Funded by the European Union

This project has been funded by the European Union (grant agreement ID: 101079227) and supported by UKRI Innovate UK Council (project reference: 10052110).

PADST

Public Administration Capabilities for Digital and Sustainable Transition

D3.4 (I) POLICY BRIEF: TOWARDS TWIN TRANSITION GOVERNANCE IN EUROPEAN CITIES

Project acronym:	PADST
Call:	HORIZON-WIDERA-2021-ACCESS-03-01
Grant Agreement:	101079227
Deliverable Leads:	TalTech
Contributing Partners:	TalTech
Submission Date:	30/09/2025
Dissemination Level:	Public
Status:	Version 1.0

TAL TECH KU LEUVEN UCL Utrecht University

Document Information

Deliverable ID:	D3.4
Deliverable Name:	Policy Brief
Due Date of Deliverable:	31/08/2025
Actual Submission Date:	30/09/2025
Work Package:	WP3
Lead Organisation for Deliverable:	TalTech
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List of Abbreviations

DoA	Description of Action
EC	European Commission
ER	Experienced Researcher
ESR	Early-Stage Researcher
KUL	KU Leuven
NGO	Non-governmental organisation
TalTech	Tallinn University of Technology
WP	Work Package

Executive Summary

City governments across Europe are under increasing pressure to lead the twin transition—the simultaneous pursuit of digital transformation and ecological sustainability. While both agendas are politically prioritized and often rhetorically linked, the reality on the ground reveals a persistent disconnect. Digital and green transitions are typically managed through separate institutional logics, funding mechanisms, and governance structures.

This fragmentation is not merely a coordination issue—it reflects a deeper institutional puzzle. The two transitions are embedded in distinct socio-technical regimes with different actors, incentives, and temporalities. As a result, cities struggle to align them in ways that produce synergistic, systemic change.

The policy brief argues that the twin transition is not just a technical or managerial challenge, but a triple coordination challenge: aligning digital and green transformation across multiple levels of governance, between private and public sectors, and between policy domains within city governments. Without addressing this complexity, the twin transition risks becoming a rhetorical ambition rather than a transformative agenda.

To overcome this, cities should go beyond superficial integration and invest in new organizational capabilities that enable them to:

- Strategically couple digital and sustainability goals;
- Develop fit-for-purpose coordination routines across government domains;
- Create, experiment and learn through innovation niches;
- Institutionalize change through adaptive governance.

This policy brief is a key output of Work Package 3 of the PADST project: a joint pilot research initiative on public sector innovation capabilities for digital and sustainable transformations. The policy implications presented here are based on a multi-case study conducted in ten European cities. From February to November 2024, the PADST project team interviewed 82 city government officials from 10 European cities (see Appendix 1). In addition, the research team studied relevant policy documents in respective cities. There was also a co-creation seminar organized with the representatives from city of Utrecht. The Policy Brief also benefitted greatly from the practitioners' sessions organized at the PUPSIC 2025 conferences and PADST project summer schools. A more detailed overview of the research and findings forming this Policy Brief is provided in Appendix 2.

Introduction

The concept of the twin transition has become a **central narrative in European policy discourse**. It reflects the growing recognition that combining digital and green innovations is essential for driving sustainability transitions. It is prominently featured in strategic frameworks such as the European Green Deal, Digital Europe Programme, and NextGenerationEU, which envision a future where digital technologies enable more sustainable, inclusive, and resilient societies. **Local governments, especially cities, are seen as pivotal actors** in addressing place-based sustainability challenges by fostering new markets, enabling transition networks, supporting emerging social practices, and leading by example through the transformation of public services.

At the same time, the phenomenon of **twin transition remains understudied**. We know little about how the digital and green transitions can be related and how exactly they reinforce each other. Crucially, we have limited understanding of the role city governments can play in governing the twin transition.

Based on the PADST project research results, this policy brief:

- Explains the **complexities of twin transition**;
- Demonstrates the **current state-of-affairs in European cities** by focusing on cities of Barcelona, Camden (London), Hamburg, Helsinki, Leuven, Lund, Rotterdam, Tallinn, Tartu, and Utrecht;
- Provides **policy lessons** for other cities to couple the two transitions.

While policy ambition around the twin transition is high at the European and national levels, evidence from leading cities reveals a significant gap between rhetoric and practice. Despite these challenges, the policy brief offers practical insights into how emerging forms of multi-regime interaction and related capabilities can help cities better align digitalization and sustainability goals. **The key policy message** is clear: without deliberate changes to organizational strategies, routines and skill sets, the public sector will remain limited in its ability to coordinate and drive a synergistic twin transition.

The complex interplay between digital and green transitions

Digital transition is the process through which organizations, sectors, and societies adopt digital technologies and adjust their institutional practices and relationships accordingly. This change includes:

- Technological innovation: The continuous development of powerful, affordable, and accessible digital tools (cloud computing, AI, mobile devices, etc.);
- Societal expectations: People increasingly become accustomed to fast, convenient, and personalized digital services in both public and private sectors;
- Global competition: Organizations and countries must adapt to global pressure and constraints to stay competitive, efficient, and relevant in a digital-first world.

These drivers are motivating governments to collect, analyse, and act on data to transform how decisions are made, services are delivered and societies are governed, as well as to improve transparency, efficiency, and inclusivity of governance through digitalization.

Sustainability transition refers to the profound, long-term process of shifting socio-technical regimes—such as energy, transportation, food, or urban infrastructure—toward more sustainable modes of production and consumption. This transition aims to balance environmental health, social well-being, and economic prosperity for current and future generations. The main driving force behind sustainability transition is the need to address the interconnected crises of environmental degradation, resource depletion, and social inequality. Both these drivers and the transition itself are strongly contested by societal and political actors. Although there is growing societal awareness and demand, and international agreements (like the Paris Agreement) supporting sustainability transition, it is currently dependent on government actions in creating, supporting and accelerating niche innovations, scaling them up, and tilting the socio-technical regimes and landscape to accommodate them.

Twin transition refers to the understanding whereby these two transitions are expected to reinforce and accelerate each other. However, the core challenge of twin transition stems from the fundamental insight that **digitalisation and sustainability represent distinct socio-technical meta-regimes,** shaped by its own constellation of technologies, institutions, actors, and cultural norms. The digital transition is driven by rapid innovation, data infrastructures, and private-sector-led platforms, often prioritising efficiency, scalability, and disruption. In contrast, the sustainability transition is rooted in long-term environmental goals, public regulation, and systemic resilience, often requiring slower, consensus-driven change.

Combining digitalisation and sustainability requires careful governance to capitalise on opportunities and steer away from dangers. Digitalisation offers short-term sustainability benefits and enables transformative change, but it also risks deepening ecological degradation and reinforcing unsustainable socio-technical

regimes. While it enables cross-sectoral integration, decentralised systems, and tools for product lifecycle transparency it also reinforces unsustainable practices through efficiency gains that entrench dominant technological trajectories. Digital platforms can expand their influence into critical sectors like mobility and energy, shaping social behaviours, consumption patterns and global power imbalances, while the environmental footprint of digital technologies continues to grow.

Because these regimes operate on different logics, timelines, and governance structures, **aligning them is not a matter of simply layering one onto the other**. Instead, it requires a deliberate effort to bridge institutional silos, reconcile competing priorities, and create shared pathways for transformation. Recognizing the twin transition as a convergence of two powerful but divergent regimes helps explain why integration is so difficult and why it demands more than technical solutions. It calls for institutional innovation, cross-sectoral collaboration, and new governance capabilities.

How to couple digital and green transitions in cities?

To effectively align digitalization with sustainability goals, city governments must move beyond symbolic commitments and adopt deliberate strategies for integration. There are at least three distinct types of coupling that cities can pursue.

First, **rhetorical coupling** involves framing digital technologies as enablers of sustainability, such as promoting "smart" solutions for climate action. While useful for agenda-setting and political buy-in, this form of coupling often lacks operational depth.

Second, **functional coupling** refers to the practical use of digital tools like data platforms, sensors, or AI to directly support sustainability outcomes, such as reducing emissions or improving energy efficiency. This approach creates tangible synergies but may still operate within siloed governance structures.

Third, perhaps the most ambitious form, **structural coupling**, entails the creation of new institutions, strategies, or governance mechanisms that jointly manage digital and green transitions. This could include integrated departments, cross-cutting policy frameworks, or shared funding models. Structural coupling is essential for long-term transformation, but it requires significant organisational change and political commitment. Together, these forms of coupling offer a roadmap for cities seeking to turn the twin transition from a rhetorical ambition into a systemic reality.

Capabilities for twin transition

Successfully coordinating digital and sustainability transitions requires more than policy alignment. It demands a transformation in **how city governments think, act, and organise**. Government organisations need to develop capabilities and structures that align with the twin transition challenge.

Organizational capabilities are the collective skills, resources, routines, and processes that enable an organization to coordinate activities and deploy resources

effectively in order to achieve its goals and adapt to its environment They go beyond individual skills or assets: capabilities are about *how* an organization combines and mobilizes its resources in a systematic way. Put simply, resources are what an organization has, capabilities are what it can do with them. Capabilities relate to both routine tasks (e.g. strategic foresight), changing, emergent tasks (e.g. creating new institutions), and relational tasks (e.g. maintaining relationships with stakeholders).

Four types of public administration capabilities are essential for navigating the complexity of the twin transition. First, cities need to be able to shape the overall direction of the two transitions by influencing their aims, values and framing. For this there is a need to develop **strategic foresight capabilities** to anticipate long-term challenges and opportunities across both digital and green domains. Whereas the long-term change often involves shaping the dominant cultural frames influencing both domains and remains a highly difficult task, the ability to work with uncertainty, envision alternative futures, and align short-term actions with long-term goals should be at the core of how city governments organize themselves.

Second, cities should consider setting clear policy goals and practical steps for managing the twin transition. This means developing strategies that explain their choices and outline how they plan to support or phase out different technologies and systems to move toward a more digital and sustainable future. This assumes the development of **institutionalized practices**.

Third, cities must foster a culture of experimentation, innovation and learning. **Innovation niches** such as experimental projects can serve as testing grounds for integrated solutions. However, these must be connected to broader institutional strategies to avoid fragmentation and ensure scalability. The ability to regularly institutionalize the learnings and practices emerging from experiments and pilots becomes central.

Fourth, adaptive governance is key. Twin transitions are dynamic and non-linear, requiring flexible structures that can evolve over time. This **constant capacity-building** includes the ability to revise strategies, mobilize and reallocate skills and resources, develop new routines, and respond to emerging challenges.

In sum, the twin transition is not just a technical or managerial task, it is a capability challenge. City governments must evolve into learning organisations that can coordinate across regimes, experiment with new solutions, and institutionalise change.

How European city governments align digital and sustainability regimes?

This section provides an overview of the current state of the twin transition in European city governments. The analysis highlights prevalent trends, best practices, and opportunities for further development identified during the research.

Sustainability and digital transitions: different origins, distinct paths

Cities mostly treat digital and sustainability agendas as separate transitions. The existing European policy initiatives (such as NetZeroCities or Recovery and Resilience fund) are considered as "an opportunity to integrate both transitions more meaningfully" (emphasised by interviewees from Barcelona) but are perceived as too scarce and underwhelming to count as drivers for influencing the two transitions from a joint perspective. Consequently, in the studied cities, shaping the long-term goal formulation and norm-setting in sustainability and digitalization transitions are separated.

Digitalization is mostly perceived as a tool to increase the efficiency and effectiveness of service delivery and to involve citizens in urban affairs. The position of cities is rather "catching up" and "capitalizing on" with the fast pace of digital developments in the private sector, than "driving" or "shaping" it. The sustainability transition, on the other hand, is internalized in the strategic goals in terms of climate emergency and is directly shaped by national contexts (e.g., its legitimacy, legal frameworks, funding, competencies).

> *Since these are both huge megatrends and topics, we approach it more that they both need to be looked at separately and then need to have the connection where the connection makes sense, and the references where it makes sense, but to try to tackle them entirely together would be overwhelming, because they are so complex (Policy officer, City of Hamburg).*

Hence, on the strategic level, **cities mostly treat digital and sustainability agendas as separate transitions**, i.e. the long-term goal formulation and norm-setting in sustainability and digitalization transitions are separated. Consequently, the city representatives were having difficulties in imagining the cities' role in the wider cultural shaping and long-term vision of the twin transition.

Occasional integration in policy domains

Where integration exists, it is often instrumental rather than transformational and happens on the level of policy domains. All the studied cities have developed domain-specific strategies where the integration of digitalisation and sustainable is addressed. Harnessing digital technologies for emission reduction (and to a lesser extent biodiversity protection and material use) are visible in the energy (Lund, Helsinki, Utrecht), transport (Barcelona, Hamburg, Lund, Helsinki, Tartu), urban planning (Hamburg, Camden, Leuven, Lund, Helsinki, Tartu, Utrecht), construction and circular economy (Rotterdam, Lund, Utrecht), and waste management (Lund) domains.

For example, in Hamburg the traffic authority is developing a mobility strategy, focusing on creating a comprehensive master plan for digitalisation. The primary objective of this strategic approach is to encourage a 'modal shift', nudging citizens towards more environmentally friendly modes of transportation by 2030. The mobility strategy document states, 'The strategic goals interlock to enable future-proof digital mobility that meets the needs of all users while simultaneously minimising environmental impact.'

However, the domain-specific strategies and initiatives have not led to overarching (city-level) twin transition coordination nor the adoption of corresponding meta-strategy. Beyond the instrumental use, the two transitions seem not to fundamentally shape each other trajectories.

> *You need to move up and down between the operational project level and the abstract, strategic level. For that, you need a governance model and you need to let it trickle down to test it. The question is: can you move back and forth between operational, tactical and strategic levels like a yo-yo, constantly trying to connect the whole? There's an interesting interaction there… only top-down doesn't work [and] bottom-up doesn't work either (Programme manager, City of Rotterdam).*

This renders twin transition complex, adding to the difficulties in establishing twin transition pathways and guiding them. Civil servants often require additional legitimation from citizens and companies, as political mandates are vague or lacking altogether. Observed successful strategizing embrace multi-level and multi-stakeholder approaches that diminish complexity. **Successful cities employ participatory arenas that mobilize stakeholder and citizens** (e.g. citizen assemblies, green digital networks) **for simultaneously setting strategic goals and implementing them through experiments**. Arenas are also employed for resolving conflicts that stem from destabilizing the old socio-technical systems and aligning participatory expectations and implementation. For example, Lund engages network of private

companies that are experimenting with reducing parking spaces relying on digital modelling.

Datafication as the first step towards twinning

A recurring theme in merging digitalization with sustainability is the emphasis on datafication. Digitalization is often framed to enhance analytical and accountability capacities in sectoral sustainability transitions – what can be termed the **institutional use of data**. For instance, cities like Lund, Hamburg, and Helsinki provide sustainability data to citizens to foster accountability, while civil servants in cities such as Tallinn and Tartu use data to bolster the legitimacy of green policies.

Alternatively, data is used for achieving green-house gas (GHG) emission reduction, biodiversity protection and other sustainability goals. This can be interpreted as the **instrumental use of data**. Data may be harnessed for GHG emission reduction through better engineering (gathering data from district heating systems in Helsinki and optimising its flows), towards behaviour change and collaboration with citizens (using digital platforms for capping peak energy reduction in Lund, Helsinki), or towards process and behaviour change inside the city administration (applying a new spatial planning narrative based on GIS in Lund).

However, despite these ambitions, officials in Lund, Hamburg and Tallinn acknowledge the difficulty of linking digital interventions directly to measurable reductions in greenhouse gas (GHG) emissions, as impacts may only become evident over decades. In some other cases, the growing demand by various stakeholders for increasingly granular data is seen as a form of "paralysis by analysis," delaying more fundamental policy decisions.

Fragmented innovation pathways

In each cities' policy domain there is a wide range of ongoing projects which combine digitalization and sustainability logics. Based on the main driver and focus, these initiatives fall under three categories that can be named sustainability-driven, technology-driven and coordination-driven innovations (Table 1).

Table 1: Types of twin innovations

Sustainability-driven innovation	Technology-driven innovation	Coordination-driven innovation
Sectorial goals for achieving environmental sustainability motivates seeking for digital solutions	Novel technological opportunities are developed that address long-term sustainability goals	Bottom-up challenges in administrative processes trigger search for "twin" solutions
Example: data-based guiding of district heating flows in Helsinki	Example: self-driving cars in Tallinn	Example: energy communities in Lund

Most twin innovation projects are **driven by sustainability goals**, particularly those tied to sector-specific carbon reduction targets. In response, civil servants actively seek digital solutions aligned with these ambitions, most notably in energy systems.

Technology-driven innovations in cities are motivated by global competition to develop cutting-edge technologies such as autonomous vehicles, drones, or digital twins. These projects are often loosely connected to cities' immediate strategic goals and are typically supported by external funders like the EU. Although motivated through sustainability aims, their contribution to concrete sustainability outcomes, such as GHG reduction, remains ambiguous.

> *I think that most of the innovation projects now done with external funding are in the innovation Horizon 3, like drones, advanced data, ecosystems, whatever. My opinion is that we should focus on the Horizon 1, on the biggest problems that we are right now having in our services, like service production, and [thus] bring the innovation near us, instead of somebody in a bubble trying to fix future problems. (Strategy manager, Helsinki).*

The third - and smallest - type of innovation in cities is **driven by efforts to improve organizational coordination**. These initiatives showed the greatest promise in resulting in systemic transformation since the recognized the inherent complexities and need for multi-stakeholder approaches. These initiatives often originate within units tasked with collaboration or are catalysed by external funding and networks. Typically defined bottom-up by civil servants, their goals may relate to either sustainability or digitalization. For example, initiatives may seek to align energy and building departments around shared sustainability objectives. These ideas undergo a process of interpretation and intermediation, during which organizational goals, procedures, and technologies are critically examined and new models proposed. This pragmatic, analytical approach fosters a reflective stance on the sustainability impacts of digital technologies and encourages more integrated, context-sensitive innovation.

> *I'm trying to help [my colleagues] not do stupid things. It's not only technology, optimisation, but like business project process or rethinking the whole operations. That's always the platform. We don't just jump into a digital solution. We always try to take the step back. Because they often think, oh, I need an app. That" kind of the number one. We try to help them to really ask themselves, is that really the need? What is the real, real need? (Innovation expert, Lund).*

Policy implications – Governing the twin transition in cities

The twin transition – integrating digitalisation and sustainability – offers transformative potential for cities. However, current governance practices have yet to fully realize this potential. Based on the PADST project research, we can draw several key implications for urban policymakers.

Recognize the Twin Transition as a multi-regime challenge and move from rhetoric to strategic integration

While many cities frame digitalisation as a tool for sustainability, this rhetorical coupling must evolve into strategic and structural integration. The key to harnessing the twin potential is in recognizing that digital and sustainability transitions are embedded in distinct socio-technical regimes. Aligning them requires deliberate efforts to bridge institutional logics, actor networks, and governance structures. Policymakers must treat twin transition as a complex systems challenge, not a linear implementation task. Cities should develop joint transition strategies and institutional spaces, rather than separate digital and green agendas, to ensure coherence and long-term impact.

> *What is needed isn't defining common interest, but defining common needs and solutions, and common budgeting. Otherwise, it's just an MOU (High-level policymaker, Barcelona).*

Invest in organisational capabilities for enhanced strategic coupling

To couple the two innovation fields means that the city governments need to combine two very different knowledge domains and resources bases commonly distributed across various internal and external organizational units. The experience of the studied cities points to several "ways of doing" that constitute as the key twinning capabilities. We recognize five critical domains that support the systemic twin transition:

- **Exploring and sensing** long-term challenges and opportunities across both digital and green domains;
- **Repositioning** institutions and **guiding** policy goals for managing the twin transition;
- **Coordinating and collaborating** both vertically (between levels of government), horizontally (between citizens and stakeholders) and internally (and departmental silos) for legitimation and experimentation.
- **Exploiting and accelerating** promising experimental niche developments;
- **Learning and reflecting** on past changes, technological and social innovations, and stakeholder input.

Table 2 presents examples of capabilities developed and used by European cities to foster the twin transition. These capabilities are illustrated with examples from studied cities.

Table 2: Examples of twin capabilities

Generic capability	Twin-specific practice	Examples
Exploring, sensing	Participation in twin networks	EU NetZeroCities mission (most cities)
	Creating or accessing new data to understand sustainability dynamics	The Climate Impact Monitoring System (Hamburg)
	Sharing data across departments for experimenting and ideating	Combining building material and waste management data for circular economy (Utrecht)
	Sharing data across sectors	Open data provision (Barcelona)
Repositioning, guiding	Citizen engagement to legitimize radical sustainable and digital change	Citizen assemblies, digital inclusion, mobilizing citizens' pressure (Camden, Barcelona, Hamburg, Leuven)
	Clear political preferences, pressure and support enables to agree on new TT foci and overcome barriers	NetZeroCities Climate Contract signed by political leaders
	Creation of TT policy and implementation space outside traditional policy domains	Missions (Barcelona, Camden, Rotterdam); innovation centres (Barcelona, Camden, Helsinki, Rotterdam); innovation teams (Lund); living labs (Leuven)
	Holistic management towards applying digitalization for sustainability goals	Strategy department's analysis and dedication to pragmatic application of digitalization in achieving sustainability goals (Helsinki)
	Formal domain strategies that guide multi-system couplings	Sectoral strategies (e.g. mobility, energy, circularity) that explicitly guide the uptake of digital solutions for achieving sustainability goals (Hamburg, Lund, Camden, Rotterdam)
Coordinating, collaborating	Coordination with policy stakeholders within the region and state	Regional collaboration in the Netherlands, Sweden and elsewhere
	Ecosystem engagement for local changes and up-scaling	Initiation of large local climate policy networks with private stakeholders (Barcelona, Hamburg, Lund)
	Mobilizing private finances to advance TT	Public-private financing (Barcelona, Camden)
	Using public procurement to induce TT in the private sector	Plan to update procurement guidelines for sustainable technologies (Camden)
Exploiting, accelerating	Continuous expansion of the use of digital tools for sustainability goals within the city government	Experimentation with Digital Twins that led to new planning practice and paradigms (Lund, Helsinki, Tallinn)
	New organizational structures that enable digital transformation for sustainability purposes	Reforming organizational structures in municipal energy and transport companies around data creation, management and use (Helsinki)

	New budgeting logic to drive sustainability transition	Climate budgeting (Barcelona)
	Up to date and interoperable digital infrastructure	Open data, regulatory sandbox, guidelines and economic support for sustainable business (Barcelona)
	Hiring in-house staff with skill-sets capable of bridging the two fields	Hiring waste management lead from digital sector (Lund)
Learning, reflecting	Data-informed sustainability decision-making	„Traffic light" system for sustainability goals (Lund)
	Creation of new staff positions to enable learning between projects	Redefining "project managers" into "strategists" (Lund)
	Continuous initiation of cross-domain projects targeting TT	Material cadastre for building materials and recycling (Tartu, Utrecht, Lund)
	Informal networking for cross-domain learning	Informal communication between sustainability, air quality, energy and GIS teams (Camden)

Address resource and competence gaps

When designing and implementing the twin transition pathways, city governments must rely on a bundle of skills and resources. The PADST research identified four critical organizational resources for the twin transition: knowledge, skilled staff, financial resources, and digital maturity.

Knowledge resources

Effective twin transition coordination requires deep understanding of both digital and sustainability domains. However, cities report limited access to integrated twin transition expertise, which hampers their ability to identify priorities and assess how digitalization can support climate goals. For example, cities struggle to determine whether digital investments should target consumption patterns, waste systems, or urban infrastructure. Emerging technologies like AI and blockchain raise further questions about their potential to shape sustainable futures.

> *We know we can design a bus route; but it's much harder in the field of energy retrofits, mass installation of solar panels… these require new knowledge, new skills, new staff. (Strategy director, Barcelona)*

Human capital

A major constraint is the lack of skilled staff capable of bridging digital and sustainability regimes. Many city employees are unfamiliar with digital tools, especially in traditionally non-digital domains like infrastructure planning. Cities are increasingly hiring staff with hybrid skill sets and appointing high-level roles such as Chief Innovation Officers (CIOs) and Chief Data Officers (CDOs) to build internal capacity. However, staffing often follows siloed structures, reinforcing fragmented expertise.

Financial resources

Funding remains a persistent bottleneck. While innovation projects often receive EU support, scaling and mainstreaming efforts rely on local budgets, which are harder to secure. Investments in digitalisation are frequently dwarfed by sustainability spending, and budget constraints delay promising initiatives. Fragmented funding streams, where digital and green budgets are earmarked separately, discourage integrated projects. Cities acknowledge the need to attract private investment, but face challenges related to data governance and intellectual property.

Digital maturity

Many cities lack the technological infrastructure and digital readiness needed to leverage digitalization for sustainability. Legacy IT systems, outdated vendor software, and uneven digital literacy hinder progress. While some cities are upgrading systems and experimenting with new applications in planning and energy, others are still focused on establishing basic digital functions before they can innovate.

> *Maybe in a couple of years we'll be in a place where we are sure that we have the basic [IT] functions running and we can keep them up in a very secure way, and then we can start leveraging on that... Then we will have the capabilities to do some innovative added value stuff. Now we're only doing things that we need to get in place (IT manager, Helsinki).*

Strengthen coordination structures and authority

Twin transition coordination depends heavily on networks, authority, and shared norms. Cities often engage large stakeholder networks, but struggle to move from symbolic collaboration to joint problem-solving and budgeting. Even when new units are created to oversee twinning efforts, they often lack the power to influence broader city operations. Fragmentation between digital and sustainability teams – both physically and conceptually – limits cooperation. Cities also face challenges in translating lessons from pilot projects into actionable knowledge for broader coordination.

> *It's not necessarily about mandate, but rather about authority. Do you have the authority to do that? Courage, audacity and authority would be the words needed for me (Programme manager, Rotterdam).*

As a result, cities could benefit from:

- Establishing cross-cutting teams with fit-for-purpose mandate and authority;

- Promoting networked governance to develop shared norms and budgeting across the transition domains;
- Facilitating dialogue between digital and sustainability communities to foster mutual understanding.

If taken seriously, the twin transition is not just a dual agenda – it is a **governance transformation**. Cities must evolve into adaptive, learning organisations capable of coordinating across regimes, sectors, and scales. Without this shift, the twin transition risks remaining a rhetorical ambition rather than a driver of systemic urban change.

Appendix 1: The studied cities

City	Status	Population	N of interviews
Barcelona (Spain)	Regional capital	1,6 million (M); 5,3M in province	9
Utrecht (Netherlands)	Regional capital	360 000; 1,37M in province	12
Hamburg (Germany)	City-state	1,9M; 5,4M in metropolis	5
Leuven (Belgium)	Regional capital	100 000; 1,19M in province	7
Rotterdam (Netherlands)	Municipality	650 000; 3.6M in province	8
Camden (UK)	Metropolitan borough	25 000; 8,6M in metropolis	11
Helsinki (Finland)	National capital	630 000; 1.58M in metropolis	10
Lund (Sweden)	Municipality	132 000	10
Tallinn (Estonia)	National capital	460 000; 610 000 in metropolis	7
Tartu (Estonia)	Municipality	93 000	6

Appendix 2: List of source materials

A more detailed overview of the research and findings that informed this Policy Brief is provided in:

- Veiko Lember, Peeter Vihma, Erkki Karo, Marc Kristerson, Rainer Kattel, Anna Kurth, Veronika Bylicki, Joep Crompvoets, Stefan Dedovic, Albert Meijer, Emma Pullen, and Erna Ruijer. 2025. The Twin Transition Puzzle: Can City Governments Align Digital and Sustainability Regimes? UCL Institute for Innovation and Public Purpose (IIPP) Working Paper (WP 2025-12), https://www.ucl.ac.uk/bartlett/publications/2025/jul/twin-transition-puzzle.
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- Peeter Vihma, Veiko Lember and Marc Kristerson (2024) Diverging legitimacies in the twinning of sustainability and digital transitions: opportunity or constraint for the public administration? Unpublished manuscript.
- Albert Meijer, Emma Pullen, and Erna Ruijer (2024). Co-creation workshop on twin transition with the city of Utrecht. Unpublished minutes.