolitan area in relation to climate and digital transitions. Rather than prescribing a specific institutional model, the tool provides a structured way to document and analyse existing governance arrangements and assess their alignment with functional realities and transition objectives.

The tool is applied by systematically mapping:

- public institutions, agencies, and networks involved in relevant policy domains;
- legal competences, mandates, and regulatory frameworks at different territorial levels;
- decision-making processes, coordination mechanisms, and formal or informal cooperation arrangements.

This mapping allows metropolitan actors to visualise how responsibilities and resources are distributed, where coordination gaps or overlaps exist, and how representation and legitimacy are ensured across the metropolitan area. Based on this shared analysis, the tool supports discussion on which type of governance arrangement–formal, hybrid, or soft–is feasible and appropriate in the given political and institutional context. The tool also supports identifying the minimum operational capacity, roles, and continuity arrangements required to sustain coordination, monitoring, and joint action over time within the framework of the twin transition.

Guiding questions

- Who holds decision-making powers and budgets across key policy areas (e.g. climate, digitalisation, mobility, land use, housing, resilience), and where are the main overlaps, gaps, or contradictions?
- What formal (“hard”) and informal (“soft”) governance structures and coordination mechanisms exist, and which are missing?
- What level of institutionalisation is realistic and politically feasible, and which capacities (staffing, expertise, and budgets) are required to implement and sustain it?

Step-by-step process

Step 1: Governance mapping. List all relevant metropolitan actors (councils, agencies/utilities, sector authorities, data/digital actors,civil society/ formalized NGOs, etc.) and existing cooperation networks.

Step 2: Competence and mandate analysis. For each thematic area of relevance, assign: who decides / who funds / who implements / who monitors. Flag overlaps, conflicts, and "unassigned" tasks. The Energy Living Lab Toolbox provides practical tools, such as stakeholder mapping and influence-interest matrices, that can support the assessment of representation, legitimacy and participation gaps.

Step 3: Representation and legitimacy assessment. Analyse how municipalities participate: financial contribution, voting rules, leadership rotation, advisory boards, civil society representation.

Step 4: Identify coordination gaps. Spot where sectors operate in silos, whether an "integrator" exists (e.g., coordination unit, data office, resilience/innovation hub), and whether data stewardship and reporting roles are clear and resourced.

Step 5: Choose a governance model. Choose the simplest model that fits your context (formal authority, hybrid, soft coordination, or sectoral agencies) and define how it connects to municipalities and sector actors.

Step 6: Define operational capacity and continuity. Define staff/budget/mandate, assign stable ownership for data and reporting, and add continuity tools (handover protocols, shared documentation, regular reporting routines, working groups/forums)

ILLUSTRATION

Institutionalised but capacity-constrained (Città Metropolitana di Milano (CMM), Italy)

CMM illustrates a metropolitan governance model with formal legal status and a broad mandate in spatial planning, mobility, and digital innovation. Its steering capacity depends on the clarity of competences, availability of resources, and effectiveness of coordination among member municipalities. Digital tools such as the Digital Twin and Symmetro support joint planning and information sharing, but are most effective when embedded in governance arrangements with clear responsibilities and stable capacities.

- ***Steps illustrated:*** *2, 4, 6.*
- ***Lesson****: Metropolitan governance models benefit from combining clear mandates and coordination mechanisms with adequate resources and operational capacities, while using digital tools as enablers rather than substitutes for institutional arrangements.*

Strong procedural cooperation without a single metropolitan institution (Berlin-Brandenburg, Germany)

The Berlin-Brandenburg region operates through long-standing joint planning institutions, intergovernmental platforms, and sectoral agencies (e.g. transport, spatial planning). Despite the absence of a unified metropolitan authority, governance is effective due to stable political commitment, integrated planning frameworks, and continuous procedural cooperation.

- ***Steps illustrated:*** *2, 4, 6.*

- ***Lesson***: Soft governance ("procedural" or "network-based") can work when supported by mature planning cultures and clear mechanisms for coordination.

Hybrid metropolitan governance and quadruple-helix collaboration (Medellín, Colombia)

Medellín illustrates an advanced quadruple-helix governance model that connects the formal AMVA (Metropolitan Area of Valle de Aburrá) with academia, the private sector, and citizens. By establishing the FutuMed innovation ecosystem, the city mapped all relevant actors (Step 1) to co-design technology and climate solutions in real-world pilot zones. This hybrid structure allows for strategic continuity and collaborative experimentation, ensuring that transition policies are not just municipal mandates but collective regional efforts supported by diverse stakeholders.

- ***Steps illustrated:*** *1 3, 5.*
- ***Lesson***: *Linking formal metropolitan institutions with quadruple-helix innovation ecosystems can enable both strategic continuity and collaborative experimentation.*

Topic 1.3 Metropolitan Climate & Digital Challenges and Needs Analysis

CHALLENGE

Metropolitan areas often struggle to translate a general understanding of problems into a clear, shared set of metropolitan-level needs that can guide strategy and action. Without a structured process that starts from identifying metropolitan climate and digital challenges and translates them into prioritised needs, transition strategies risk remaining abstract, overloaded, or disconnected from implementation realities.

BENEFITS OF THE ACTION

A structured challenges and needs analysis helps metropolitan actors to:

- Build a shared understanding of the most pressing climate and digital transition challenges
- Distinguish between local issues and challenges that require metropolitan-level coordination
- Translate challenges into clear, actionable metropolitan needs
- Create a robust analytical bridge between diagnosis (Module 1) and strategy development (Module 3)

The result is a concise, collectively owned set of metropolitan needs that provides a strong foundation for defining priority directions for action and developing transition roadmaps.

SOLUTIONS/TOOLS

Build a **Metropolitan Challenges & Needs Analysis Tool,** which helps metropolitan authorities jointly identify their key climate and digital challenges and translate them into shared metropolitan needs. The tool is applied in three iterative steps:

- Identify metropolitan climate challenges

- Identify metropolitan digital challenges
- Translate challenges into metropolitan needs and priorities

Rather than aiming for exhaustive diagnosis, the tool focuses on selecting challenges that have the greatest impact on transition feasibility and that require collective metropolitan action. The output is a short, prioritised list of metropolitan needs that feeds directly into the Metropolitan Transition Roadmap.

Example - How metropolitan challenges can be translated into metropolitan needs

This example illustrates how metropolitan actors can translate identified climate and digital challenges into shared metropolitan needs that require collective action. It demonstrates the logic of moving from problem framing to actionable inputs for strategy and roadmap development.

How to use

1) List key climate and digital challenges affecting the metropolitan area.
2) For each challenge, briefly describe why it has a metropolitan dimension (e.g. crosses municipal borders, depends on shared infrastructure, requires coordination).
3) Translate each challenge into a metropolitan need by specifying what must be developed, strengthened, or put in place at metropolitan level.
4) Use the resulting list of needs as an input for defining priority directions for action in Topic 3.1 (module 3)

Challenge type	Metropolitan challenge (what is happening?)	Why this is metropolitan-level	Metropolitan need (what is required?)
Climate	Heatwaves increasingly affect vulnerable neighbourhoods across multiple municipalities	Heat risks and vulnerable populations are distributed across the functional urban area and cannot be addressed by isolated local measures	A coordinated metropolitan heat adaptation framework, including shared vulnerability mapping, cooling infrastructure standards, and joint funding mechanisms
Digital	Municipal data systems are fragmented and not interoperable	Climate and mobility planning require metropolitan-wide data integration	A shared metropolitan data governance framework and interoperable data platform
Climate + Digital	Limited monitoring of mobility-related emissions	Emissions are generated across municipal borders and depend on metropolitan transport flows	A metropolitan-level monitoring system combining transport data and emissions indicators

Guiding questions

- What are the most pressing climate and digital transition challenges across the metropolitan area?
- Which of these challenges cannot be effectively addressed by individual municipalities and therefore require metropolitan-level coordination?

- What is needed at metropolitan level to address these challenges (e.g. governance arrangements, shared capacities, data systems, funding, skills)?

Step-by-step process

Step 1: Prepare the baseline (inputs). Collect the most relevant existing materials: climate and digital strategies, key plans, risk or emissions data, service/digital maturity assessments, and outputs from Topics 1.1 (territory) and 1.2 (governance). Agree on the territorial perimeter used for the analysis.

Step 2: Set up a short working session. Convene a small cross-municipal group (core city + smaller municipalities) and, where possible, key agencies (mobility/energy/data) to ensure a metropolitan perspective.

Step 3: Identify climate challenges. List the main climate-related challenges affecting the metropolitan area (e.g., heat, flooding, air quality, mobility emissions, energy poverty). Cluster similar items and note where impacts or drivers cross municipal borders. The CIVITAS Tool Inventory can support the identification of mobility-related climate challenges, including transport emissions, sustainable mobility planning and urban mobility measures.

Step 4: Identify digital challenges. List the main digital-related challenges limiting planning, service delivery or participation (e.g., data fragmentation, lack of interoperability, weak data governance, digital exclusion, limited skills). Cluster and note cross-boundary interdependencies.

Step 5: Filter for metropolitan relevance. For each challenge, ask: Can this be solved by a single municipality? If not, mark it as metropolitan-level. Remove purely local issues or park them for municipal follow-up.

Step 6: Translate challenges into needs. For each metropolitan-level challenge, define what is needed to address it (e.g., shared governance arrangements, joint standards, a data platform, pooled capacity, funding mechanisms, coordination routines, inclusion measures).

Step 7: Prioritise needs (3–5). Rank needs by (a) impact on transition feasibility, (b) urgency, and (c) feasibility. Select a short list of priority metropolitan needs.

Step 8: Validate and document. Share the shortlist with key stakeholders for quick validation and produce a short "Metropolitan Challenges & Needs Summary" to feed directly into Topic 3.1 (Common Vision & Strategy

ILLUSTRATION

Climate, Air and Energy Territorial Plan (Lyon Métropole, France)

Lyon shows how a metropolis can translate climate pressures into shared metropolitan needs. The authority used existing territorial data and strategies to identify cross-boundary challenges such as mobility emissions, air quality, and energy transition gaps. It then convened a broad coalition of public institutions, private actors, and civil society to identify which

challenges could not be solved by individual municipalities. Through this collective diagnosis, Lyon defined concrete metropolitan needs, including coordination mechanisms, joint priorities, and integrated actions, creating a clear bridge from diagnosis to roadmap development.

- ***Steps illustrated:*** *1 3, 5, 6, 8.*
- ***Lesson:*** *Climate challenges become actionable when they are translated from broad pressures into shared metropolitan needs, validated with relevant actors and connected to roadmap priorities.*

Digital inclusion as a metropolitan need (Almaty, Kazakhstan)

Almaty illustrates how a metropolitan authority can translate digital challenges into clear transition needs. The city identified digital exclusion as a systemic barrier affecting access to services, participation, and community capacity. Rather than treating digital inclusion as a standalone social issue, Almaty embedded it within its broader metropolitan governance agenda, linking it to human rights and the SDGs. This approach helped define concrete metropolitan needs, including inclusive digital policies, targeted support for underserved groups, and shared capacities to ensure that digital transformation does not deepen inequality.

- ***Steps illustrated:*** *2, 5, 6, 7.*
- ***Lesson:*** *Digital challenges should be assessed not only as technical issues, but also as inclusion and governance challenges that require metropolitan-level responses.*

Topic 1.4 Funding mechanisms

CHALLENGE

Financing metropolitan climate and digital transitions is one of the most persistent structural challenges for metropolitan areas. Metropolitan areas rarely have a unified budget or common financial authority and must rely on heterogeneous municipal budgets, national schemes, EU project funding, or temporary grants, none of which ensure long-term stability. Smaller municipalities often lack the capacity to prepare funding applications or manage complex financial instruments, creating territorial asymmetries. Funding is also frequently tied to short political cycles, thematic silos, or sector-specific programmes that do not match the integrated and long-term nature of metropolitan transitions. In addition, the absence of a clear snapshot of digital and climate readiness and maturity makes it difficult to estimate realistic funding needs and sequence investments, leading to misaligned financing and weakened implementation capacity.

BENEFITS OF THE ACTION

Developing a coordinated approach to funding enables metropolitan areas to mobilise resources more efficiently, reduce duplication, and strengthen their ability to secure external financing. A funding strategy supports long-term planning and helps align municipal budgets with metropolitan priorities, making transition actions more realistic and achievable. Joint financial planning enhances cooperation through shared investments, pooled resources, and economies of scale, while increasing competitiveness for EU and national funding. Clear funding mechanisms improve transparency, predictability, and accountability, enabling multi-annual investment planning and reducing vulnerability to short-term political turnover.

SOLUTIONS/TOOLS

The **Funding Mechanisms Tool** supports metropolitan areas in identifying, mobilising, and managing financial resources across multiple levels of government and actors. It helps metropolitan authorities develop a funding strategy that is aligned with the metropolitan roadmap and connects local budgets, EU and national funding opportunities, and innovative financing instruments. As part of this process, metropolitan actors are encouraged to establish a light digital and climate readiness and maturity snapshot to inform the prioritisation and sequencing of funding needs.

The tool enables metropolitan actors to systematically assess how different funding sources, instruments, and capacities can be combined to support transition priorities. It supports the mapping of existing funding sources and gaps, the design of blended financing models, and the exploration of joint municipal budgeting or pooled resources. It also helps identify opportunities for EU, national, and private co-financing, strengthen administrative and technical capacity for preparing and managing applications, and plan budgets across short-, medium-, and long-term horizons. Finally, the tool supports the definition of simple governance rules for fund allocation, monitoring, and reporting, and encourages the use of participatory and innovative financial instruments.

Guiding questions

- Which funding sources currently support – or could be leveraged for – climate and digital transition actions in the metropolitan area, and where are the main financial gaps?
- Which actions require metropolitan-level coordination and long-term financing, and how could resources be pooled or budgets coordinated to support them?
- What is the current level of digital readiness and climate planning/implementation maturity, and how does this affect the type, scale, and timing of required investments?

Step-by-step process

Step 1: Establish readiness and baseline. Use the light digital and climate readiness and maturity snapshot to understand existing capacities and constraints. Review priority areas emerging from Topic 1.3 and agree on the scope and time horizon for funding analysis.

Step 2: Map indicative funding needs. Link priority areas and emerging action directions to indicative cost components and implementation phases. Produce a high-level overview of potential funding needs (without detailed budgeting).

Step 3: Identify existing and potential funding sources. Map municipal budgets, national schemes, EU programmes (e.g. ERDF, ESF+, Horizon), and relevant sectoral funds that could support climate and digital actions.

Step 4: Identify major funding gaps and risks. Compare indicative needs with available and potential sources to highlight where resources are clearly insufficient, uncertain, or fragmented.

Step 5: Explore feasible funding approaches. At a conceptual level, explore options such as pooled municipal resources, joint procurement, co-financing arrangements, or public-private partnerships, considering what appears realistic in the metropolitan context.

Step 6: Define orientations for the roadmap. Summarise key findings as funding orientations to be taken forward into Module 3 (e.g. areas requiring multi-annual funding, actions needing blended finance, capacity gaps to be addressed).

Template for step 1 - Simple Digital & Climate Readiness and Maturity Snapshot checklist

Purpose: This checklist provides a quick snapshot of readiness and maturity to support realistic budgeting, sequencing of investments, and selection of funding mechanisms. It is not intended as a detailed assessment.

Digital readiness

- Metropolitan or municipal digital strategy exists
- Shared or interoperable data platforms exist
- Basic data governance arrangements are in place
- Staff with digital and data-related competences available

Climate readiness

- Climate mitigation and/or adaptation plans exist (e.g. SECAP)
- Climate targets and priority sectors defined
- Monitoring or reporting mechanisms for climate actions in place
- Dedicated staff or unit for climate action

Checklist item	Funding implication depending on maturity
Metropolitan or municipal digital strategy exists	If NO: fund strategy development, technical assistance, capacity building. If YES: fund interoperable platforms, shared systems, joint procurement.
Shared or interoperable data platforms exist	If NO: fund basic digital infrastructure and data management systems. If YES: fund advanced analytics, digital twins, integrated service platforms.
Basic data governance arrangements in place	If NO: fund governance setup, standards, coordination units. If YES: consider blended finance, PPPs, metropolitan-scale digital investments.
Staff with digital and data-related competences available	If NO: fund training programmes and technical assistance. If YES: fund complex implementation and innovation projects.
Climate mitigation and/or adaptation plans exist (e.g. SECAP)	If NO: fund plan preparation and feasibility studies. If YES: fund implementation and capital investments.
Climate targets and priority sectors defined	If NO: fund strategic definition and stakeholder processes. If YES: fund actions aligned with the roadmap.
Monitoring or reporting mechanisms for climate actions in place	If NO: fund monitoring systems and data collection. If YES: consider performance-based or results-linked funding.
Dedicated staff or unit for climate action	If NO: fund staffing and organisational capacity. If YES: consider multi-annual investment programmes.

ILLUSTRATION

Multi-annual regional investment planning and co-financing (Stuttgart Region - Germany)

The Verband Region Stuttgart (VRS) has demonstrated how predictable funding mechanisms can support long-term transition goals. The region uses a combination of regional levies, municipal contributions, and national co-financing schemes to fund its core competences,

including mobility (S-Bahn rail system), spatial development, and regional planning. VRS is able to develop **multi-annual investment plans** for mobility corridors, digital infrastructure upgrades, and climate resilience projects. This stability stems from the region's democratic legitimacy and legal mandate, allowing it to negotiate co-financing effectively with the federal state of Baden-Württemberg. The result is a funding environment that supports large-scale, cross-municipal projects – such as new S-Bahn extensions or integrated mobility hubs – while reducing administrative burdens for smaller municipalities.

- ***Steps illustrated:*** *2, 3, 5, 6.*
- ***Lesson****: A dedicated regional funding system, grounded in legislation and multi-year planning, provides metropolitan areas with the predictability needed to implement long-horizon climate and mobility transitions*

Metropolitan pooled funding for transport, infrastructure and innovation (Górnośląsko-Zagłębiowska Metropolia - GZM, Poland)

Górnośląsko-Zagłębiowska Metropolia (GZM) illustrates how pooled metropolitan funding can support long-term cross-municipal investment. Its financing model combines municipal contributions, negotiated annually, with national transfers linked to its legal status as a metropolitan union. A significant part of these pooled resources supports the regional public transport authority (ZTM), enabling integrated ticketing, shared standards and large-scale infrastructure investments across 41 municipalities. The same funding logic also supports innovation programmes, such as the Metropolitan Cycling Initiative and pilot projects on clean mobility and digital tools. By concentrating resources, GZM can plan investments that no single municipality could manage alone.

- ***Steps illustrated:*** *3, 5, 6.*
- ***Lesson****: Pooled metropolitan funding can strengthen cooperation, reduce territorial inequalities and enable strategic investments in transport, innovation and digital services.*

Blended finance and public-private partnerships for metropolitan green infrastructure (Casablanca, Morocco)

Casablanca illustrates how blended finance and public-private partnerships can support large-scale green infrastructure. Its municipal action plan combines local resources with national investment funds, including the Fonds Mohammed VI pour l'Investissement, while technical support from international partners such as the World Bank and the EU helps structure complex projects. This approach allows Casablanca to develop initiatives, such as waste-to-energy infrastructure, that exceed the capacity of ordinary municipal budgets. By combining public resources, national investment mechanisms and private capital, the city *can address funding gaps while advancing metropolitan climate and infrastructure priorities.*

- ***Steps illustrated:*** *3,4, 5, 6.*
- ***Lesson:*** *Blended financing models can help metropolitan areas deliver large-scale green and climate infrastructure when ordinary municipal budgets are insufficient.*

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