In search of City Government Innovation in Europe: A Scoping Paper on Concept and Approach

City Government Innovation (CGI) Observatory
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Abstract. This scoping paper presents the objectives, the conceptual framework and the methodological approach of the European City Government Innovation Observatory hosted by LSE Cities at the London School of Economics and Political Science as part of the Bloomberg LSE European City Leadership Initiative. It also presents some early findings from surveying a selection of European cities. The Observatory aims to establish a robust evidence base on City Government Innovation (CGI) that offers policymakers actionable insights for improving urban governance and presents researchers a rich empirical fundus for analysing how European cities innovate and function. The Observatory is dedicated to help answer a question central for the future of urban governance: what makes for impactful CGI conditions and performance at the city level?

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1 Introduction

This scoping paper presents the objectives, the conceptual framework and the methodological approach of the European City Government Innovation Observatory hosted by LSE Cities at the London School of Economics and Political Science as part of the Bloomberg LSE European City Leadership Initiative. It also presents some early findings from surveying a selection of European cities. The Observatory aims to establish a robust evidence base on City Government Innovation (CGI) that offers policymakers actionable insights for improving urban governance and presents researchers a rich empirical fundus for analysing how European cities innovate and function. The Observatory is dedicated to help answer a question central for the future of urban governance: what makes for impactful CGI conditions and performance at the city level?

In addressing this question, the CGI Observatory employs quantitative data and methods to analyse CGI conditions, performance and impact. These are shaped by an interplay of antecedent (upstream) politics, policy priorities, institutions, laws and regulations, administrative systems, cultural and economic parameters. The observatory will also centrally consider whether and how CGI contributes to consequent (downstream) public good provision, for example, through better public services and policy outputs, outcomes and impacts. In turn, these can create positive feedback and change antecedents, further improving the enabling environment for CGI. The focus is thus on capturing public sector innovation activities at the city government level while analysing their complex interactions between upstream and downstream factors.

The Observatory is dedicated to the overarching research question of what brings city government innovation in Europe about and makes it impactful in terms of improving residents´ quality of life. This overarching research question immediately points to a whole series of related questions leading up to potential answers. Each of these questions contains critical issues and requires design decisions for establishing the evidence base that is at the heart of the Observatory.

1. How does city government innovation relate to the size and type of cities (the make-up, politics, structure and rules of city government), and regional, state, national and supranational (EU) contexts?
2. What claims can be established on the impact of city government innovation with regards to specific changes to policy outcomes and resident impacts? Under what conditions can city government innovation be most effective?
3. Which policy domains are most representative in or responsive to city government innovation? And which missions, priorities and challenges have resulted in the most successful forms of city government innovation?

This paper first presents a short review of relevant prior work to then introduce a conceptual framework for City Government Innovation (CGI) in the third section. For operationalising the work of the Observatory, we then identify the priority indicators which will underpin future research in the fourth section. Section five sets out our approach to data collection and empirics cutting across introducing the empirical base, the identification and measurement of CGI, and data sources. Section six sets out the analytical approach and its three broad categories from more qualitative-comparative to causal inference methodologies.

2 Prior work and knowledge base

Existing research on what we call city government innovation (CGI) is mostly covered under the broader umbrella of public sector innovation (PSI) at the local level. Such research often focuses on a small number of cases and specific types, capabilities and policy fields of innovation (Cinar, Demircioglu et al. 2024, da Cruz, Ellaway et al. 2024, Robb, Marcoux et al. 2024, Criado, Alcaide-Muñoz et al. 2025). Based on their review of public sector innovation, Criado et al (2025) note that driving innovation capacity is a predominant focus of existing works whereas a much smaller number of cases relate to

missions, policy and service innovation. Only a minority of studies looks at the effects and outcomes of public sector innovation.

Furthermore, while work over the last decades has made some empirical progress, including on the diffusion of innovation in local government (Walker 2006), the study of CGI and its downstream effects and impacts remain underdeveloped. For the latter, broad claims on a relationship between the levels of local government innovation and resident impact have been put forward (OECD 2022) but robust evidence remains particularly insufficient on how, when and whether CGI can directly make a difference for critical policy outcomes addressing specific urban challenges and opportunities.

For higher level, national government public sector innovation, the CGI Observatory can build on well-established conceptual and empirical work (Nauta and Kasbergen 2009, Anheier and Fliegauf 2013, De Vries, Bekkers et al. 2016, Cinar, Simms et al. 2024). Of particular relevance is the OECD's Observatory of Public Sector Innovation (OPSI 2025). More quantitative accounts of public sector innovation at the city level have focussed on innovation capacity (OECD 2019) or country specific dynamics (Walker 2007). In this section, we first introduce relevant public sector innovation framings and concepts that are agnostic with regards to the level of government to then present early quantitative findings from a scoping literature review exclusively focusing on CGI (Appendix A).

2.1 Innovation in the public sector

Beginning with the innovation part of PSI, the OECD/Eurostat (2018) defines *innovation* as "a new or improved product or process (or combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users (products) or brought to use by the unit (process)" (p20). More generally, governance innovations are novel rules, regulations and approaches that, compared to the current state of affairs, seek to address a public problem in more efficacious and effective ways, to achieve better policy outcomes, and ultimately, to enhance legitimacy (Anheier and Korreck, 2013: 83; Anheier and Fliegauf 2013).

Recognising the uniqueness of *public sector innovation* (Moore and Hartley 2008), the OECD (2015) identify three key characteristics including (1) novelty: "innovations introduce new approaches, in the context where they are introduced", (2) implementation: "innovations must be implemented, not just an idea", and (3) impact: "innovations aim at better public results, including efficiency, effectiveness, and user or employee satisfaction" (p14). Regarding the latter, Osborn and Brown (2011) refer to PSI as a normative good which must be positive.

Finally, it is helpful to test whether a clear boundary can be drawn between PSI and other governance factors that may lead to positive societal change and a better provision of public goods. For example, such factors could include policy consistency and enforcement, political will and prioritisation or a reduction in corruption. Scholars have also specifically highlighted the role of transparency (Kaufmann, Kraay et al. 1999), stakeholder engagement (Aggarwal 2023), accountability (Carr Kelman, Brady et al. 2023), decentralization (Ciccone, Vian et al. 2014), conflict resolution mechanisms (Carr Kelman, Brady et al. 2023) and strengthened social capital (Ciccone, Vian et al. 2014) in achieving better policy outcomes. However, it could be argued that each of these factors can be part of PSI if related changes include new approaches. Ultimately, the appropriateness of applying the innovation terminology for changes in public governance may be most contingent on their speed and disruptiveness which we discuss below.

2.2 Innovation characteristics and patterns

A critical discussion about the definition of public sector innovation concerns the interpretation of 'new' and the difference between continuous change or newness which Osborne and Brown (2013) consider as discontinuous change. They suggest to clearly differentiate between continuous development and innovation. 'Pure' or 'nascent' public sector innovation is rare. Many analysts contrast Christensen's (2018) concept of disruptive innovations to more sustaining or incremental.

Disruptive innovations are marked by a set of superior features that gradually supersede the existing governance approaches, tools, or service and make them obsolete. A classic example of disruptive

innovation in the public sector is Estonia's e-Governance system, which replaced traditional, paper-based administration with a fully digital model. Through secure digital IDs, interoperable databases, and online public services, Estonia introduced faster, more transparent, and accessible governance. These superior features have gradually rendered older bureaucratic processes obsolete and set a global benchmark for digital government transformation.

Henderson and Clark (1990) focus on the internal retroactivity of (mostly technological) innovations on knowledge structures, which can be applied to governance as well. In an urban setting, the provision of public goods like education or mobility consists of components and the linkages between them and other institutions dealing with housing, for example. Knowledge about specific parts such as an individual school or road (component knowledge) is less valuable than systemic knowledge (what they call 'architectural innovation'), i.e. the understanding of linkages between the relevant components. Innovations can thus be characterised as

- *incremental innovations*, when they enhance components, linkages and systemic knowledge (e.g. the UK's NHS Electronic Health Records system, which gradually improved data sharing and coordination across healthcare services);
- *radical innovations and revolutionary government change*, when they destroy both knowledge structures (e.g. Germany's reunification and the subsequent overhaul of East Germany's governance system, which completely dismantled existing administrative and institutional structures and replaced them with the democratic, market-oriented framework of the Federal Republic — effectively destroying previous knowledge systems and creating an entirely new governance order);
- *systemic innovations*, as they enhance component knowledge while destroying systemic knowledge (e.g. the creation of the European Union's Single Euro Payment Area (SEPA), which replaced fragmented national payment systems with a unified digital framework — fundamentally transforming financial governance and knowledge structures across member states); and
- *modular innovations*, which enhance systemic knowledge but destroy component knowledge (e.g. the introduction of electronic voting systems in several European countries, such as Belgium and Estonia, which replaced traditional paper ballots (component knowledge) with digital voting modules while enhancing systemic knowledge about voter participation, data management, and electoral efficiency).

The distinction between radical and incremental innovations is useful and also aligns with Moore's (2005) differentiation of break-through innovation and continuous improvement. Radical innovations introduce new approaches and services that see some stakeholders better off, open opportunities for others, and disrupt others yet, even leaving them worse off. Successful innovations of any of the four kinds, however, do not stop here but merely reach a new point of departure for (mostly) incremental innovations during their dissemination. Innovations beget innovations, changes lead to more changes later, recalling Hirschman´s (2015) adage about economic and political development, in this case, the interplay among downstream factors, including their interactions with the macro level.

Considering the above, various patterns or basic types of innovations have been suggested in the literature. While most were developed in a business context, several apply to the actions of city governments and administrations. For example, perspectives from organisational learning utilise the concepts of *exploitation* and *exploration* to understand the dynamics of government innovation (Choi and Chandler 2015,p141). Building on March's (1991) seminal work, they consider exploitation "as refinement activities that imply learning within a given boundary" and exploration as "boundary-spanning activities […] that include the adoption of new technology and management structures" (Choi and Chandler 2015, p141).

Furthermore, two basic patterns of innovations in institutional-organisational contexts are common as they apply to governance (Romanelli 1991). In contemporary organizational and urban governance studies, *refunctionality* and *recombination* represent two complementary modes of public-sector

adaptation and innovation. Refunctionality refers to the process by which existing structures, institutions, or spaces are assigned new purposes or operational roles in response to changing environmental or social conditions. It embodies adaptive reuse and reapplication, as seen in cases such as Hamburg's *Urban Data Platform* or Stockholm's *OpenLab*, where centralised urban data utilises broader data governance collaboration or existing innovation spaces are adapted for city-led experimentation respectively (see Table 1).

In contrast, recombination denotes the creative integration of existing institutional, technological, and social resources to generate new governance capacities or service models. Rather than repurposing individual elements, recombination synthesizes them across administrative and policy boundaries—illustrated by Helsinki's open-data ecosystem, Amsterdam's data-driven welfare services, and Copenhagen's health-oriented urban design (Table 1). While refunctionality emphasizes functional transformation within existing systems, recombination focuses on systemic innovation through integration. Together, they capture the dual logic of modern city governance: renewal through redefinition and innovation through interconnection.

Table 1: Recombination and Refunctionality patterns
Source: Authors

City	Case	Concept Applied	Description
Hamburg (Germany)	*Hamburg – Urban Data Platform*	Refunctionality	Centralized urban data repositor became a multi-stakeholder data governance system
Stockholm (Sweden)	*OpenLab: From innovation hub*	Refunctionality	Innovation space connecting universities and city agencies become embedded in city administration as a policy experimentation framework using digital tools.
Helsinki (Finland)	*Open Data & Smart Services*	Recombination	Combined datasets from housing, transport, and environment into open innovation platforms.
Amsterdam (Netherlands)	*Social welfare analytics*	Recombination	Merged data analytics with social policy to predict and prevent poverty.
Copenhagen (Denmark)	*Healthy City Initiative*	Recombination	Integrated urban design, health policy, and mobility planning for well-being.
Tallinn (Estonia)	*e-Governance ecosystem*	Recombination	Combined administrative databases through digital X-Road system for seamless service delivery.

Another classification, developed by the OECD (2022), makes the differentiation between the directionality and uncertainty of public sector innovation. For that, directionality is "how much top-down steering of innovation is desirable" and certainty "how much uncertainty the organisation can tolerate and how much emphasis to place on stability versus more radical change". These two dimensions of PSI establish a matrix field (Figure 1) of sustaining change (certain/directed), transformative change (uncertain/directed), disruptive change (uncertain/undirected) and optimising change (certain/undirected).

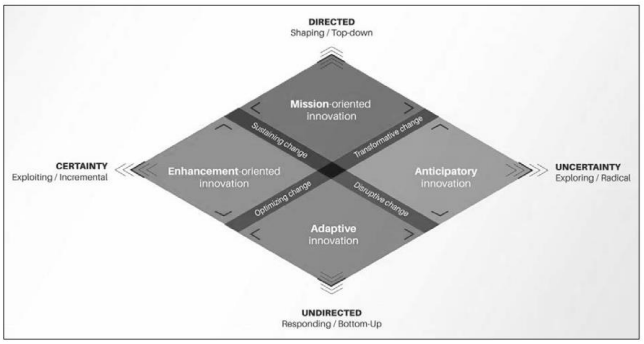


Figure 1: Dimensions of public sector innovation
Source: OECD (2022) / OPSI

An example of the enhancement-oriented / adaptive (relatively low uncertainty, moderate directionality) is Sitra in Finland, a public innovation fund, which uses an innovation-portfolio approach to manage a set of strategic goals (e.g., climate, circular economy, data, democracy) and to undertake user-interview-based "pain-point" analyses (OECD 2022). Although the overarching goals (e.g., "strengthen democracy", "advance circular economy") provide some direction (thus moderate to high directionality), the specific path is more exploratory (hence moderate uncertainty).

The Barcelona Metropolitan Strategic Plan (PEMB) in Spain illustrates the mission-oriented (high directionality, higher uncertainty) approach (OECD 2022). PEMB identified 68 challenges and defined 10-12 "missions" for the region, for instance a mission about local food security aiming for a target (e.g., one-third of food consumption from local products). Here the directionality is high: specific missions with measurable goals (e.g., local food consumption target). But uncertainty is also higher: how exactly to achieve the mission involves many actors, unknown pathways, cross-sector collaboration.

Net-Zero/Climate Missions (conducted in multiple countries) stands for the anticipatory (low to moderate directionality, high uncertainty) type. The OECD (2022) has studied 101 "net zero missions" and 17 in-depth case studies on mission-oriented innovation policies for net zero. These missions often have a direction (e.g., achieve net zero by a certain date) but the paths, technologies, behaviours, regulatory frameworks are *highly uncertain*.

Beyond these concepts, the public sector innovation literature presents a range of other terms and dimensions. Appendix B provides an overview of these and organises key terms broadly in order of a timeline of public sector innovation processes. Alongside the characteristics and patterns above, they establish an important classification system for studying government innovation. While most of them are self-explanatory, the following PSI dimensions require further discussion and are covered below: stages, triggers and types.

2.3 Innovation processes and stages

Various frameworks of public sector innovation discuss the process of innovations, typically along various stages or phases (e.g., OECD Observatory of Public Sector Innovation, Nesta, UNDP, etc.). Most put forward five fundamental stages:

*Problem Identification / Agenda Setting***,** where the goal is to detect challenges and define opportunities for innovation. This typically includes citizen feedback, data analysis, foresight workshops, and challenge mapping, sometimes involving "urban labs" or "innovation units". Examples are:

- Amsterdam (Netherlands) – Uses the *Amsterdam City Data Lab* and *Chief Technology Office* to identify data-driven challenges such as waste management and air quality.
- Paris (France) – The *Urban Innovation Laboratory (Le Lab)* conducts foresight studies on mobility and climate adaptation.
- Tallinn (Estonia) – Uses digital participation platforms for residents to propose issues and solutions for city services (e.g., participatory budgeting).

Ideation / Co-Creation to generate potential solutions with stakeholders through hackathons, design sprints, citizen assemblies, living labs, co-design sessions. This stage often involves collaboration between departments, universities, startups, NGOs, and citizens. Examples are:

- Barcelona (Spain) – The *Decidim Barcelona* platform allows citizens to propose and vote on policy ideas, directly feeding into the city's strategic plan.
- Helsinki (Finland) – The *Urban Lab Helsinki* co-creates digital tools with residents, e.g., mapping green spaces or testing autonomous buses.
- Vienna (Austria) – Uses "co-creation workshops" for smart city projects (e.g., energy efficiency, urban mobility).

Experimentation / Prototyping for testing ideas on a small scale to assess feasibility and value. Activities cover pilots, sandbox environments, prototyping tools, rapid experiments, and design testing. Examples include:

- Copenhagen (Denmark) – *Solutions Lab (SOIL)* runs pilots in housing, climate adaptation, and social inclusion; experiments are small, time-bound, and evaluated rigorously.
- Reykjavík (Iceland) – Tests participatory platforms like "Better Reykjavík", where proposals are piloted before full implementation.
- Helsinki (Finland) – Conducts "anticipatory experiments" (via OECD Anticipatory Innovation Governance model) to test future-oriented policy responses, such as lifelong learning or automation impacts.

Implementation / Scaling with the goal to integrate successful pilots into mainstream city operations. At this stage, the change management, interdepartmental coordination, procurement reform, and capability-building become essential, including the formal adoption into budgets and policies. Examples are:

- Stockholm (Sweden) – Scales up smart mobility solutions (e.g., integrated ticketing, shared data platform) after successful pilots.
- Lisbon (Portugal) – Integrated *Lisboa Participa* (citizen innovation platform) into regular urban governance, now part of budgeting and planning cycles.
- Rotterdam (Netherlands) – Institutionalized innovation via the *Resilient Rotterdam Strategy*, embedding experimental outcomes into long-term city planning.

Evaluation / Learning for assessing impact, capture lessons, and feed insights into future cycles. Activities are typically monitoring and evaluation frameworks, feedback loops, data dashboards as well as reflection on failures and scaling barriers. Examples include:

- Paris (France) – Uses *Urban Innovation Scorecards* to track progress and learning.
- Vienna (Austria) – The *Smart City Vienna Framework Strategy* includes regular monitoring indicators and public progress reports.
- Helsinki (Finland) – Publishes open data on pilot outcomes and citizen feedback to ensure transparency and learning.

Discussion occurs in relation to the mutual exclusivity of these stages as well as how iterative they are. According to OECD (2022) / OPSI, innovation in cities is best managed as a portfolio of initiatives at different stages, not a linear process. Thus, cities often have *multiple processes* running in parallel, each at different stages. For example:

1. Enhancement projects → small service improvements (low uncertainty, often through recombinations).
2. Adaptive projects → pilots to adjust to new challenges.
3. Mission-oriented projects → clear strategic goals but uncertain paths, often involving refunctionalities.
4. Anticipatory projects → exploring futures with high uncertainty.

It is therefore important neither to envision innovation as linear processes, where one stage necessarily leads to the next, nor as an isolated process that takes place relative shielded from other activities and developments.

2.4 Innovation motivators, triggers and origins

Unlike in business settings where the profit motive dominates, innovation in the public sector is more likely the result of the following *motivations and triggers* (Borins 2021):

- strong demands by politics, be it because of elections or legislative pressure, preferably coinciding with new leadership (new political leader elected by a landslide to handle major problems caused by previous administration);
- publicly visible and serious governance failures (e.g., major corruption scandal by government; neglect of public spaces; crime rate; pollution);

- punctuated equilibria (Romanelli and Tushman 1994) with a sudden drop of inertia for example as a result of complex emergencies (e.g., global financial crisis, pandemic; soaring unemployment);
- opportunities either created by new technologies (e.g., e-governance, IT) or otherwise (e.g., EU expansion, prosperity boost, new trade relationships).
- In addition to Borins (2021), we recognise persisting and increasing budgetary pressures that render the status quo untenable.

Finally, it is often impossible to identify where the ideas for public sector innovation came from. However, some have argued that they come rarely from the centre of power (e.g., central government), somewhat more likely from the margins (e.g., civil society at large, advocacy groups, -- they have greater incentives to innovate but lacking power); more likely from organizational locations and moments of overlapping "circles" (e.g., formal and informal networks between and among government departments, administrative units, professions, interest associations, lobby groups, distinct organizational cultures), and where voice capacities for upstreaming into political parties and legislatures exist (Anheier and Fliegauf 2013, Anheier and Korrek 2013)

2.5 Public sector innovation at the city level

Despite the burgeoning literature on public sector innovation, including several systematic reviews of the topic (De Vries, Bekkers et al. 2016, Cinar, Simms et al. 2024, Criado, Alcaide-Muñoz et al. 2025), this body of work is largely tier-of-government agnostic and does not explicitly examine the specific contributions of city government innovation. As a result, a systematic understanding of existing scholarly knowledge on city government innovation remains underdeveloped. Moreover, the public sector innovation literature has primarily unfolded within public administration and public management journals. This is problematic for the study of city government innovation, as many relevant contributions are likely also to be found in fields such as urban studies, environmental planning, and economics, which offer important insights into the role of innovative actions and interventions undertaken by city governments. Nonetheless, it remains unclear where exactly this body of scholarly knowledge lies, and what it focuses on in terms of the types of city government innovation studied, the geographies covered, and the broader evidence on the role of public innovation at the level of city government.

As part of the CGI Observatory, we have started to conduct a scoping review of the scholarly literature on city government innovation. Scoping reviews map the scope and coverage of a body of literature on a given topic, providing a clear indication of the volume of studies available and an overview of their focus, and are particularly useful for examining emerging evidence when it is still unclear what more specific questions could be posed and more precisely addressed by a systematic review (Munn, Peters et al. 2018). Gathering evidence through this process also provides empirical insights into the key components of the CGI Observatory conceptual framework.

Of the 240 articles that we identified as relevant for CGI research, three areas of study are particularly common: environmental sciences and ecology, public administration and urban studies (Table 2). A majority of 63 per cent operate with qualitative methods with either a single or comparative/multiple cases (Table 3). Only 21 per cent use quantitative methods and a small share of 7 per cent are conceptual or theoretical in nature. A closer look at case-study based work reveals a high share of single cases with 40 per cent and a considerable share of two to five cases with 17 per cent. Only 11 per cent of the work included six or more cases.

Table 2: Scoping review of CGI research areas of study
Source: Authors

Area of Study	Count	%
Environmental Sciences & Ecology	87	37%
Public Administration	72	30%
Urban Studies	67	28%
Business & Economics	37	16%
Geography	36	15%
Science & Technology - Other Topics	35	15%
Government & Law	21	9%
Development Studies	10	4%
Social Sciences - Other Topics	9	4%
Transportation	8	3%

** Areas of study are not mutually exclusive. Therefore, counts do not sum to 240 and percentages to 100%, as some articles can have multiple areas of study.*

Table 3: Scoping review of CGI research methods and number of city cases
Source: Authors

Data item category	Category	Count	%
Research method	Quantitative: observational	23	10%
	Quantitative: quasi-experimental	23	10%
	Quantitative: experimental	3	1%
	Qualitative: single case study	81	34%
	Qualitative: comparative/multiple case studies	70	29%
	Methodology unknown	24	10%
	Non-empirical (i.e. theoretical or conceptual work)	16	7%
Number of cities included in study	1	93	40%
	2-5	41	17%
	6-20	9	4%
	21-50	4	2%
	51-100	3	1%
	101+	9	4%
	Unknown	65	27%
	Non-empirical (no cities studied)	16	7%

A closer look at the geographies which are covered by the reviewed reveals a considerable focus on Europe followed by Asia and North America (Table 4). Considering only studies that include cases from Council of Europe cities, Table 5 reveals the top ten countries (with Italy, the UK and Germany most utilised) and cities (with Rotterdam, Barcelona and Copenhagen cases used most) covered.

Table 4: Scoping review of CGI geographies
Source: Authors

Data item category	World Region	Count *	% *
Geography (continent only)	Asia	45	19%
	Africa	4	2%
	Europe	107	45%
	Oceania	8	3%
	North America	42	18%
	South America	12	5%
	None	38	16%

** World regions are not mutually exclusive. Therefore, counts do not sum to 240 and percentages to 100%, as some articles cover multiple world regions.*

Table 5: Scoping review top 10 European countries and cities covered
Source: Authors

CGI Research Cases - Top 10 European Countries	Count	CGI Research Cases - Top 10 European Cities	Count
Italy	35	Rotterdam	7
United Kingdom	32	Barcelona	7
Germany	24	Copenhagen	6
Spain	20	Amsterdam	6
Netherlands	20	Vienna	4
Sweden	11	Turin	4
Denmark	11	Stockholm	4
Finland	9	Manchester	4
France	8	Madrid	4
Belgium	6	Glasgow	4

2.6 Knowledge gaps

There are several glaring and interrelated gaps in our understanding of CGI. The first are conceptual in nature. For one, there is neither a widely accepted definition of CGI nor a unified framework for studying it. Boundaries between policy and governance innovation, technological innovation, and organisational innovation remain blurred. Most diffusion theories come from private-sector or technology fields, so that how urban governments adapt, learn, and imitate from one another (especially across national and political contexts) is under-theorized. Finally, there is limited understanding of how institutional capacity, bureaucratic culture, and political leadership jointly shape innovation readiness.

The second gap is about the available empirical base. Longitudinal studies are limited, and most research focuses on single-case or short-term innovations. We lack evidence on the institutionalisation and sustainability of urban government innovations over time. Then there is a paucity of comparative research. While most studies in CGI are based in North America and Europe, there is little of explicit comparative work. Next are understudied actors and networks like mid-level bureaucrats, civic tech groups, public-private partnerships or the role of informal governance networks (e.g., community leaders, NGOs, data intermediaries). These remain poorly mapped.

Third, there are methodological gaps caused by several factors: an overreliance on qualitative case studies that are rich in context but often lack comparability or generalisability; quantitative and mixed-methods research on the effectiveness of innovations is limited; many studies assess innovation activity (e.g., number of new projects) rather than impact (e.g., improved equity, efficiency, or sustainability); few use standardised indicators or metrics to compare across cities; and despite the growth of smart city datasets, few studies systematically link governance innovation to urban spatial patterns (Rode 2018) or citizen-level outcomes. For example, is it the case that cities that pursue CGI in response to considerable budgetary constraints can stabilise or improve targeted outcomes?

Fourth are practical and policy gaps due to a limited understanding of why certain innovations fail to scale within or across cities and other succeed. More research is needed on how bureaucratic inertia, political turnover, and interdepartmental silos hinder innovation. Moreover, despite the popularity of participatory governance, we know little about how citizen engagement truly shapes CGI design and legitimacy. Finally, digital innovations often reproduce inequality or surveillance risks; yet the social justice implications of urban innovation remain understudied.

At the same time, as we will point out, there are rich methodological literatures on innovations and impact assessment (Vilys, Jakubavičius et al. 2015, Edler, Cunningham et al. 2016, Uyarra, Edler et al. 2016), which we can mine for filling the knowledge gaps. What is more, there are indicator systems in place for some of the upstream and downstream performance measures that can help build a basis for a future evidence base. Irrespective of available indicators, significant gaps in data coverage remain nonetheless Therefore, planned surveys of CGI are necessary to fill in the most glaring information missing on how, why and to what effect European city governments innovate.

Ultimately, this is not only about research but possibly about practice gaps. As van Gestel and Grotenberg (2021) observe, innovation in public sector settings may be a field of big ambition but at the same time also one with a scarcity of bold actions. Therefore, we will put emphasis on the research-policy-action interface and engage with broad cross-sections of policymakers and practitioners, including those from neglected professions, networks and communities.

3 City Government Innovation: Towards a conceptual framework

Building on the above, below follows an adaptation of public sector innovation for the specific case of its application at the city level. We refer to this as City Government Innovation (CGI).

3.1 Defining City Government Innovation (CGI)

With city government, we primarily refer to a singular entity that governs the city. However, this does not only include the static structures of government but its processes and the wider city-level public administration. This perspective establishes an important relationship between city government and urban governance. Whereas the first is exclusively made-up by the local state (which we focus on), urban governance follows the broader urban affairs focussed definition of governance as the "sum of rules and regulations (…), processes as well as structures (…) justified with reference to a public problem" brought about by state and non-state actors (Enderlein et al. 2010).

Considering the above and applied to the CGI Observatory, *City Government Innovation (CGI)* is then defined as the intentional creation, development and implementation of novel ideas, processes, policies, services, technologies or governance models by city and urban governments that aim to improve urban value (discussed below) and where possible lead to efficiency and effectiveness gains. In this context, novelty refers to what has not been done before within a given context (geography, policy domain or otherwise) or is something that is perceived as such by people in the city (see distinction between re-functionality and re-combination above). CGI also occurs along a continuum rather than in binary terms (see classification of innovations below).

It is important to re-emphasise that CGI has limited overlap with innovation policy where governments primarily act as enabler of innovative activities outside government (Muzyka and Hodgson 2018). This is particularly important at the city level where innovation policy has strong associations with innovation clusters and industrial development which is not included here. Instead, CGI positions government as in-house producer of innovation itself (De Vries, Tummers and Bekkers 2016; Sørensen and Torfing, 2011).

Essentially, CGI is about the local state doing things in a new and different way to achieve better outcomes for cities. More specific to Europe is the key element of innovation about achieving greater speeds of change and thus faster delivery.

3.2 The aim of CGI

Most definitions of public sector innovation centrally incorporate aims linked to *governance performance* or how well public problems are managed. For example, it may be in support of 'good governance' defined as "an effective, efficient, and reliable set of legitimate institutions and actors engaged in a process of dealing with a matter of public concern, be it in the field of financial markets, health care, security, or migration, and across local, national and international levels" (Anheier and Alter 2016). The above definition for CGI refers to aiming for efficiency and effectiveness gains.

What sets it apart from the wider aims of public sector innovation is an explicit aim to improve *urban value*. For the purposes of the Observatory, we define urban value as a normative, context specific concept. Urban value is the collective benefit generated through the interplay of public institutions, city stakeholders, shared spaces, and the relational qualities of urban life. It builds on Moore's (2013) and Bozeman's (2007) definition of public value with a focus on collective benefit but specifically arises from 'cityness', i.e. the proximity of urban functions, the density and complexity of urban systems, the openness of public space, and the social mix and diversity of people and practices that make a city inclusive, prosperous and sustainable.

Examples of contributions to urban value include advancing the affordability of housing, improving city access through better public transport or the creation of socially inclusive public spaces. By contrast, urban value may be compromised by public policy leading to ghettoisation and gated communities, a significant increase in motorisation and private car use or the privatisation of public land.

3.3 Framework for the study City Government Innovation

For studying CGI, we build on a heuristic framework for public sector innovation (Figure 2) put forward by De Vries et al (2016). Their framework operates with three main verticals over a time axis: innovation antecedents, types and outcomes.

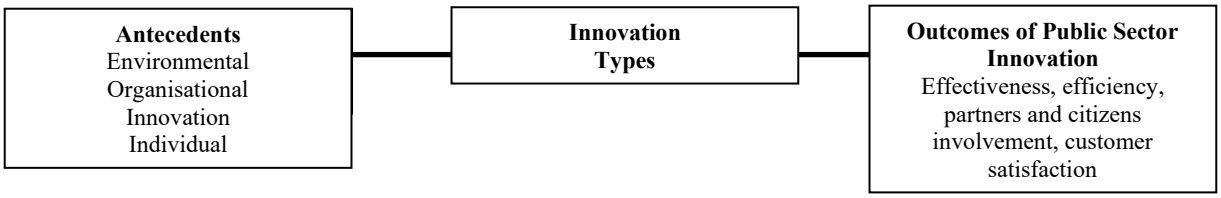


Figure 2: Heuristic framework for public sector innovation
Source: simplified based on De Vries et al (2016)

These three verticals are adopted and adjusted to the requirements of the CGI Observatory in the following way (Figure 3 and Figure 4):

- Vertical 01 (upstream) includes innovation antecedents across territorial scales and based on a multi-level governance perspective critical for positioning public sector innovation at the city level. Antecedents also include the level of city autonomy and political dynamics as well as motivators and triggers for change such as opportunities, challenges and problems.
- Vertical 02 (core activity) considers not only innovation types but their interaction with innovation competencies and innovation capacity within city government. City level innovation capacity is thus moved from the upstream to the core vertical. CGI actions involve and at the same time activate tools of government (policy instruments and service provision) which then impact on public goods provision.
- Vertical 03 (downstream) operates with public goods provision and differentiates between changes in outputs, outcomes and resident impact while centrally considering a contribution to urban value.

Furthermore, our framework considers critical feedback flowing from public goods provision to the antecedents of city government innovation. These include, for example, policy outcomes in the form of better digital infrastructure which change the multi-level governance antecedents or resident impacts which inform the composition of city governments through the election of city leaders and governments.

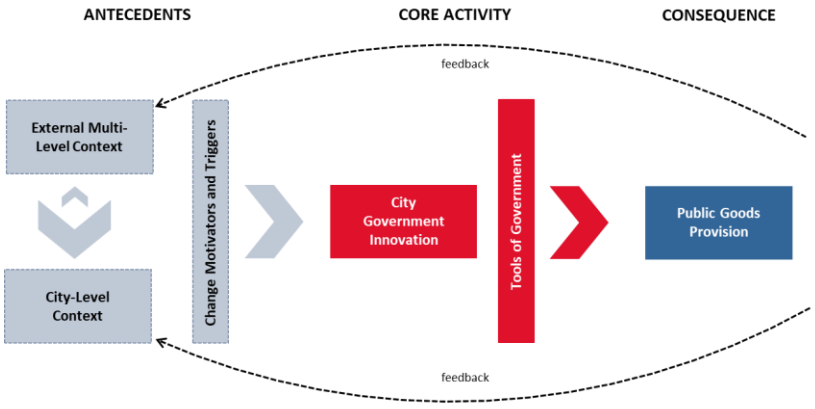


Figure 3: Simple Conceptual Framework
Source: Authors

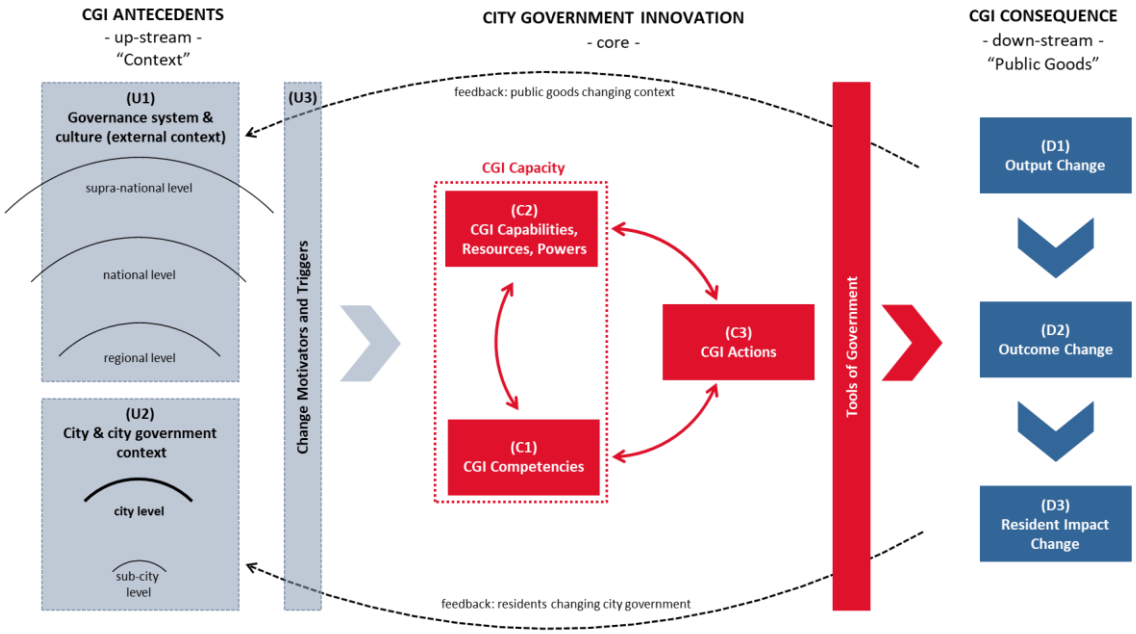


Figure 4: Detailed Conceptual Framework
Source: Authors

Our detailed conceptual framework (Figure 4) differentiates three components of the CGI core. Besides *CGI action types* as defined below, we capture two additional components: First, *CGI competencies*, defined as the specific knowledge, skills, attitudes, and/or behaviours that individuals need to action city government innovation. Second, CGI *capacity* defined as the structural and systemic potential of a city government to support innovation. It applies the broader notion of state capacity to the specific context of government innovation in cities. It encompasses CGI competencies but also dynamic capabilities, resources and budgets, and leadership commitments that allow innovation to emerge, grow, and be sustained over time.

3.4 Types of CGI Action

The CGI Observatory operates with six *CGI action types*. Table 6 presents this bespoke thematic classification based on their actual content and locus in the context of city government, alongside offering a definition and recent examples. This classification builds on common differentiations in the public sector innovation literature such as between organisational, process and product innovation (Walker 2006, De Vries, Bekkers et al. 2016, OECD/Eurostat 2018, Chen, Walker et al. 2020). A detailed taxonomy on CGI actions is presented in Appendix C1 and was tested with two prominent databases of public sector innovations: the OECD OPSI Case Study Library with 117 cases and actions collected by the European Innovation Council with 68 cases. This confirmed a coherent assignment of all cases based on this taxonomy (Appendix C3).

We acknowledge that there are instances in which a specific CGI action is difficult to classify exclusively as one or another type. This is particularly the case when involving digital and data driven innovation which often blends into product innovation as well as various other process innovations. Still, following robust testing of CGI actions covered in the literature and our inventory practice cases confirms the usefulness of this heuristic to capture CGI and support our analysis. For example, of the 240 articles that are part of our scoping review (Appendix A), we were able to conclude that most of them were investigating Type 2 – city administrative and organisational innovation (31%) and Type 6 – city service innovation (27%). Of the 60 cities that replied to the ECLI Expression of Interest Survey (Appendix E), innovation activities over the last 15 years were rated the strongest for Type 1 – democratic and civic innovation. The greatest variation in innovation strength was recorded for Type 4 – digital and data-driven innovation.

Table 6: CGI action types
Source: Authors

	Type	Definition	Recent examples	Literature (including non-urban)
Process Innovation	(1) Urban democratic and civic innovation	New processes or institutions that reimagine and deepen the role of city citizens and residents in city governance by aiming to increase opportunities for representation, participation, deliberation and influence.	citizen engagement dashboards, participatory budgeting, citizen assemblies, co-creation with citizens	(Blijleven, Hulst et al. 2019, Elstub and Escobar 2019, Smith 2019, Sørensen and Vabo 2020)
	(2) City administrative and organisational innovation	New structures or processes aiming to reshape how city governments organise their activities, manage public affairs and coordinate among different urban governance actors.	internal process improvements, new workforce models, new governance models	(Romanelli 1991, Vigoda-Gadot, Shoham et al. 2005, Matthews, Lewis et al. 2009, Ansell and Torfing 2014, De Vries, Bekkers et al. 2016, Rode 2018, Cairney and Toomey 2024)
	(3) Urban finance and procurement innovation	New ways of mobilising, structuring, and allocating financial resources and of acquiring goods and services for public purposes in cities.	outcome-based procurement, private action financing and new own-source revenue streams	(Bailey, Valkama et al. 2010, Lember, Kalvet et al. 2011, Gartner 2015, Vola, Gelmini et al. 2023, Manta and Mansi 2024)
	(4) City-level digital and data-driven innovation	New use of digital technologies and data analytics aiming to transform how city governments design policies, deliver services, and make decisions.	predictive analytics, evidence-based decision-making, data-sharing platforms, open data, AI, digital services	(Dunleavy, Margetts et al. 2006, Criado 2021, Väyrynen, Helander et al. 2022, Mergel, Dickinson et al. 2023)
Product innovation	(5) Urban policy and regulatory innovation	Novel policy frameworks, regulatory, economic and information-based policy instruments to respond to the complex and evolving challenges of contemporary urban development.	agile policymaking, novel economic policy instruments, behavioural/nudging policy	(Ben-Joseph 2005, Moulaert, Martinelli et al. 2007, Rode, Heeckt et al. 2021)
	(6) City service innovation	The introduction of novel or significantly improved city services, delivery methods, or ways of interacting with residents aiming to create value for users and providers.	citizen-centric service design, process automation, public service contracting	(Albury 2005, Chen, Walker et al. 2020) (Windrum and Koch 2008)

3.5 Public goods and policy domains

For the third vertical of downstream public goods provision, the CGI Observatory utilises the most relevant urban policy domains and related output and outcome changes resulting from CGI activities. Prior research (OECD 2019) has already established the broad general areas and specific policy domains (Table 7), which our approach builds on.

Table 7: Policy domains identified in OECD/Bloomberg Survey
Source: OECD (2019)

General Area	Policy Domains	Cities
Urban development	Transport/mobility, land-use – zoning, built environment, blight, housing, waste, sanitation, sewage, water – public works	Austin, Cape Town, Detroit, Georgetown, Indianapolis, Jersey City, Ljubljana, Louisville, Memphis, Mobile, Oklahoma, Palermo, Peoria, Philadelphia, Quillota, Reykjavik, Rochester, San Jose (CA), Santiago de Chile, Seattle, Syracuse
Economic development and environment	Economic development, labour market (jobs and skills), tourism, environment/climate change	Akron, Aurora, Charlotte, Chelsea, Curridabat, Denver, Fort Collins, Grand Rapids, Jerusalem, Lansing, Lexington, Long Beach, Madrid, Medellin, Minneapolis, Oakland, Paris, Paterson (NJ), Riverside, Saltillo, Sintra, South Bend, Turin, Walnut Creek
Socio-cultural development	Social welfare/social services, policing and law enforcement, health, education, social inclusion and equity, culture, homelessness	Alexandria, Anchorage, Athens, Baltimore, Bilbao, Chattanooga, Cincinnati, Durham, Houston, Huntington (WV), Irving, Kansas City, Los Angeles, Montreal, New York, Rio de Janeiro, Seoul, Tacoma, Toronto, Utrecht, Wellington
Administration and governance	Digital governance, internal process improvement	Beer Sheva, Braga, Chicago, Fort Lauderdale, Glendale, Inverness, Milan, Orlando, Otsu City, Rotterdam, Saint Paul, Sao Paulo, Tel Aviv

Note: Based on Question 1.5 "Which two policy areas would you say are most prioritised in your municipality's innovation work?". The table is based on cities' first option.

Given the multi-level governance exposure of most of these policy domains, it is helpful to also consider the OECD's (2025) well-established Classification of the Functions of Government (COFOG). Based on these two inputs and reflecting typical urban policy domains as used by city halls across Europe as well as those potentially most responsive to CGI action, we work with the following CGI public goods categories and CGI policy domains (Table 8).

Table 8: CGI Policy Domains
Source: Authors adapted from OECD (2025)

Main Public Goods Category	COFOG Category with broad groups (divisions) and sub-items (groups)	CGI Main Public Goods Category	CGI Policy Domains
Economic Development	- Economic affairs--General economic, commercial and labour affairs; agriculture, forestry; fishing and hunting; fuel and energy; mining, manufacturing and construction; transport; communication; other industries, R&D related to economic affairs; economic affairs n.e.c.	01 Urban Development	1.1 Housing 1.2 Transport 1.3 Permitting 1.4 Planning 1.5 Economic Development
Social Development	- Housing and community amenities--Housing development; community development; water supply; street lighting; R&D related to housing and community amenities; housing and community amenities n.e.c. - Health--Medical products, appliances and equipment; outpatient services; hospital services; public health services; R&D related to health; health n.e.c. - Recreation, culture and religion--Recreational and sporting services; cultural services; broadcasting and publishing services; religious and other community services, R&D related to recreation, culture and religion; recreation; culture and religion n.e.c. - Education--Pre-primary and primary education; secondary education; post-secondary non-tertiary education; tertiary	02 Socio-cultural development	2.1 Education 2.2 Health 2.3 Social Services 2.4 Civic life 2.5 Culture 2.6 Emergency Services 2.7 Public Order, Policing and Criminal Justice

	education; education not definable by level; subsidiary services to education; R&D Education; education n.e.c. - Social protection--Sickness and disability; old age; survivors; family and children; unemployment; housing; R&D; social protection and social exclusion n.e.c. - Public order and safety--Police services; fire-protection services; law courts; prisons; R&D related to public order and safety; public order and safety n.e.c.		
Environmental Development	- Environmental protection--Waste management; water waste management; pollution abatement; protection of biodiversity and landscape; R&D related to environmental protection.	03 Environment	3.1 Environment 3.2 Energy 3.3 Water 3.4 Waste
Enabling Administration and Governance	- General public services--Executive and legislative organs, financial and fiscal affairs, external affairs; foreign economic aid; general services; basic research; R&D related to general public services; general public services n.e.c.; public debt transactions, transfers of a general character between different levels of government. - Defence--Military defence; civil defence; foreign military aid, R&D related to defence; defence n.e.c.	04 Urban governance and administration	4.1 Democratic Engagement 4.2 General Administration

Analysing the 240 articles of our scoping review based on the above CGI public goods categories and policy domains (Appendix A) indicates a to be expected focus on the urban development category with 162 articles followed by urban governance and administration with 116 articles. Top policy domains which articles focus on include general administration (90), environment (69) and planning (54). The same top three emerges from the ECLI Onboarding Survey of 32 cities (Appendix E).

3.6 Summary

Based on a review of prior work and the innovation literature as it relates to CGI, we have developed the conceptual framework displayed in Figure 3 and 4 above. The framework includes different types of variables and outcome measures that will be operationalised in the proceeding sections. To relate this framework of antecedents, core CGI and its consequences to specific examples, Appendix C2 presents an overview of how this CGI logic model operates for specific cases representing the six different CGI action types.

At the same time, our framework also makes clear that we are neither dealing with a top-down model nor with crisp causal mechanisms. Instead, there are several levels of variations involved that affect other levels below and above. For example, macro-level variables influence lower-level behaviours, and vice versa. Given the complexity of the conceptual framework, where are dealing with various sets of independent, intervening, dependent, outcome and control variables, will require indicators that render the analytic models tractable and parsimonious. We will address these issues the following sections.

4 Priority Indicators

This section covers cross-cutting considerations for each of the three verticals of upstream, core and downstream CGI indicators.

4.1 Vertical 01 – Upstream Indicators

The upstream indicators cover the most relevant antecedents to city government innovation cutting across the external context, the city level context, and change motivators such as opportunities, challenges or problems that may act as innovation triggers. Macro-level or upstream enablers and barriers are structural factors that shape cities' capacity, incentives, and legitimacy to innovate (Hartley, Sørensen, & Torfing, 2013; OECD, 2017). The main dimensions of these macro influences are political–institutional, economic–financial, sociocultural, technological, and global–environmental.

Political and institutional structures are central enablers. Decentralized systems grant cities fiscal and administrative autonomy to experiment (Walker 1969, Berry and Berry 1990, Kuhlmann and Wollmann 2019). Stable leadership and intergovernmental collaboration further sustain long-term agendas (Sørensen and Torfing 2011, Ansell and Torfing 2014). However, centralisation, short electoral cycles, and weak coordination between governance levels remain key barriers. City-to-city networks, such as C40 and ICLEI, diffuse innovative practices and build municipal capacity (Bulkeley 2013), yet smaller or less-connected cities often struggle to access these platforms.

Economic and financial conditions determine material capacity for innovation. Fiscal autonomy and innovation-friendly procurement frameworks enable investment in pilot projects and partnerships (Mazzucato 2013, Uyarra, Edler et al. 2014). In contrast, austerity, rigid budgets, and intergovernmental dependence restrict experimentation (Swianiewicz 2010). Innovation ecosystems with universities and private firms further enhance municipal innovation through knowledge spillovers (Goldsmith and Eggers 2004).

Sociocultural and normative factors—such as administrative culture, trust, and civic engagement—strongly affect innovation legitimacy. Cultures that value learning and tolerate risk-taking promote experimentation (Borins 2001, Hartley 2005). Bureaucratic inertia and fear of failure inhibit it (DiMaggio and Powell 1983). Civic participation and social trust also act as enablers by enhancing co-creation and legitimacy (Moore 1995, Hartley, Sørensen et al. 2013).

Technological and infrastructural readiness provides an increasingly important foundation. Digital infrastructure, open-data policies, and interoperability standards facilitate data-driven governance and smart city initiatives (Meijer and Bolívar 2016, Janssen, Charalabidis et al. 2017). Conversely, digital divides, weak data governance, and vendor lock-in constrain municipal adaptability (Kitchin 2014, OECD 2020).

Finally, *global and environmental drivers* shape innovation incentives. International frameworks such as the Sustainable Development Goals and the Paris Agreement encourage local experimentation and access to transnational funding (Bulkeley 2013, Hajer and Dassen 2014). City networks foster peer learning (Smeds and Acuto 2018), while global crises such as pandemics or climate shocks can accelerate adaptive innovations (Leck and Roberts 2015). Yet donor dependency and unequal access to global networks risk producing short-lived or externally driven reforms.

Overall, macro-level enablers—including decentralization, fiscal flexibility, open civic culture, robust digital infrastructure, and transnational collaboration—create the systemic conditions for innovation. Barriers such as centralization, austerity, risk aversion, and inequality in technological and network access constrain it. These contextual forces do not determine innovation outcomes but form the environment within which cities learn, experiment, and evolve (Hartley, Sørensen et al. 2013, OECD 2021).

External context (U1)

The external context is covered by eight set of indicators (Table 9). Our entry point to describing the external context at the national level and capturing this with a robust set of indicators is the Berggruen Governance Index (BGI) (Anheier, Lang et al. 2023). The index's approach to governance sees *public goods provision* resulting from the interplay of *democratic accountability* and *state capacity*. State capacity is positioned as the crucial link mediating between democratic accountability and public goods provision. Whereas state capacity is about the state administration's ability to generate revenue, to organise collective action, and to achieve stated goals, democratic accountability refers to the process by which governments are selected, monitored, held accountable, and replaced. Each BGI dimension is broken down into subdimensions, which are constructed with the help of individual indicators.

The overall framework of this approach can be depicted as the Governance Triangle (Figure 5). The promise is that the framework can help assess the different pathways by which democratic accountability and state capacity influence public goods provision. Unlike other governance indicators, which report a single estimate of a country´s overall performance, the BGI allows to examine the relationships within and between each part of the triangle. The model can be analysed over time and cross-nationally as well as for specific regions, regime types, level of economic development, or the experience of crisis episodes

of different kinds. For the purpose of understanding CGI and how the wider governance context affects regional and local conditions, processes and impact, we utilise a modified version of the BGI emphasizing variables of particular relevance to urban settings.

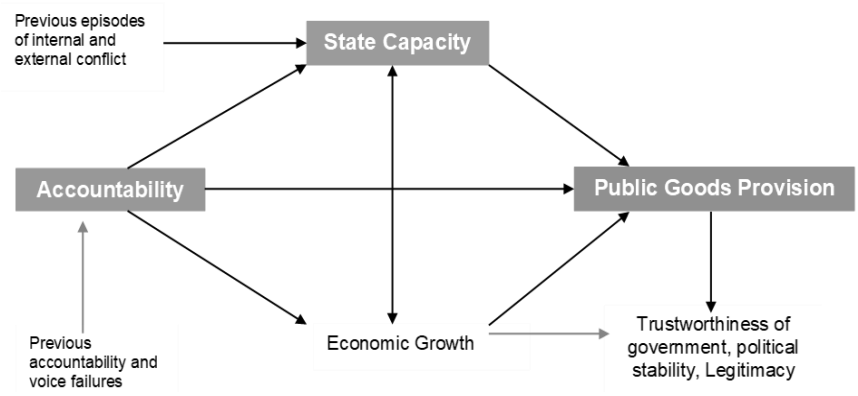


Figure 5: The Governance Triangle
Source: Berggruen Governance Index 2022

Whereas the BGI captures a country´s overall governance performance (U1.1-1.3 in Table 9), several other indicators or sets of indicators capture relevant aspects of the upstream environment for CGI. They relate to the political system and administrative traditions, political culture, legal complexity, administrative law and risk taking, and local government autonomy.

Aspects of the *administrative and regulatory system* reflect longstanding legal traditions and practices, which can shape the preferences and actions of city governments. Therefore, we are looking for a way to classify administrative traditions or cultures for comparative purposes to understand the general disposition of public administration system at the national level, assuming that local levels would largely follow the same pattern. Jugl (2025) uses multiple indicators as input to an exploratory factor analysis (principal component) that yielded two factors: First, citizen orientation with the degree to which public administration is oriented towards what citizens want or towards what politicians and bureaucrats want; and second, structural concentration with the degree to which public administration is uniform with strong vertical centralization or dispersed vertically (i.e., decentralized and horizontally fragmented).

The set of *political culture* indicators measures general value dispositions and attitudes of the population towards the political process, leadership preferences, cultural background, civic participation, voting behaviour, and trust held in political institutions, various levels of government, the law etc. The range of variables and the data are taken from regular population surveys. Knowledge of political, civic and cultural patterns, as measured by the sentiments of the population, are important for understanding the sociological context of CGI, and how they might be perceived, facilitated and hindered.

Next to such value and behavioural characteristics of the population are institutional aspects of the *legal, regulatory and administrative system* in which CGI takes place, including the degree of risk-taking. The indicators for legal complexity and risk-taking provide a broad overview of the administrative and regulatory challenges of facing businesses and administrative systems. It takes account of constraints on government powers, case duration, case flow balance, and civil justice usability.

Whereas the administrative traditions typology tells us about the general disposition of bureaucracies, the *Local Autonomy Index - LAI* (Ladner, Keuffer et al. 2025) measures the degree of autonomy enjoyed by local governments. This is an important index as it tells us if city government are actually allowed to innovate, experiment, or act independently of national or regional governments. In other words, the LAI is a measure of the city governments´ legislative and executive freedom and constraint in their response to actual and perceived urban problems, and hence decisions and actions about innovations.

Table 9: External Context indicator sets
Source: Authors

U1 Indicator Set	Description	Level	Indicators #
U1.0 Country Characteristics	Country characteristics: population size, GDP, GDP per capita, inequality	NUTS 0	8
U1.1 Democratic Accountability	Covering institutional, electoral and societal accountability	NUTS 0	38
U1.2 State Capacity	Covering fiscal, coordination and delivery capacity	NUTS 0	15
U1.3 Public Goods Provision	Covering social, economic, environmental and infrastructural public goods	NUTS 0	31
U1.4 Political System and Administrative Traditions	Political system, state tradition, politization, personal system, accountability, fragmentation and coordination	NUTS 0	3
U1.5 Political Culture	Voting, political and civic participation, institutional trust, preference for democracy, perceived performance of public institutions	NUTS 0	21
U1.6 Legal Complexity. Law and Risk Taking	Employing readily available proxy indicators of constraints on government powers, case duration, case flow balance, and civil justice usability, legal predictability, regulatory impact assessments and budget transparency.	NUTS 0	4
U1.7 Resilience and Future Proofing	Public health preparedness, climate, economic, tech and AI, conflict and energy stability	NUTS 0	9
U1.8 Local Autonomy Index (national level)	Legal autonomy, access, policy scope, political discretion, financial autonomy, organisational autonomy, non-interference	NUTS 0	11

City-level context (U2)

The city-level context is captured by four sets of indicators cutting across city characteristics, the governance system, city government and administration and descriptors for the mayor (Table 10). As above, the assumption is that any of these indicators represent conditions which we expect play a role as antecedents to city government innovation. In total, these indicator sets add up to 107 individual indicators.

Table 10: City-level context indicator sets
Source: Authors

U2 Indicator Set	Description	Geographic Level	Granularity Level 1 Indicators #	Granularity Level 2 Indicators #	Granularity Level 3 Indicators #
U2.0 City Characteristics	Population, territory and urban form, social structure, economic composition	NUTS 2	19	19	19
U2.1 City Governance System	Governance structure, city electoral system, autonomy and legal authority	NUTS 2	10	10	15
U2.2 City Government and Administration	Governance quality, leadership and strategy, people, financial capacity, transparency and accountability, partnerships, processes, political composition	NUTS 2	0	0	21
U2.3 Mayor	Personal profile, education and background, leadership, politics, and tenure	NUTS 2 Mayor	0	0	16

**See Section 5.1 for the definition of granularity levels.*

Change motivators and triggers (U3)

Three change motivators and triggers of opportunities, challenges and problems are considered here (Table 11). They each play different roles and lead to different rationales for activating city government innovation. First, opportunities are conditions external to city government that invite or open space for CGI and lead to proactive innovation approaches. Examples include technology diffusion, socio-economic shifts or civic movement. Second, challenges are structural or systemic pressures that necessitate CGI and lead to reactive innovation approaches. Relevant examples are fiscal, demographic, environmental or geopolitical stressors which make "business as usual" untenable. Third, problems are acute governance failures, inefficiencies or public complaints that force CGI and lead to problem-driven innovation. These cut across crises, scandals, legitimacy crises or performance failures. In addition, we consider the political priorities of a city a central motivator and trigger which can also occur in the absence of specific and obvious opportunities, challenges and problems.

Table 11: Change motivators and triggers indicator sets
Source: Authors

U3 Indicator Set	Description	Level	Granularity Level 1* Indicators #	Granularity Level 2* Indicators #	Granularity Level 3* Indicators #
U3.0 Political city priority	Three city priorities defined by the current administration	City-level	0	0	3
U3.1 Opportunity triggers	Technology, socio-economic transformation, civic and participatory trends, market and industry growth	Multi-level	0	0	19
U3.2 Challenge triggers	Fiscal and economic stress, demographic pressure, environmental stress, social inequality, geopolitical conflict	Multi-level	0	0	25
U3.3 Problem triggers	Public service failure, disasters, emergencies, economic shocks, disruptive events, legitimacy crises, policy deadlock	Multi-level	0	0	37

**See Section 5.1 for the definition of granularity levels.*

Vertical 02 - Core CGI Indicators

CGI Competencies (C1)

Commentators and scholars frequently highlight the importance of individual-level features to advance public sector innovation which include education, motivation, and empowerment (Damanpour and Schneider 2009, Fernandez and Moldogaziev 2013, Miao, Newman et al. 2018). Here, we focus on those that can be directly addressed through educational settings, referred to as competencies and we build on several related studies (Hero, Lindfors et al. 2017, Genari, Faccin et al. 2024).

CGI competencies address the respective needs for each of the five innovation stages introduced above (Section 2.3) while most of them serve multiple stages at the same time. More generally, competencies are strongly associated with what individuals can learn with the objective to permanently change their knowledge, skills, attitudes, and/or behaviours. We identify four core sets of CGI competencies and three sets of higher order innovation skills (Table 12) which informed our CGI priority sub-competencies in Appendix D1. These sets address different seniority levels: M (Mayors), SL (Senior Leaders) and CT (City Teams).

Table 12: CGI Competencies and Higher Order Innovation Skills Indicator Sets
Source: Authors

C1 Indicator Set	Description	Seniority Level	Indicators #
CGI Competencies			
C1.1 Leaderships and strategic competencies	that enable translating ideas into viable and impactful actions	M and SL	5
C1.2 Collaborative and co-creation competencies	that enable integrated governance and policy coherence	M and SL	5
C1.3 Communicative and media competencies	that enable clear messaging and the right choice of narratives and channels	M and SL	6
C1.4 Technical and methodological competencies	that support analysis, experimentation, agile management, digital and data literacy	SL and CT	5
Higher order innovation skills			
C1-A Cognitive dimension	that support ideation, problem-solving, and original thinking	M, SL, CT	5
C1-B Intrapersonal dimension	that shapes motivational, affective, and dispositional capacities enabling individuals to initiate, sustain, and recover creative work across its stages.	M, SL, CT	6
C1-C Interpersonal dimension	that governs an individual's capacity to operate within and across social and organisational contexts to develop and champion ideas.	M, SL, CT	5

CGI Capabilities, Resources and Powers (C2)

For introducing indicator sets and themes representing CGI capacity, we translate the more generic definition introduced earlier to its specific application within the context of the European City Leadership Initiative and its research strand on the CGI Capacity Deep Dive. For that, Rogers, da Cruz et al (2025) refer to the extent to which a city administration can sustainably allocate effort and resources toward innovation. CGI capacity reflects how competencies and capabilities are mobilized over time and is shaped by broader systemic factors such as authority, scale, and context. Importantly, while strong CGI competencies (e.g., skilled personnel) and capabilities (e.g., effective organizational structures and processes) are essential, they do not automatically translate into strong CGI capacity (da Cruz, Ellaway et al. 2024). Therefore, Table 13 identifies four key indicator sets for CGI capacity: CGI competencies, dynamic capabilities, resource base and soft power.

Table 13: CGI Capacity Indicator Sets
Source: Authors based on Rogers, da Cruz et al (2025)

C1 Indicator Set	Description	Level	Indicators #
C2.1 CGI competencies	As above		26
C2.2 Dynamic capabilities	Strategic awareness, adjusting priorities, building coalitions, learning and experimentation, reconfiguring delivery		19

C2.3 Resource base	Financial, infrastructural and human resources available and usable for innovation	13
C2.4 Soft power	Ability to take risks, absorb failure, and push change – related to legitimacy, political majorities and leadership cycles	6

CGI Actions (C3)

Indicators for CGI actions over a given time period are defined for two different units of analysis: first, for the level of city governments cutting across all types of CGI actions and second, for the level of individual, selected CGI actions. Table 14 below introduces a total of 20 indicator sets through which we intend to survey CGI Actions. Seven sets operate with city governments as unit of analysis and 13 with specific actions. Half of the indicator sets are action agnostic the other half action specific.

Table 14: CGI Actions Indicator Sets
Source: Authors

C3 Indicator Set	Description	Unit of Analysis	CGI Action Type Relation	Indicators #
C3.1 Level of CGI activity by type	how active city governments have been across the six CGI action types differentiated for three periods: 2010-2019, 2020-2024, since 2025	City Gov	specific	18
C3.2 Level of CGI activity by subtype	how active city government has been since 2010 for the 32 CGI action subtypes	City Gov	specific	32
C3.3 Initiation of CGI action examples	which examples of CGI actions cities have initiated since 2010 across a list of 96 option plus option to register additional examples	City Gov	specific	96+
C3.4 Number of CGI actions initiated	number of CGI actions initiated across six CGI action types differentiated for three periods: 2010-2019, 2020-2024, since 2025	City Gov	specific	18
C3.5 Crises and emergencies triggers	extent to which CGI actions have been triggered by different types of crises and emergencies, innovation impact of crises and emergencies	City Gov	agnostic	7
C3.6 Resourcing, planning and monitoring of CGI actions	how well CGI actions were supported in terms of budget, time commitments, staffing, planning and monitoring across the six CGI action types since 2010, percentage of staff involved with CGI, staff training for CGI, percentage of budget allocated to CGI	City Gov	agnostic	33
C3.7 CGI evaluation and recognition	level of evaluation and award recognition	City Gov	agnostic	2
C3.8 Scope and Nature of Change	intensity, diffusion, formalisation, innovation character, experimentation level, pace of innovation, exploitation vs exploration, directionality vs uncertainty	CGI Action	agnostic	7
C3.9 Origin and Trigger	internal/external initiation, departmental origin, key triggers, external idea provision	CGI Action	agnostic	4
C3.10 Purpose, Focus and Locus	action type, mission alignment, internal/external stakeholders	CGI Action	agnostic	3
C3.11 Methodology and Process	standardisation, length, stages completed, re-combinations, re-functionality	CGI Action	agnostic	5
C3.12 Resources and Financing	costs, budget allocation, staff level, external funding,	CGI Action	agnostic	5
C3.13 Actors	internal departments, external partners	CGI Action	agnostic	2

C3.14 Monitoring and Recognition	monitoring, awards	CGI Action	agnostic	2
C3.15 Action Type 01 'democracy'	participant eligibility, decision-making authority, selection mechanism, demographic scope, feedback loop, legal codification	CGI Action	specific	6
C3.16 Action Type 02 'organisation'	organisational level, boundary scope, structural change, process redesign, governance ownership, accountability mechanism	CGI Action	specific	6
C3.17 Action Type 03 'finance'	financial scale, instrument purpose, counterparty type, instrument duration, risk allocation, accounting implications	CGI Action	specific	6
C3.18 Action Type 04 'digital'	technology type, ownership model, data source, storage location, compliance framework, automation level, impact assessment	CGI Action	specific	7
C3.19 Action Type 05 'policy'	legal instrument, target actor, instrument modality, policy domain, review clause, territorial scope, authorisation level	CGI Action	specific	7
C3.20 Action Type 06 'services'	target user, delivery channel, service reach, satisfaction measurement, delivery model, unit cost, service relationship	CGI Action	specific	7

4.2 Vertical 03 – Downstream Indicators

Outputs and outcomes of public sector innovation are unpredictable, difficult to measure and to isolate from a complex causal chain cutting across CGI, tools of government and impact. Thus, defining indicators needs to follow a pragmatic rather than exhaustive approach with a key focus on data availability.

Across our downstream indicators of outputs, outcomes and impact, we are interested in the changes of key descriptors over time during which CGI Actions may have made a difference. For our initial analysis, we will primarily focus on outcome indicators which are collected irrespective of any hypothesis for the consequences of specific CGI actions. By contrast, output and impact indicators are established at a later stage and in consultation with city governments that have established claims about impact or have otherwise established relationships between CGI actions and downstream consequences. For both outputs and outcomes, we employ a categorisation by 18 policy domains as introduced in Table 8 in Section 3.5 across the four main public goods categories of (1) urban development, (2) socio-cultural development, (3) environment and (4) administration and governance.

Outputs (D1)

Output indicators describe policy and service output changes that are under the direct control of city government. They relate to the tools of government that may have been affected by city government innovation and capture how specific and controllable outputs of regulatory, economic and information-based policy instruments produce specific results. For example, such outputs include the number of nursery places, public buses or police officers in a city. They also cut across service fees and taxes such as the fee for public sports facilities, parking or public transport. As these policy outputs are identified in relation to specific CGI actions, we do not operate with generic indicators but with city-specific ones following the identification of a hypothesis on CGI consequences.

Outcomes (D2)

By contrast to output indicators, we pre-define outcome indicators to reflect the urban value dimension of CGI (Table 15) and to also assist with the identification CGI Actions (see Section 5.1 below). This requires a prioritisation process for a vast amount of potential domain specific indicators that are often

employed based on a city-specific preference making outcome comparison and data harmonisation difficult.

Selecting priority indicators for each domain required several iterative phases. In the first phase, we identified key indicators for each policy domain with the help of domain-specific urban experts. In the second phase, additional indicators relevant to the public goods dimension from the Berggruen Governance Index were incorporated, followed by a new round of evaluation. During this stage, all indicators were rated based on their relevance, universality and availability.

In the final phase, and in combination with the three highest-ranked indicators from the previous phase, three readily available Eurostat indicators were added to each policy domain. This process resulted in a maximum of six indicators per domain, provided that the Eurostat indicators did not duplicate those already selected.

Table 15: Outcome Indicator Sets
Source: Authors

D2 Indicator Set	Policy Domains	Priority Indicators #
01 Urban Development	Housing, transport, permitting, planning, economic development	15
02 Socio-cultural development	Education, health, social services, civic life, culture, emergency services	18
03 Environment	Environment, energy, water, sewage, waste	15
04 Urban governance and administration	General administration, democratic engagement	6

Impact (D3)

Our impact indicators are treated similarly as the output indicators and are defined once knowledge about CGI Actions, the intentionality of city governments and their policy priorities is established.

5 Data Collection and Empirics

With the priority indicator sets and themes defined, this section presents our analytical approach and first discuss its operationalisation, followed by introducing our data sources.

5.1 Operationalisation

For existing indicators, data and indices, operationalising the Observatory research follows established routes for data collection. The process is more complex for establishing new data for capturing city government innovation competencies, capacity and actions. Below, we first re-confirm our empirical base and units of analysis to then establish the approach for identifying the key CGI components.

Empirical base and units of analysis

For the upstream analysis, the member states of the Council of Europe and selected cities constitute the macro unit of analysis and observation. Depending on the constitutional-administrative structure of a country, a meso-level might become relevant, following EUROSTAT´s classification of regions.

The cities within the region are incorporated into the analysis at three different levels of granularity depending on their involvement with the European City Leadership Initiative (ECLI) up to 2029:

- Level 1: ~700 Council of Europe cities above 100k inhabitants (low level of granularity);
- Level 2: all ECLI invitation cities (~400 cities, medium granularity); and
- Level 3: all ECLI participating cities (120 cities, high granularity).

Table 16 presents how the different levels of granularity translate to servicing key data for each of components of the CGI framework introduced above.

Table 16: Levels of granularity and data depth (a-highest data ambition, b-considerable, c-modest)
Source: Authors

CGI Components	Level 1 (~700 cities)	Level 2 (~400 cities)	Level 3 (120 cities)
U1 – External Context	a	a	a
U2 – City Context	c	b	a
U3 – Change Motivators/Triggers	n/a	c	a
C1 – CGI Competencies	n/a	c	a
C2 – CGI Capacity	n/a	c	a
C3 – CGI Actions	c	b	a
D1 – Outputs	n/a	n/a	a
D2 – Outcomes	b	b	a
D3 – Impact	n/a	n/a	a

Identifying CGI actions

Figure 6 establishes three sets of approaches for identifying CGI action, each associated with one of the verticals of our conceptual framework. Three approaches (A1-3) initially focus on the CGI antecedents, two approaches (B1 and B2) directly target CGI actions and one approach (C) initially identifies CGI outcome changes.

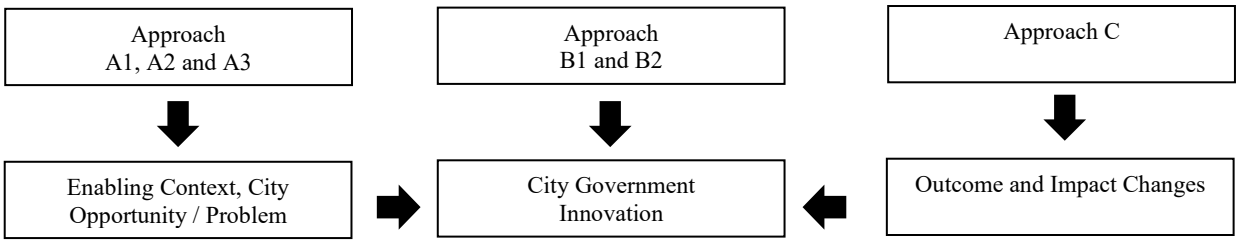


Figure 6: Approaches for identifying CGI
Source: Authors

More specifically, the six approaches operate as follows. For each we detail how they could point towards CGI actions:

- *Approach A1:* Through high-level enabling environments and external contexts at the country level with follow-up research on cities within these countries (including change over time, positive and negative extreme).
- *Approach A2:* Through significant change motivators and triggers such as city opportunities, challenges or problems with follow-up research on whether or not they led to CGI.
- *Approach A3:* Real time / futures approaches of ECLI Cities by cohort identifying opportunities/challenges for which CGI strategies are being developed.
- *Approach B1:* Through direct surveying of city hall leaders and staff on innovation activities and types (surveys evaluated by research team). These will use a combination of long-lists of CGI actions (based on taxonomy in Appendix C1) as well as open ended questions.

- *Approach B2:* Snowballing by connecting with policy domain and city innovation networks as well as innovation delegates in Europe to identifying pioneering cities and through these cities, other cities these are working with, learning from or consider otherwise CGI leaders.
- *Approach C:* Through significant changes to urban value, resident impact and public goods outcomes and then testing whether or not and to what degree CGI lays behind it.

Following the identification of CGI actions, our methodology requires a classification of these actions considering the six CGI action types to enable action-specific, comparative surveying. As there will be actions that may fit two or more types (i.e. the types are not entirely mutually exclusive), we operate with the following hierarchy of principles for assigning types: (1) assigning the type for which the innovation is strongest, (2) if unclear and action includes digital/data innovation assigning Type 04 (digital/data), and (3) if none of the previous and action includes democratic innovation assigning Type 01 (democratic/civic).

Our methodological approach also requires capturing the various characteristics, dimensions and patterns of CGI actions as detailed by the indicator sets presented in Section 4.2. Besides nominal variables, this includes ordinal categories with scales and rankings. For example, the novelty scale (incremental to radical), innovation scope (unit level, number of departments and staff involved) and length of actions belong to the latter. Where units are not pre-defined (e.g. length measured in months), we adopt a Likert scale.

5.2 Data Sources

Data is collected for two periods of analysis: Period A with 2010-2025 for near-term historic analysis and Period B with 2025-2029 for live tracking. Both time dimensions (looking back and contemporaneous) complement each other. Near-term historic approach focusses on ex post analysis with an opportunity to include findings for outcomes and impact while live tracking with real time analysis offers greater access to the genesis of CGI and dependencies on the external context, competencies and capacities.

Three main types of data is collected: secondary data, primary data via surveys and primary data via interviews and other methods.

Secondary data

The following approach facilitates data collection from secondary sources and provides an initial foundation for comparative city analysis prior to conducting city-level CGI data collection.

- Datasets related to antecedents (U1-U3) and outcomes (D2) based on desktop research and accessing existing data repositories. Some data collection is commissioned through third-party data collection.
- Desktop research for core CGI (C1-C3) includes scans of existing archives, including best practice cases and awards, and references in research, media and other publications.
- Additional CGI can be identified by utilising AI and vetting according to the above definitions.

Primary data via surveys

Survey cities include pilot cities, those participating in ECLI and applying for ECLI. In addition, surveys are conducted with selected non-ECLI city officials and experts.

As already presented for the CGI Action Indicators above, we will approach cities utilising a two-tier survey structure:

- *Tier 1:* Aggregate-level questions cutting across all CGI actions since 2010. For this, key informants within each city government (up to three) are asked to provide summary data across all innovation actions. The results will be triangulated for verification. This survey establishes a macro-level view without requiring detail on each individual action.
- *Tier 2:* Exclusive questions for 1 to 2 representative cases around critical CGI actions. Here, innovation leads are asked to complete the detailed questionnaire. The specific case will be selected in consultation with the city considering the level of innovation activity, the most

impactful or recent innovation as well as the perceived impact. This survey will provide qualitative and quantitative data on specific cases.

All surveys will be digitally hosted and offered in local languages. They will operate with pre-fill and modularised approach to reduce survey time and effort as much as possible. Respondents are able to skip sections not relevant to their CGI action. Furthermore, a smart survey logic limits follow-up questions if the answer to a previous question warrants it.

Survey respondents within survey cities included elected officials and city employees at different levels of seniority. For both tiers, and for particularly time-constrained respondents, a short 'pulse' version of the survey with only 5 minutes engagement time considers on the most relevant aggregate indicators and high-level questions about one innovation.

While ECLI cohort cities will have an inherent incentive as part of a growing network to participate in this survey, other cities will be provided with other benefits. These include a summary report with benchmarking insights, personal follow-up communication once key policy briefs are released and an invitation to join the network of the CGI Observatory research cities.

Primary data via interviews and other data collection methods

Selected interviews with city officials, network partners and academics mainly service the purpose of consolidating the quantitative survey techniques. Alongside, some more qualitative aspects are captured to complement survey data. The CGI Observatory may also convene focus groups and expert workshops to further advance survey techniques and related approaches.

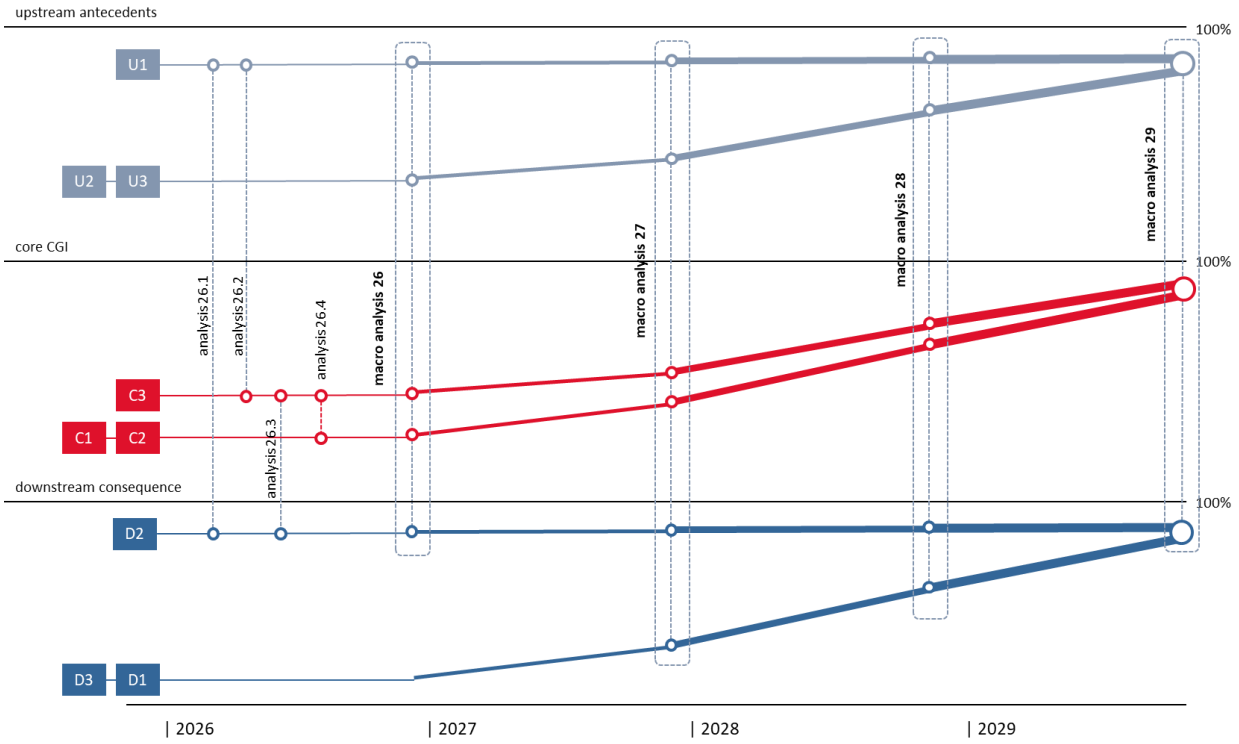
6 Analytical approaches

Our CGI conceptual framework (Figure 4) establishes numerous relationships and potential associations. Three key segments of these relationships are of central importance to our research: A down-stream focus (ECLI Priority) with associations between CGI actions and down-stream consequences from (C3) to (D3); a core CGI focus (ECLI Exec Ed perspective) with associations between CGI competencies, capacity and actions from (C1) to (C3); and an upstream focus (Antecedents perspective) with associations between upstream context and CGI activities from (U1) to (C3).

Figure 7 introduces the growth of data collected across all key components of the above CGI framework and identifies key moments and data points for different analysis steps. For each of the main verticals of upstream antecedence (U1-3), core CGI (C1-3) and downstream consequence (D1-3), the figure illustrates the case coverage up to 100% in 2029. Full coverage differs across the above levels of granularity as well as for national, regional and city cases. The line thickness represents the indicator coverage which grows in parallel to the case coverage. Table 13 covers the most relevant analysis steps in greater detail.

In analysing the data – depending on the actual hypotheses posed and their underlying causal assumptions defined in the first year – we will make use of a range of qualitative and quantitative tools, supported by illustrative case studies through the CGI Capacity deep dive research. The data analysis employed for the CGI Observatory follows a multi-method design including three broad approaches: (1) qualitative-comparative approaches to identify configuration of CGI associated with desirable policy outcomes, (2) descriptive and associational quantitative techniques to gain a richer understanding of both the structural patterns and temporal dynamics of CGI, and (3) causal inference and policy impact evaluation methods to strengthen claims about causality. Here, we provide a summary for each of the three approaches for which individual methods are associated with the analysis steps presented in Table 17.

Figure 7: Timeline of data maturity and key analysis steps
Source: Authors



Qualitative-comparative approaches

These approaches emphasise contextual understanding and structured comparison rather than statistical estimation and include Qualitative Comparative Analysis (QCA), comparative law methods (common core approach, legal trend analysis), and process-based analysis (tracing causal mechanisms and institutional pathways). Their aim is to identify CGI configurations and cross-case patterns through systematic qualitative comparison and legal-institutional analysis.

Of particular relevance for this set of approaches is fuzzy-set Qualitative Comparative Analysis – fsQCA (Ragin 2008) for meaningful conclusions from a medium-sized sample without sacrificing analytical depth. It is utilised to identify combinations of conditions (CGI actions and antecedents) and CGI configurations rather than single factor that lead to specific policy outcomes. FsQCA accounts for the diversity of governmental contexts by recognising that multiple, context-specific pathways may lead to CGI success. Its rigorous, systematic comparative logic also allows retaining the richness of case-level insights and allows differentiating necessary and sufficient conditions (Mendel 2013, Pappas and Woodside 2021).

For the CGI Observatory, we adopt four key steps from a typical application of FsQCA (Mendel 2013). First, the raw data is transformed into fuzzy-set scores ranging from 0 (non-membership) to 10 (full membership). For example, based on analysing CGI actions in a city allows assigning the degree of its membership for innovative city government. Second, so-called 'truth tables' are constructed with each row representing a unique combination of conditions and each city government case being assigned according to its fuzzy scores. Third, the truth tables are analysed by setting consistency thresholds, using logical minimisation and identifying core and peripheral conditions for each path. Fourth, the results are interpreted by looking for sufficient and necessary conditions, comparing configurations that lead to the outcome vs. those that don't and considering contrasting paths (equifinality) and contextual nuances.

Descriptive and associational quantitative techniques

These techniques are designed to uncover patterns, associations, and regularities within the data, offering an initial quantitative understanding of how CGI capacities and actions relate to contextual factors and outcomes. Rather than aiming for causal identification, this stage focuses on systematic description and structured exploration of relationships, providing a solid empirical foundation for later, more sophisticated analyses. It balances analytical rigor with interpretability, allowing us to gain a clear understanding of trends and potential linkages across cities and governance contexts. In practice, these approaches include descriptive statistics, correlation analyses, and regression-based models that examine associations both across units (e.g., cities or countries) and over time. Robust correlation techniques – such as Ordinary Least Squares (OLS), Logit, and Probit regressions, estimated with or without fixed effects – allow for the identification of consistent patterns while controlling for observable characteristics, and, in the case of fixed effects, also for unobserved factors that are constant within units and/or over time.

Logit and Probit models are particularly useful when the outcome is binary, for instance to analyse responses to yes/no questions or similar dependent variable settings. In addition, Bayesian factor analysis and longitudinal studies help capture latent dimensions of governance quality, track their evolution, and identify clusters of cities with similar profiles. This approach highlights both stable patterns and emerging trends, facilitating a richer understanding of the diversity of CGI strategies and capacities across contexts. To ensure credibility and robustness, robustness and placebo checks are systematically applied, testing whether associations hold under alternative model specifications, sample restrictions, or synthetic outcomes. Together, these techniques allow us to describe empirical regularities, explore potential mechanisms, and identify meaningful patterns in the data without over-interpreting correlations as causal effects. By doing so, they provide valuable guidance for generating hypotheses, informing comparative analyses, and supporting evidence-based policy insights across cities and governance contexts.

Causal inference and policy impact evaluation methods

To move beyond descriptive and associational analyses, we employ quasi-experimental methods designed to estimate the causal effects of policies and interventions. These approaches provide a structured framework to assess the impact of CGI actions under clear identification assumptions, addressing common challenges such as endogeneity and selection bias.

The main counterfactual techniques we use include Difference-in-Differences (DiD), Matching, Instrumental Variables (IV), and Regression Discontinuity Designs (RDD). DiD compares pre- and post-intervention changes between treated and control units. Matching constructs comparable control groups based on observable characteristics, helping approximate the counterfactual scenario when randomization is not feasible. IV methods exploit external sources of variation to generate quasi-random treatment assignment, mitigating the influence of unobserved confounders. RDD takes advantage of discontinuities in treatment assignment to estimate causal effects for units close to eligibility thresholds.

Where appropriate, we combine multiple counterfactual methods to strengthen causal inference and complement this with robustness, placebo, and heterogeneity analyses, which test the sensitivity of results, detect potential spurious effects, and explore how impacts may differ across subgroups or contexts. Together, these strategies allow us to move from descriptive associations toward credible estimates of causal relationships, providing a solid foundation for understanding how CGI actions and capacities translate into policy outcomes across diverse cities.

As an illustrative example, we could apply a Difference-in-Differences design to examine the potential effect of City Government Innovation (CGI) on outputs such as service quality (proxy for D1, output change) or citizen satisfaction (proxy for D3, resident impact change), including a full set of controls. By using a continuous measure of CGI intensity, this design would leverage variation both across cities and over time, while accounting for staggered adoption, where different cities implement innovations at different points. This framework provides a clear and rigorous way to estimate the potential causal impact of innovation intensity on key outcomes, while controlling for potential confounding factors.

Table 17: Sequencing and scaling of data analysis
Source: Authors

Analysis Step	Description	Case Coverage	Indicator Coverage	Type of Analysis	Analysis Outputs
26.1 External Context (U1) and Outcomes (D2)	Comparing the city-level outcomes performance with the same national indicators to establish outliers with significant performance variation compared to nation level. These will be used as part of Approach C identification of CGI cases.	17 Countries (ECLI Cohort 1 Countries) 30 Cities (ECLI Cohort 1 Cities)	10 (top urban development indicators on housing, transport, environment) at national and city level	Use of descriptive statistics and summary measures (e.g., mean, median, quartiles, skewness, kurtosis, standard deviation, coefficient of variation, variance, and z-scores) to characterise indicator distributions and detect outliers across cities and policy domains.	Identification of outlier cases per policy domain.
26.2 External Context (U1) and CGI Actions (C3)	Establishing associations between the prevalence and type of CGI actions and the external context at the national level.	17 Countries (ECLI Cohort 1 Countries) 30 Cities (ECLI Cohort 1 Cities)	45 BGI state capacity and democratic accountability indicators 6 CGI actions indicators	Descriptive statistics, summary measures, indices, graphical representations (e.g., scatterplots), and correlation analyses to support the preliminary exploration of whether countries with specific characteristics have implemented certain CGI actions more extensively.	Methodology testing and hypothesis building on CGI antecedents.
26.3 CGI Actions (C3) and Outcomes (D2)	Establishing associations between the prevalence and type of CGI actions and the outcomes at the city level.	30 Cities (ECLI Cohort 1 Cities)	6 CGI actions indicators 10 (top urban development indicators on housing, transport, environment) and BGI state capacity and democratic accountability indicators	Descriptive statistics, summary measures, indices, graphical representations (e.g., scatterplots), and correlation analyses to preliminarily examine whether cities implementing specific CGI actions exhibit better performance in the policy domains most relevant to each type of action. Identification of combinations of CGI actions leading to specific policy outcomes via fsQCA.	Methodology testing and hypothesis building on CGI outcomes.
26.4 CGI Capacities (C2) and CGI Actions (C3).	Establishing associations between the prevalence CGI capacities and the type of CGI actions.	30 Cities (ECLI Cohort 1 Cities)	6 CGI capacities indicators 6 CGI actions indicators	Descriptive statistics, summary measures, indices, graphical representations (e.g., scatterplots), and correlation analyses to investigate the relationships between CGI capacities and the types of CGI actions. Identification of combinations of CGI capacities leading to specific CGI actions via fsQCA.	Methodology testing and hypothesis building on CGI capacities and actions.
Macro 26 Statistical tests with all available indicators.	Testing multiple associations across all indicators.	17 Countries and 30 Cities (ECLI Cohort 1 Cities)	All above	Descriptive statistics, summary measures, indices, graphical representations (e.g., scatterplots), correlation analyses, and exploratory regressions to examine multiple associations across all indicators. Identification of combinations of core CGI and CGI antecedents leading to specific policy outcomes via fsQCA.	Methodology testing and hypothesis building
Macro 27 Statistical tests with all available indicators.	Testing multiple associations across all indicators.	30 Countries and 60 Cities (ECLI Cities)	All above plus U2 and U3	Robust correlational techniques, including OLS and/or Logit/Probit models, with or without fixed effects, together with exploratory robustness and placebo checks, to test multiple associations across all indicators. Updating of fsQCA.	Methodology testing and hypothesis building
Macro 28 Statistical tests with all available indicators.	Testing multiple associations across all indicators.	35 Countries and 90 Cities (ECLI Cities)	All above	Robust correlational techniques, including OLS and/or Logit/Probit models with or without fixed effects, combined with robustness checks, placebo tests, and heterogeneity analyses to examine multiple associations across all indicators. Preliminary counterfactual impact evaluation using methods such as Difference-in-Differences, Instrumental Variables, Regression Discontinuity Design, or Matching, accompanied by robustness and placebo analyses. Updating of fsQCA.	Methodology testing and hypothesis building
Macro 29 Statistical tests with all available indicators.	Testing multiple associations across all indicators.	46 Countries, 700 Cities (level 1) and 120 Cities (level 3 - ECLI Cities)	All above	To examine multiple associations across all indicators, we employ one or more of the following counterfactual impact evaluation methods: Difference-in-Differences, Instrumental Variables, Regression Discontinuity Design, or Matching, complemented by robustness, placebo, and heterogeneity analyses. Where feasible, we also explore methodological triangulation, for example by combining Difference-in-Differences with Matching. Updating of fsQCA.	Methodology testing and hypothesis building

7 Risks and Mitigation of proposed work: Research scenarios of surveying and analysing CGI

Large-scale social science projects come with several common risks. These are especially acute for longitudinal cohort studies and mixed-methods projects, as is the case with the current CGI project, which covers 46 countries and around 700 cities over a 5-year period. These major risks, which can be grouped into categories, are:

In terms of longitudinal cohort studies (Menard 2002, Lynn 2017), there are *methodological and design risks* that include attrition (participant dropout); cohort effects (changes in society, economy, technology; instrument drifts, e.g. measurement tools or criteria may evolve during long studies, complicating consistency over time), and panel conditioning (repeated surveys can influence participants' attitudes or behaviour). Other risks relate to ethical issues and participant relations, in particular re-consent requirements (over longer spans, ethical standards or participant status may require re-consenting) and participant fatigue (too-frequent contact can lead to disengagement or withdrawal).

Mixed-methods projects face *other research risks* as well (Bazeley 2018, Creswell and Plano Clark 2018). Among them are integration risks, i.e., methodological misalignment (quantitative and qualitative components may not mesh due to different epistemologies, timing, or data structures can prevent genuine integration); sequencing challenges (when to collect what kind of data); and analytic inconsistency (researchers may interpret data differently across methods, leading to contradictory conclusions).

Next are *resource and coordination risks* because of uneven expertise distribution and time and cost escalation, as mixed-methods designs require more coordination, staff training, and data management than single-method studies. Equally important are interpretation and communication risks caused by failures to properly synthesize qualitative insights with quantitative trends. This can reduce the project to two parallel analyses rather than one coherent "story" and to selective presentations, whereby convergent findings are highlighted but divergences ignored.

There are, however, various *risk mitigation strategies* tailored to longitudinal cohort studies and mixed-methods social science projects (Miller and Boulton 2007, European 2018, National Institutes of 2019, OECD 2021). These approaches, summarized in Table 18, aim at maintaining methodological integrity, data quality, and ethical robustness over time, various structural safeguards and continuity planning, among others.

Table 18: Risk mitigation matrix
Source: Authors

Risk Category	Specific Risk	Likelihood	Impact	Mitigation Measures
Participant Retention	Attrition / loss to follow-up	High	High	Multi-channel contact strategy; participant newsletters; flexible participation modes; retention incentives
Data Quality	Instrument drift or inconsistent measures	Medium	High	Preserve original tools; anchor key variables; document and justify any instrument changes
Sampling Bias	Cohort becomes unrepresentative over time	Medium	High	Oversample key subgroups; apply weighting adjustments; continuous demographic monitoring
Data Management	Data loss, corruption, or obsolescence	Medium	High	Secure backups; open formats; version control; periodic data integrity audits
Confidentiality & Ethics	Data breach or re-identification	Low–Medium	Very High	Strong encryption; restricted access; de-identification; unified ethics protocol
Funding & Continuity	Interrupted funding or institutional change	Medium	High	Multi-year grant commitments; contingency fund

Staff Turnover	Knowledge loss or inconsistent methods	Medium	Medium	Cross-training; succession documentation ("study bible")
Integration (Mixed-Methods)	Weak linkage between qualitative & quantitative strands	Medium	High	Shared conceptual model; co-analysis workshops; integration memos
Analytic Bias	Overemphasis on convergent findings	Medium	Medium	Encourage reporting of divergences; peer debriefing; external audit of analyses
Participant Fatigue	Reduced response quality or withdrawal	Medium	Medium	Shorter instruments; rest periods; transparent communication on study value
Technology / Platform Risk	Tools or storage become obsolete	Medium	Medium	Use non-proprietary formats; scheduled tech reviews; maintain migration plan for data and technology
Political or Social Sensitivity	Changes in policy environment affect participation or publication	Low–Medium	High	Engage stakeholders early; ethics board oversight; scenario planning for sensitive results
Reproducibility / Transparency	Incomplete documentation or opaque methods	Medium	High	Data dictionaries; pre-registration; open-access protocols and code sharing
Timeline Management	Delays in data collection or analysis	Medium	Medium	Detailed Gantt chart with buffer time; periodic milestone reviews; adaptive rescheduling

8 Conclusion

With this paper, we introduce the point of departure, conceptual underpinning and methodological approach for the City Government Innovation (CGI) Observatory. This ambitious research programme aims to significantly advance the study of city government innovation in Europe and to support the establishment of a coherent field of knowledge, education and practice.

By moving beyond fragmented case studies, our intention is to deliver a comprehensive, empirically grounded analysis of public sector innovation practices across diverse urban contexts. Through the integration of qualitative-comparative approaches, descriptive quantitative techniques and advanced causal inference methods based on a multi-tiered data strategy, the Observatory not only offers robust insights into the real-world co-dependencies and impacts of CGI but also introduces a novel conceptual framework that redefines how innovation is understood and measured in city governments.

Embracing the inherent complexity and unpredictability of public sector innovation at the city level, our research approach prioritises curiosity-driven inquiry over confirmatory analysis, thereby contributing to both theoretical development and practical policy relevance. The findings are poised to inform future scholarship and policymaking, setting new standards for methodological rigor and interdisciplinary engagement in urban governance research.

Appendix A – Scoping Literature Review

A.1. Introduction

This appendix sets out an initial strategy for conducting a scoping review for the CGI Observatory. As we develop this strategy, we follow the PRISMA guidance on conducting scoping reviews (Tricco, Lillie et al. 2018). This current version of the strategy is focussed on establishing eligibility criteria, search and selection procedures, information sources, search queries, and data items to be captured. It also provides some early-stage insights into the relevant literature, based on preliminary analysis of a sample of 240 relevant articles already identified through Web of Science.

A.2. Eligibility and inclusion criteria

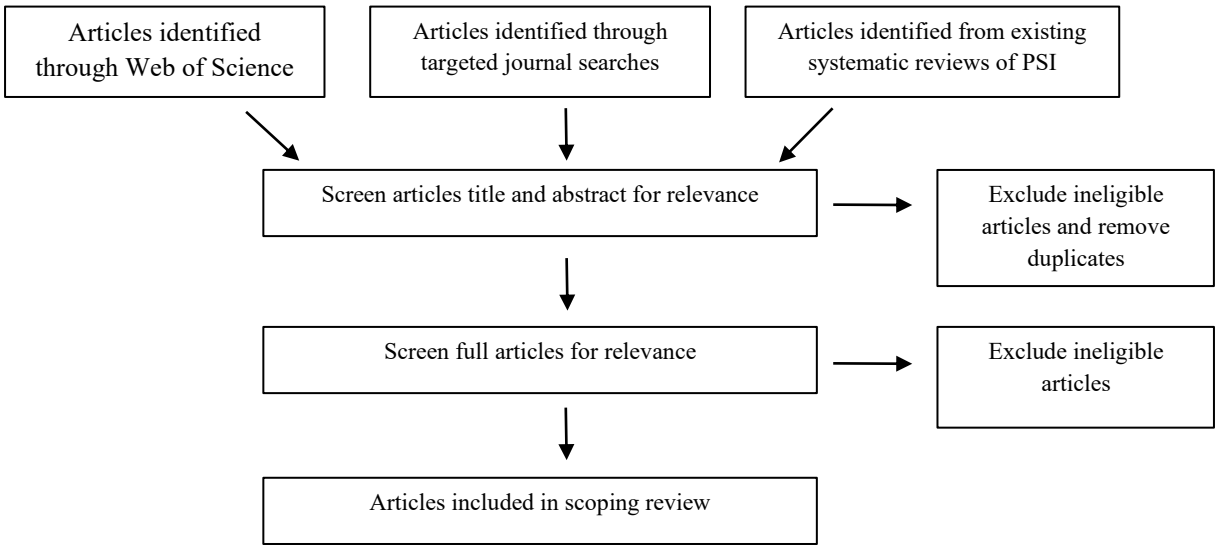
To be included in the review, evidence must be from articles written in English and published in peer-reviewed academic journals from 1990 onwards. The following list specifies initial further criteria for inclusion in terms of articles' substantive focus and approach.

1. Articles for inclusion must focus on city government innovation, defined as the creation, development, and/or implementation of novel ideas, processes, services, technologies, or governance models by city governments. Articles that focus on public sector innovation in an urban context may also be included.
2. Articles discussing general innovation policy, such as initiatives focused on supporting science, R&D and the knowledge economy, economic or green growth, entrepreneurship, or financial services and venture capital, are not included, as these generally do not pertain to innovations in the activities or operations of city governments per se. More often than not, these initiatives are targeted towards stimulating innovation beyond government and more broadly in the economy. In other words, they do not constitute public sector innovation within the context of city governance, even if they are areas in which governments may seek to encourage innovation in urban agglomerations through targeted policies, funding, and other forms of assistance.
3. Articles discussing urban social innovation (including Urban Labs, Living-Labs etc.) may be included, providing the article focuses on social innovation in ways that relate clearly to the role of city government or the wider public sector in this. However, articles that discuss autonomous forms of urban social innovation – i.e. innovation not involving the participation of state actors, such as innovation solely among self-organising communities or civil society groups – are not included.
4. Articles adopting theoretical, conceptual, and empirical works may all be included.
5. Articles that introduce new methodological or analytical tools described as 'innovations', but focus mainly on how these tools could address a policy issue in an urban context or be hypothetically adopted by city governments, are not included.
6. Articles whose main focus is not chiefly on city government innovation but may include recommendations or conclusions emphasising the importance of government innovation in an urban context are not included.

A.3. Search and selection process

Figure A.2.1. outlines the process that will be used to identify eligible articles for the CGI Observatory scoping review. Articles are first identified through systematic search queries in Web of Science and targeted journal searches, as well as from articles included in existing systematic reviews of the public sector innovation literature (see Sections A.4 and A.5). Bibliographic data files (*BibTeX*) from these searches are then exported to Rayyan, a web-based platform for managing collaborative systematic and scoping reviews. In Rayyan, team members first screen article titles and abstracts for suitability, followed by full-text review to confirm eligibility for inclusion.

Figure A.3.1: Scoping Review Search Process



A.4. Information sources

The top row of Figure A.3.1. shows three information sources we will use to identify articles:

1. *Web of Science.* We search the Web of Science bibliographic database, limiting our search to those articles indexed in the Social Sciences Citation Index (SSCI). Search term queries for this are described in Section A.5.1.
2. *Targeted journal searches.* We conduct targeted searches for articles in specific subfield journals, for instance in public management, geography, and urban studies, which are known to contain likely relevant material. The exact list of journals has yet to be determined but will be based on factors such as subject-expert assessments of relevance and suitability, as well as consideration of journal rankings. We will search within these journals via Web of Science, however with adapted search terms to the broader Web of Science (SSCI) search. Potential search terms for these targeted journal searches are discussed in Section A.5.1.
3. *Existing systematic reviews.* We search for articles already featured in published systematic reviews on public sector innovation research. These reviews likely contain cases of city government innovation in their analysed data, but this has not been examined to verify whether the articles specifically study city governments. Specifically, we include in our search articles reviewed in Criado et al.'s (2025) systematic review of public sector innovation, as this is the most recently published review in this area.

A.5. Search queries

We construct our search queries based on combinations of keywords relating to three conceptual categories: *cities* + *innovation* + *government*. These keywords are listed in Table A.5.1. The keywords were agreed upon by the research team and selected on the basis of several rationales. Following a similar approach to Criado et al.'s (2025) systematic review of public sector innovation, our terms for the *innovation* category include "innovat*" as well as "lab" and "laborator*", in order to capture innovation laboratory environments, which are a known setting for innovation in public organisations, including in city governments (Dekker, Franco Contreras et al. 2020). Because we are interested only in city government organisations, or at least public sector organisations operating in an urban context, we also focus on keywords grouped under the *cities* and *government* categories (as shown in Table A.5.1.).

Table A.5.1: Keywords for search queries.

Cities	Innovation	Government
city* OR cities* OR urban* OR municipal* OR metropol*	innovat* OR lab OR laborator*	public* OR state* OR govern* OR administrat* OR policy*

A.5.1. Web of Science search terms

The CGI Observatory search query in Web of Science SSCI will retrieve articles that include:

- an *innovation* keyword in the title,
- a *cities* keyword in the title or author keywords, and
- a *government* keyword in the title, abstract or author keywords.

This is expressed in the following Web of Science search query structure**:** *TI=(innovat* OR lab OR laborator*) AND TS=(public* OR state* OR govern* OR administrat* OR policy*) AND (TI=(city* OR cities* OR urban* OR municipal* OR metropol*) OR AK=(city* OR cities* OR urban* OR municipal* OR metropol*))*.[1] This search yields 1263 results.[2]

A.5.2. Targeted journal search terms

The exact search terms used when conducting targeted journal searches will vary and adapt depending on the journals in question, but will still follow the same keyword combination approach established above. Given these searches will also be conducted via Web of Science, the search queries will be of a similar nature in their structure. However, potential adaptations could include:

- Relaxing where in the article metadata keywords must be identified (e.g., rather than requiring an *innovation* keyword in the title, articles may only need to include it in the title, abstract, or author keywords)
- Where certain journals, by virtue of their subfield focus, may implicitly be assumed to focus on a particular general topic, we might drop the requirement for keywords belonging to that category (e.g., we might assume an urban studies journal is focused on *cities* and therefore not require a keyword for that category, or assume a public administration journal is focused on *government* and therefore not require a keyword for that category).

A.6. Data items

Once team members have read an article in full and determined it to be relevant and suitable for inclusion, they extract and chart information relating to the data items (or 'variables') of interest for each article. These items are informed by facets of the CGI Observatory conceptual framework discussed in the main paper. Some of these items can be identified directly from the article's metadata, whilst others require closer examination of the article itself. The current data items of interest are included in Table A.6.1.

As a provisional stage of analysis, we have begun categorising articles based on information in paper titles and abstracts for a select number of items. The articles included in the provisional analysis were obtained solely via the Web of Science SSCI search. This search yielded 1,263 results, of which two

[1] All Web of Science searches were additionally limited to English language articles in the Social Science Citation Index (SSCI) and published between 1990-01-01 and 2025-09-25. The 'exact search' option was also turned on when searching.

[2] A link to these search results can be accessed via this url: https://www.webofscience.com/wos/woscc/summary/c9f209bd-9122-47ed-b522-e6726b3f9fe6-017cd4cea2/relevance/1

researchers read all the article abstracts to determine whether articles met initial inclusion criteria. This resulted in a sample of 240 articles marked as likely relevant and, based on the abstracts of these articles, a further two researchers began labelling on a select number of dimensions. The dimensions captured in the provisional analysis are also included in Table A.6.1. Results from the provisional analysis are in Section A.7.

Table A.6.1. Data items for analysis of core literature

Data item category	To be included in full scoping review	Included in provisional analysis
Journal field (e.g. economics, public administration)	✓	X
Date of publication	✓	✓
CGI action type(s) covered	✓	✓
CGI main public good(s) and policy domain(s) covered	✓	✓
Geographies covered (continent/country/city)	✓	Partial
Author country	✓	X
Research method	✓	✓
Number of cities included in study	✓	✓
Claims/evidence of CGI antecedents	✓	X
Claims/evidence of CGI competencies, capacities and/or actions	✓	X
Claims/evidence of CGI output, outcome, resident impact	✓	Partial
Innovation triggers covered	✓	X
Innovation stages covered	✓	X

A.7. Provisional analysis

Table A.7.1. reports the article counts for those data items currently labelled as part of the provisional analysis of 240 articles. As a reminder, for the provisional analysis, this labelling is only based on an assessment of article titles and abstracts. While Table A.7.1. provides a breakdown of continents covered, Table A.7.2. provides a more detailed breakdown of countries and cities covered, although at this stage is only focused on reporting this for European cities that can be identified. In total, 107 articles that included some focus on a European context were identified, collectively studying 93 unique cities from across 27 European countries.

Table A.7.1. Provisional analysis article counts

Data item category	Label	Count *	% *
Area of study	Environmental Sciences & Ecology	87	37%
	Public Administration	72	30%
	Urban Studies	67	28%
	Business & Economics	37	16%
	Geography	36	15%
	Science & Technology - Other Topics	35	15%
	Government & Law	21	9%
	Development Studies	10	4%
	Social Sciences - Other Topics	9	4%

	Transportation	8	3%
Geography (continent only)	Asia	45	18.8
	Africa	4	1.7
	Europe	107	44.6
	Oceania	8	3.3
	North America	42	17.5
	South America	12	5
	None	38	15.8
Research method	Quantitative: observational	23	9.6
	Quantitative: quasi-experimental	23	9.6
	Quantitative: experimental	3	1.2
	Qualitative: single case study	81	33.8
	Qualitative: comparative/multiple case studies	70	29.2
	Methodology unknown	24	10
	Non-empirical (i.e. theoretical or conceptual work)	16	6.7
Number of cities included in study	1	93	38.8
	2-5	41	17.1
	6-20	9	3.8
	21-50	4	1.7
	51-100	3	1.2
	101+	9	3.8
	Unknown	65	27.1
	Non-empirical (no cities studied)	16	6.7
CGI main public goods category	(1) Urban Development	162	67.5
	(2) Socio-cultural Development	69	28.7
	(3) Environment	89	37.1
	(4) Urban Governance and Administration	116	48.3
CGI policy domain (i.e. detailed main public goods)	(1.1) Housing	5	2.1
	(1.2) Transport	20	8.3
	(1.3) Permitting	3	1.2
	(1.4) Planning	54	22.5
	(1.5) Economic Development	49	20.4
	(1.6) Other urban development	94	39.2
	(2.1) Education	6	2.5
	(2.2) Health	10	4.2
	(2.3) Social Services	14	5.8
	(2.4) Civic Life	21	8.8
	(2.5) Culture	3	1.2
	(2.6) Emergency Services	12	5
	(2.7) Other socio-cultural development	23	9.6
	(3.1) Environment	69	28.7
	(3.2) Energy	18	7.5
	(3.3) Water	11	4.6
	(3.4) Sewage	1	0.4
	(3.5) Waste	9	3.8
	(3.6) Other environment	3	1.2
	(4.1) General Administration	90	37.5
	(4.2) Democratic Engagement	26	10.8
	(4.3) Other urban governance and administration	7	2.9
CGI action type (high level)	(1) Urban democratic and civic innovation	16	6.7
	(2) City administrative and organisational innovation	75	31.2
	(3) Urban finance and procurement innovation	11	4.6
	(4) City-level digital and data-driven innovation	35	14.6
	(5) Urban policy and regulatory innovation	23	9.6
	(6) City service innovation	64	26.7
	Unknown/Not possible	17	7.1
CGI action type (detailed)	(1.1) Representative	2	0.8
	(1.2) Participatory	11	4.6
	(1.3) Deliberative	3	1.2
	(1.4) Transparency and accountability	1	0.4
	(1.5) Civic education	0	0

	(1.6) Political Communications	2	0.8
	(1.7) Other (urban democratic and civic innovation)	3	1.2
	(2.1) Governance structure	33	13.8
	(2.2) Processes	16	6.7
	(2.3) Human resources system	10	4.2
	(2.4) Collaborative innovations	46	19.2
	(2.5) Other (city administrative and organisational innovation)	8	3.3
	(3.1) Budgeting and planning	2	0.8
	(3.2) Funding and mobilising	3	1.2
	(3.3) Spending and auditing	6	2.5
	(3.4) Other urban finance and procurement innovation	1	0.4
	(4.1) Democratic and civic technologies	8	3.3
	(4.2) Communications technologies	5	2.1
	(4.3) Automation	2	0.8
	(4.4) Digital technologies and data governance	13	5.4
	(4.5) Data collection	8	3.3
	(4.6) Data analysis	9	3.8
	(4.7) Data applications	9	3.8
	(4.8) Cybersecurity	1	0.4
	(4.9) Other city-level digital and data-driven innovation	11	4.6
	(5.1) Missions, strategies and directives	13	5.4
	(5.2) Regulatory instruments	8	3.3
	(5.3) Economic-based instruments	3	1.2
	(5.4) Information-based instruments	2	0.8
	(5.5) Other urban policy and regulatory innovation	1	0.4
	(6.1) Efficiency focus	12	5
	(6.2) Quality focus	9	3.8
	(6.3) Adoption focus	9	3.8
	(6.4) Inclusion focus	14	5.8
	(6.5) Integration focus	17	7.1
	(6.6) Sustainability focus	28	11.7
	(6.7) Adaptability focus	10	4.2
	(6.8) Other city service innovation	3	1.2
	Unknown/Not possible	17	7.1
Claims/evidence of CGI output, outcome, resident impact (i.e. CGI consequences)**	Consequences reported	119	49.6
	No reference to consequences	121	50.4

** Labels within each category are not mutually exclusive, except for: (1) research method, (2) number of cities included in study, and (3) consequences reported vs. no reference to consequences. Therefore, counts in most categories do not sum to 240 and percentages may not sum to 100%, as articles can have multiple labels within the same category.*

*** This provisional analysis only measures whether or not an article abstract reports CGI consequences. It does not differentiate between outputs, outcomes, or resident impacts, nor does it distinguish whether the article makes claims and/or provides evidence on these consequences – it simply captures the mention of CGI consequences.*

Table A.7.2. Coverage of European countries and cities in provisional analysis

Country	City	Count
Albania	no specific city*	1
	Albania TOTAL	**1**
Austria	Vienna	4
	Austria TOTAL	**4**
Belgium	Brussels	1
	Ghent	3
	Leuven	1
	no specific city	1
	Belgium TOTAL	**6**
Croatia	Zagreb	1
	no specific city	1
	Croatia TOTAL	2

Czech Republic	no specific city	1
	Czech Republic TOTAL	**1**
Denmark	Aarhus	1
	Copenhagen	6
	Roskilde	1
	no specific city	3
	Denmark TOTAL	**11**
Estonia	Tallinn	1
	Estonia TOTAL	**1**
Finland	Espoo	1
	Helsinki	3
	Oulu	1
	Tampere	2
	Vantaa	1
	no specific city	1
	Finland TOTAL	**9**
France	Lyon	2
	Nancy	2
	Paris	1
	no specific city	3
	France TOTAL	**8**
Germany	Bremen	2
	Cologne	2
	Darmstadt	1
	Dortmund	1
	Hagen	1
	Hamburg	2
	Munich	2
	Oberhausen	1
	Offenbach	1
	Oldenburg	1
	Rhine-Ruhr Metropolitan Region	1
	Schwaubisch Hall	1
	Treuchtlingen	1
	no specific city	7
	Germany TOTAL	**24**
Greece	Athens	1
	no specific city	2
	Greece TOTAL	**3**
Hungary	no specific city	1
	Hungary TOTAL	**1**
Ireland	Dublin	1
	Galway	1
	Ireland TOTAL	**2**
Italy	Appignano	1
	Bari	1
	Bergamo	1
	Bologna	1
	Brescia	1
	Como	1
	Cremona	1
	Florence	1
	Genoa	1
	Lecco	1
	Lodi	1
	Lucca	2
	Mantua	1
	Milan	3
	Monza	1
	Naples	1
	Pavia	1

	Rome	1
	Sondrio	1
	Trento	1
	Turin	4
	Varese	1
	Venice	1
	no specific city	6
	Italy TOTAL	**35**
Latvia	Riga	2
	no specific city	1
	Latvia TOTAL	**3**
Lithuania	Vilnius	1
	Lithuania TOTAL	**1**
Netherlands	Amsterdam	6
	Enschede	1
	Heerlen	1
	Rotterdam	7
	no specific city	5
	Netherlands TOTAL	**20**
Norway	Oslo	1
	no specific city	4
	Norway TOTAL	**5**
Poland	Gdansk	1
	Warsaw	1
	Wroclaw	1
	no specific city	2
	Poland TOTAL	**5**
Portugal	Lisbon	3
	Oporto	1
	no specific city	1
	Portugal TOTAL	**5**
Romania	Cluj-Napoca	1
	Timisoara	1
	no specific city	1
	Romania TOTAL	**3**
Slovenia	no specific city	1
	Slovenia TOTAL	1
Spain	Barcelona	7
	Bilbao	1
	Madrid	4
	Seville	1
	Valencia	1
	Viladecans	1
	Zaragoza	1
	no specific city	4
	Spain TOTAL	**20**
Sweden	Goteburg	2
	Malmo	2
	Stockholm	4
	no specific city	3
	Sweden TOTAL	**11**
Switzerland	Geneva	1
	no specific city	1
	Switzerland TOTAL	**2**
Turkey	no specific city	1
	Turkey TOTAL	**1**
United Kingdom	Birmingham	2
	Bristol	2
	Coventry	1
	Edinburgh	3

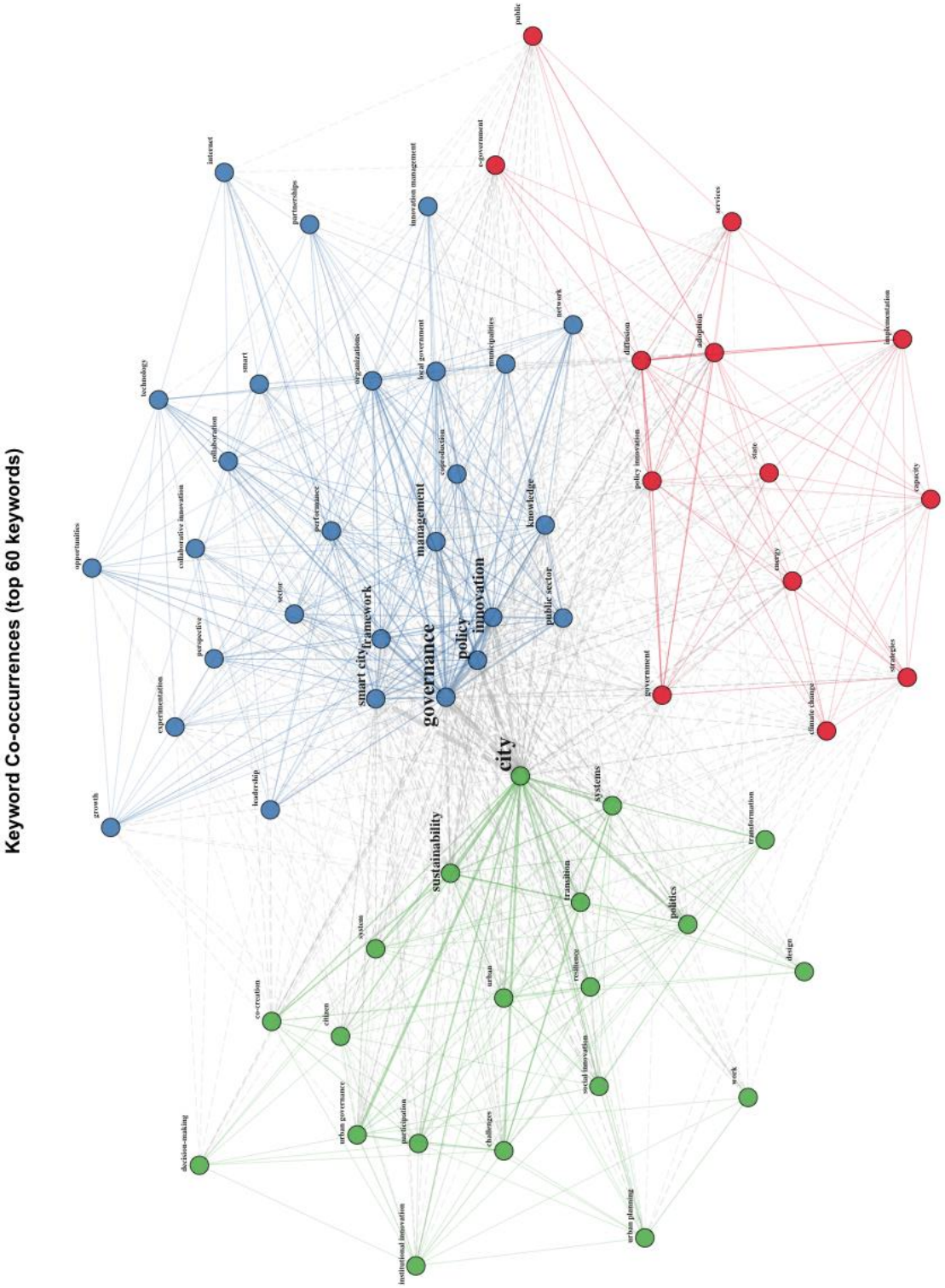
Glasgow	4
Leeds	3
Leicester	1
London	3
Manchester	4
Milton Keynes	1
Newcastle	1
Peterborough	1
no specific city	6
United Kingdom TOTAL	**32**

** No specific city is used when an article examines a European country without identifying a particular city.*

A.8. Other analysis

In addition to extracting information from included articles based on the chosen data items and reporting article counts, we will conduct bibliometric analyses to quantitatively examine our corpus. For instance, the R Bibliometrix package (Aria and Cuccurullo 2017) provides various routines for performing bibliometric analysis and building data matrices for co-citation, coupling, scientific collaboration, and co-word analysis. These tools also facilitate a more inductive approach to analysing clusters and connections amongst authors, topics, and concepts in the identified literature. For example, Figure A.8.1 shows a network visualisation of the relationships between the top 60 author keywords in the 240 articles included in the provisional analysis, where connected keywords frequently appear together in the same publications, revealing connections between thematic clusters of core concepts in the research field.

Figure A.8.1. Author keyword analysis



Appendix B – Glossary

General public sector innovation (PSI) terms and dimensions

PSI Terms and Dimensions	Details
Antecedents	Aspects that influence the emergence, initiation and selection of innovation (Andrews, Bellò et al. 2021)
Enablers	Aspects that create the condition for applying and institutionalising innovation (Touati, Denis et al. 2019)
Barriers	Aspects that compromise the application and institutionalisation of innovation. A major barrier for PSI has been legitimacy-focused conformity leading to a homogenising effort and institutional isomorphism (DiMaggio and Powell 1983)
Motivators and triggers	PSI motivators: response to external environments, Institutional pressures by regulatory environment (coercive), stakeholder expectation (normative), diffusion across organisations (mimetic).
Origins and sources	The individuals, groups and/or organisations which can be considered as the ideas provide for innovation.
Stages	The iterative phases through which innovation processes moves from inception to implementation and evaluation. These typically include idea creation, conceptualization, development, evaluation, and implementation (Hawi, Alsyouf et al.).
Types	Categorized into four main types: product, process, conceptual, and governance innovations. Process innovations are often further divided into administrative and technological process innovations (De Vries, Bekkers et al. 2016). Others have defined PSI types by innovation focus and locus, including mission, policy, management, partner, service, and citizen innovations (Chen, Walker et al. 2020). Collaboration most common type as part of PSI (Criado, Alcaide-Muñoz et al. 2025).
Scale	The magnitude and scope of change an innovation brings to existing systems, processes, or structures. Important to differentiated scaled PSI and micro-environments (e.g. labs) that allow for ignorance, creativity and crossing ideas/perspectives (Criado, Alcaide-Muñoz et al. 2025).
Capacities	Defined by six interrelated dimensions: learning capacity, connective capacity, ambidexterity, risk monitoring, leadership, and technological capacity (Boukamel, Emery et al. 2019).
Capabilities	Multidimensional organisational routines, processes, tools, and structures alongside individual competencies that enable adaptive, value-creating transformations in government systems through dynamic managerial and organisational processes (Fuglsang and Sundbo 2016, Gullmark 2021).
Outcomes	Outcomes: efficiency and effectiveness improvements (Cucciniello and Nasi 2014), employee and user satisfaction (Torugsa and Arundel 2016), problem-solving capacity (Yuan and Gasco-Hernandez 2021), legal and regulatory adherence, new policy ideas, legitimacy, responsiveness, and recognition (Criado, Alcaide-Muñoz et al. 2025).

CGI Observatory – Glossary

Concept	Definition
City Government Innovation (CGI)	The intentional creation, development and implementation of novel ideas, processes, policies, services, technologies or governance models by city and urban governments that aim to improve urban value and where possible lead to efficiency and effectiveness gains. In this context, novelty refers to what has not been done before in a given context (geography, policy domain or otherwise) or is something that is perceived as such by people in the city. CGI occurs along a continuum (small to major) rather than in binary terms.
Urban Value	Urban value, as a normative, context specific concept, is the collective benefit generated through the interplay of public institutions, city stakeholders, shared spaces, and the relational qualities of urban life. It builds on Moore's (2013) definition of public value with a focus on collective benefit but specifically arises from 'cityness', i.e. the proximity of urban functions, the density and complexity of urban systems, the openness of public space, and the social mix and diversity of people and practices that make a city inclusive, prosperous and sustainable.
CGI Competency	The specific knowledge, skills, attitudes, and/or behaviours that individuals need to action city government innovation.
CGI Capacity	The structural and systemic potential of a city government to support innovation. It applies the broader notion of state capacity to the specific context of government innovation in cities. It encompasses CGI competencies defined above, dynamic capabilities, resources and budgets, and leadership commitments that allow innovation to emerge, grow, and be sustained over time.
Tools of government	The means through which government action is accomplished — the instruments or techniques used to achieve public purposes. This is directly related to policy instruments for which regulatory, economic and information based instruments are usually differentiated.
Urban Leadership	The process by which elected or appointed individuals guide, influence, and coordinate the development and implementation of public policies, manage resources, and represent constituents to achieve the collective goals of a city or municipality.
Government Modernisation	The comprehensive process of reforming public sector institutions, practices, and policies to enhance efficiency, transparency, responsiveness, and accountability—often through the adoption of digital technologies, new management approaches, and participatory governance mechanisms.
Urban Change Management	The structured process through which municipal leaders plan, implement, and oversee transitions in policy, operations, or organisational culture to improve public service delivery, respond to community needs, and ensure stakeholder engagement and institutional resilience.

Appendix C1 – CGI Actions Taxonomy

CGI Action Type	Subtype	Examples
01 Urban democratic and civic innovation New processes or institutions that reimagine and deepen the role of city citizens and residents in city governance by aiming to increase opportunities for representation, participation, deliberation, and influence.	**1.1 Representative democracy** Reforms to representative democratic institutions (e.g., formally elected councils, city parliaments, etc.) aimed at improving representation, responsiveness, or accountability.	Elected community board, citizens' council, youth council
	1.2 Participatory processes New processes aiming to enable citizens to directly influence public decisions, policies, or service design.	Neighbourhood forums, participatory budgeting, participatory planning
	1.3 Deliberative democracy New processes aiming to facilitate reasoned discussion among citizens (selected through lottery / sortition) to inform or shape collective decisions.	Citizens' assembly, citizens' jury, planning cell
	1.4 Transparency and accountability New practices aiming to ensure public access to information and mechanisms for holding decision-makers responsible for outcomes.	Mandatory asset declarations, public budget books, whistleblower protection
	1.5 Civic education New initiatives aiming to build citizens' knowledge, skills, and motivation to engage in public decision-making.	Multi-actor civic education initiatives, peer-led civic education initiatives, civic leadership programme
	1.6 Public communications and engagement New strategies and tools aiming to foster dialogue, trust, and information exchange between citizens and public authorities.	Mayor's public office hours, visual communication boards, rapid misinformation response
02 City administrative and organisational innovation New structures or processes aiming to reshape how city governments organise their activities, manage public affairs, and coordinate among different urban governance actors.	**2.1 Governance structures** New structures and organisational designs aiming to make city government more adaptive, effective, inclusive and/or responsive.	Innovation teams, super departments, administrative boundary reform
	2.2 Governance processes New internal operational activities aiming to make city government more adaptive, effective, inclusive and/or responsive.	Internal knowledge management, results-based collaboration, internal operations mapping
	2.3 Collective problem-solving New coordination and partnerships with public entities, private organisations, or civil society groups.	Intergovernmental / departmental collaboration, public-private partnerships, civil society and third sector partnerships
	2.4 Staffing and talent development Workforce transformation and enhancing innovation-related skills, knowledge, and experience aiming to enable individuals and teams to effectively perform their roles.	Innovation upskilling programmes, hiring policies targeting innovation skills, innovation knowledge programmes
03 Urban finance and procurement innovation New ways of mobilising, structuring, and allocating financial resources or acquiring goods and services for public purposes in cities.	**3.1 Budgeting and planning** New processes for setting financial priorities, forecasting resources, and allocating budgets aligned with strategic goals.	Strategic priority budgeting, outcome-based budgeting, scenario-based budgeting
	3.2 Funding and mobilising New mechanisms to generate, attract, and manage revenues, grants, or investments to finance public activities.	Revolving investment fund, blended finance, innovative fundraising campaign
	3.3 Spending and auditing New activities aiming to ensure effective use of funds and control of financial and operational risks.	Innovation procurement, citizen finance instrument, green procurement
04 City-level digital and data-driven innovation New use of digital technologies and data analytics aiming to transform how city governments design policies, deliver services, and make decisions.	**4.1 Democratic and civic technologies** New digital tools aiming to enable citizen participation, co-creation, and collaboration with external stakeholders.	E-participation platforms, civic issues reporting app, co-creation platforms
	4.2 Organisational and process technologies New digital tools, techniques, and methods aiming to coordinate people and resources or to transform inputs into outputs (policy or services).	VR assisted recruitment, e-procurement, AI-powered productivity programme
	4.3 Automation Use of new digital systems or algorithms aiming to perform and support administrative or operational tasks with minimal human intervention.	AI citizen service and chatbots, automated invoicing and billing, automated smart infrastructure systems

	4.4 Digital technologies governance New frameworks, policies, and practices aiming to ensure responsible, ethical, and effective implementation and management of digital technologies.	Digital public payment system, digital technologies governance framework, public dashboards
	4.5 Data collection New forms of collecting data aimed at informing decision-making, policy design, and service improvement.	Sensor-based big data, risk registers, citizen science
	4.6 Data analysis New ways of analysing data aimed at informing decision-making, policy design and service improvement.	Predictive analysis, integrated data analysis, risk and resilience analysis
	4.7 Data management and storage New data management and infrastructures for organising, storing, integrating, and maintaining data.	Municipal data warehouse / data lakes, data quality and validation tools, data retention and archiving system
	4.8 Cybersecurity New systems aiming to protect digital infrastructure, data, and services from unauthorised access or disruption.	Cyber security framework, sovereign cloud space, backup and disaster recovery systems
05 Urban policy and regulatory innovation Novel policy frameworks or regulatory, economic and information-based policy instruments aiming to respond to the complex and evolving challenges of contemporary urban development.	**5.1 Missions, strategies and directives** Novel frameworks and strategic principles aiming to define long-term priorities and guide policy direction under which city government operates.	Long-term strategic plans, city-wide mission statements, digital transformation strategy
	5.2 Regulation-based policy instruments Novel legal frameworks aiming to set the rules and conditions governing institutional and individual behaviour.	Regulatory sandboxes, experimental governance zones, data-driven regulation
	5.3 Market-based policy instruments Novel financial incentives or disincentives, including taxes, subsidies, grants, and fees, aiming to steer behaviour toward desired policy outcomes.	Means-tested pricing, local environmental charges, dynamic parking fees
	5.4 Information-based policy instruments Novel forms of knowledge dissemination, education, or persuasion such as awareness campaigns, labelling schemes, or public reporting aiming to influence resident and organisational behaviour.	Behavioural campaigns, public awareness campaign, public policy narratives and reframing
06 City service innovation The introduction of novel or significantly improved city services, delivery methods, or ways of interacting with residents aiming to create value for users and providers.	**6.1 Efficiency focus** Service innovations explicitly designed to minimise input use (financial, temporal, and human resources) while service output.	Remote inspections, automated appointment scheduling, co-located one-stop service hubs
	6.2 Quality focus Enhancements mainly focused on increasing the reliability, responsiveness, or overall user experience of public services.	User-centred service design, real time service status updates, improved service accessibility
	6.3 Inclusion focus Novel initiatives aiming to expand equitable access to services for all social groups, including vulnerable or marginalised populations.	Digital inclusion programme, social reintegration services, family literacy programmes
	6.4 Environment focus Novel services aiming to integrate environmental sustainability or climate objectives in their design and operation.	Shared mobility services, circular economy–oriented municipal services, smart waste and recycling services
	6.5 Integration focus Novel mechanisms aiming to combine or coordinate multiple stakeholders into single access points.	One-stop service portals, inter-agency service agreements, cross-sector service hubs
	6.6 Adoption focus Improvements aiming to increase user uptake, engagement, and sustained use.	Nudging approaches to services, user co-creation, early adoption incentives
	6.7 Resilience focus Novel service models centrally considering or in response to crises, disasters, or changing urban conditions.	Temporary or mobile service units, inter-agency emergency service, partnership-based service delivery

Appendix C2 – CGI Actions cases with logic stories

(1) Urban democratic and civic innovation: Paris Permanent Citizens' Assembly | U1: Decentralised French governance system, unitary state, semi-presidential, state-centred, The Renaissance Party; U2: council-elected mayor, assembly renewed every 12 to 18 months, influence on the Paris Council agenda; U3: limited democratic representation, fragmented participation and deliberation, Gilets Jaunes 2018; C1: experienced facilitators in participatory design, deliberative mediation and government exchange; C2: dedicated unit and budget supporting response capacity; C3: citizens' assembly as new democratic body influencing public policy, random selection; D1: public deliberation reports, citizen-drafted bill, formal recommendations to the Council of Paris; D2:effective governance, democratic engagement, trust in government; D3: institutionalisation of participatory governance, civic education, inclusion.

(2) City administrative and organisational innovation: Transport for London | U1: Centralised UK System, unitary state, third way policy, New Labour; U2: directly elected Mayor, chair of TfL Board, strong political transport powers; U3: congestion, underinvestment and risk of losing competitiveness against NY and European counterparts (1990s); C1: change makers in transport administration; experience in transport administration change in New York, Boston and Hong Kong; C2: mayoral powers in transport, transport budget; C3: restructuring of pre-2000 London transport governance to TfL transport governance; D1: congestion charging, lobbying central government for more direct grants; integrated transport policy; D2: sustainable modal shift, increase in bus use; cycling revolution; D3: quality of life, reduction of air pollution, accessibility.

(3) Urban finance and procurement innovation: Hamburg Urban Wealth Fund | U1: Federal government of Germany, parliamentary system, coordinated market economy; U2: both federal state and municipality, unicameral parliament directly elected, indirectly elected Mayor; HafenCity owner; U3: housing shortage, structural shift in production and trade, political momentum; C1: financial investors, commercial managers, urban planners, legal advisory; C2: institutional autonomy, assets ownership; C3: coordinated financing to adapt the harbour area; D1: up to 8,000 homes for 16,000 residents, and 45,000 jobs, educational and cultural spaces; D2: expansion of Hamburg City area by 40%, economic development, public-private urban planning; D3: urban adaptive capacity, residents welfare.

(4) City-level digital and data-driven innovation: Zurich IoT-Networks | U1: Federal Swiss government, parliamentary and direct democracy, consensus-oriented, governed by the Federal Council; U2: City Council and Mayors (City President) directly elected, strategic coordination body; U3: technological progress, densification; C1: data analysis, IT skills, urban planners; C2: innovation ecosystem, technological infrastructure; C3: long range network of sensors giving insight into the operating states of different facilities and locations; D1: sensor network coverage, open-access to insights via Akenza; D2: data-driven governance, evidence-based policy, energy efficiency; D3: urban resilience, innovation ecosystem.

(5) Urban policy and regulatory innovation: Lahti Personal Carbon Trading | U1: Decentralised Finland system, unitary state, parliamentary with proportional representation, Nordic welfare state, National Coalition Party; U2: council-elected Mayor, coordinating and monitoring CitiCAP project; U3: high transport emissions, low carbon footprint awareness, PCT's lack of evidence; C1: environmental policy makers, transport modelling, data scientists, cross-silo collaboration; C2: EU funded, academia and private sector involvement; C3: market-based carbon trading scheme for individual mobility emissions, supported by a mobile app; D1: PCT mobile app, emission budgets, database; D2: Lahti's carbon neutrality target, replication in other cities; D3: 36% of users shifted their mobility behaviour, people's acceptance.

(6) City service innovation: Housing Service Vienna | U1: Federal government of Austria, parliamentary system, coordinated market economy; U2: indirectly elected Mayor, head of city and state governor; U3: housing policy legacy, long-term commitment to affordability, immigration and ageing population; C1: housing planners, public finance expertise; C2: city-owned estates, institutional autonomy; C3: dual system, municipal and subsidised housing, and building renovation; D1: variety of housing, active support, safety measures; D2: affordability, social housing coverage and quality, sustainable city; D3: social cohesion, less inequality, political resilience.

Appendix C3 – CGI Actions by database

CGI Actions by databases and type

	Type	OECD OPSI Case Study Library	European Innovation Council
Process Innovation	(1) Urban democratic and civic innovation	19	8
	(2) City administrative and organisational innovation	26	20
	(3) Urban finance and procurement innovation	6	14
	(4) City-level digital and data-driven innovation	17	16
Product innovation	(5) Urban policy and regulatory innovation	16	3
	(6) City service innovation	33	7

CGI Actions by databases, type and subtype

	Type	Subtype	OECD OPSI Case Study Library	European Innovation Council
Process Innovation	(1) Urban democratic and civic innovation	1.1 Representative democracy	1	1
		1.2 Participatory processes	7	6
		1.3 Deliberative democracy	3	1
		1.4 Transparency and accountability	6	0
		1.5 Civic education	2	0
		1.6 Public communications and engagement	0	0
	(2) City administrative and organisational innovation	2.1 Governance structures	11	3
		2.2 Governance processes	5	0
		2.3 Collective problem-solving	9	17
		2.4 Staffing and talent development	1	0
	(3) Urban finance and procurement innovation	3.1 Budgeting and planning	1	0
		3.2 Funding and mobilising	2	10
		3.3 Spending and auditing	3	4
	(4) City-level digital and data-driven innovation	4.1 Democratic and civic technologies	1	4
		4.2 Organisational and process technologies	4	2
		4.3 Automation	3	2
		4.4 Digital technologies governance	1	2
		4.5 Data collection	2	1
		4.6 Data analysis	3	1
		4.7 Data management and storage	3	3
		4.8 Cybersecurity	0	1
Product innovation	(5) Urban policy and regulatory innovation	5.1 Missions, strategies and directives	5	0
		5.2 Regulation-based policy instruments	0	2
		5.3 Market-based policy instruments	3	0
		5.4 Information-based policy instruments	8	1
	(6) City service innovation	6.1 Efficiency focus	5	0
		6.2 Quality focus	4	0
		6.3 Inclusion focus	11	4
		6.4 Environment focus	1	2
		6.5 Integration focus	9	1
		6.6 Adoption focus	1	0
		6.7 Resilience focus	2	0

Appendix D1 – CGI Competencies and higher order innovation skills

CGI Competencies

01 **Leaderships and strategic competencies** that enable translating ideas into viable and impactful actions.

- 1.1 Urban value thinking – knowledge and mindset that enables prioritising the creation of urban value
- 1.2 Opportunity recognition – ability to spot unmet needs, pressure points and emerging trends
- 1.3 Resource mobilisation – ability to identify resources and knowledge of resourcing opportunities
- 1.4 Risk assessment and decision-making – knowledge of decision-making approaches that consider innovation potential, risks and feasibility
- 1.5 Change leadership – ability to motivate and guide others through innovation processes

02 **Collaborative and co-creation competencies** that enable integrated governance and policy coherence.

- 2.1 Multilevel and vertical coordination – knowledge and skill to connect across levels and tiers of governance
- 2.2 Boundary spanning and horizontal coordination – knowledge and skill to connect across policy domains, disciplines and cultures
- 2.3 Co-creation and facilitation – ability to guide group ideation and decision-making
- 2.4 Conflict resolution – ability to manage tension constructively
- 2.5 Design thinking – ability to understand user and stakeholder needs

03 **Communicative and media competencies** that enable clear messaging and the right choice of narratives and channels.

- 3.1 Political communication – ability to craft and deliver messages that effectively navigate political contexts
- 3.2 Strategic communication – ability to design and deliver communication that aligns innovation goals with policy priorities and clearly explains the purpose, value, and direction
- 3.3 Change communication – skill in crafting messages that support organizational culture change, reduce resistance, and build buy-in for new approaches, tools, and mindsets.
- 3.4 Storytelling & narrative development – competence to tell value-focussed, compelling human-centred stories that clarify benefits and inspire support.
- 3.5 Risk & crisis communication – skill in communicating uncertainty, addressing concerns, and managing sensitive or high-risk issues related to innovative policies, technologies, or experiments.
- 3.6 Digital and data-informed communication – ability to use digital channels, platforms, visualisations and analytics to communicate innovation work in accessible, transparent, and user-friendly ways.

04 **Technical and methodological competencies** that support analysis, experimentation, agile management, digital and data literacy.

- 4.1 Research literacy – knowledge and skills required for designing and interpreting qualitative and quantitative studies
- 4.2 Prototyping and testing – knowledge, skills and mindset enabling rapid development and evaluation of ideas
- 4.3 Digital literacy – knowledge and skills required for using digital tools to design, simulate, or collaborate
- 4.4 Data analysis and evidence use – knowledge and skills required for interpreting data to guide innovation
- 4.5 Project design and agile methods – ability to structure iterative, learning-based projects

Higher order innovation skills

A. **Cognitive dimension** that supports ideation, problem-solving, and original thinking.

A1. Deep domain knowledge or domain-relevant skills (expertise) - domain-relevant skills are the person's repertoire of knowledge, technical skills, and special talents in the focal domain that enable high-quality work and constrain what is feasible/appropriate.
A2. Divergent thinking (idea generation / alternatives) - ability to generate multiple possibilities (idea fluency/originality) by exploring information in varied directions.
A3. Convergent thinking evaluation (selection/refinement) - ability to evaluate the alternatives/ideas generated and refine them against feasibility and appropriateness criteria (selection/retention).
A4. Cognitive flexibility - ability to shift representations, explore multiple perspectives, and reorganize associations
A5. Executive control for creative thought - creative thinking recruits interactions among memory, attention, and cognitive control systems

B. **Intrapersonal dimension** that shapes motivational, affective, and dispositional capacities enabling individuals to initiate, sustain, and recover creative work across its stages.

B1. Intrinsic motivation and sustained engagement - the ability to initiate and sustain creative work. Essential in stages requiring exploration and novelty (problem finding and idea generation
B2. Persistence - capacity to persist through ambiguity, iterate, and complete work
B3. Affect regulation - ability to maintain or shift affective states that support (a) exploration and idea generation (e.g., curiosity/interest, approach-oriented positive affect) and (b) evaluation and implementation (e.g., tolerating frustration, managing anxiety during scrutiny), thereby sustaining engagement across stages.
B4. Resilience - ability to persist, bounce back, and flourish when faced with stressors/the capacity to recover quickly from negative events, extract learning, and re-engage in problem solving, protecting the continuity from idea generation through championing and implementation
B5. Tolerance for ambiguity- ability to maintain engagement and make reasoned decisions when information is incomplete, goals are contested, and outcomes are uncertain
B6. Risk taking independence - the capacity to act autonomously and challenge prevailing assumptions by testing novel approaches, with a balanced willingness to take responsible risks and learn from setbacks

C. **Interpersonal dimension** that governs an individual's capacity to operate within and across social and organisational contexts to develop and champion ideas.

C1. Psychological safety (interpersonal risk taking) - the sense of being able to show and employ one's self without fear of negative consequences to self-image, status, or career
C2. Boundary spanning (mobilising external ties/resources) - ability to establish and leverage external relationships to obtain information, resources, and support for idea development and implementation
C3. Political skill - capacity to read social situations, tailor communication, and influence stakeholders to secure buy-in and coordinated action for an idea
C4. Collaboration skills - ability to coordinate interdependent work through information sharing, mutual adjustment, and constructive conflict management to sustain joint problem solving
C5. Shared problem framing - ability to align interpretations of the problem (goals, constraints, success criteria) so that collective work proceeds from a common representation

Appendix D2 – Outcome sets, policy domains and indicator themes

Set	Policy domain	Indicator theme	Indicator
D2.1 Urban Development			
	1.1 Housing	Availability and Accessibility	Housing vacancy rates and availability of new housing units.
		Housing Affordability	Percentage of income spent on housing (rent or mortgage).
		Housing Quality and Safety	Access to basic utilities (water, sanitation, electricity).
	1.2 Transport	Accessibility and Connectivity	Average public transport expenses/month (€)
		Sustainable Mobility Share	Modal share increase of sustainable transport modes
		Car Ownership	Reduction in car ownership
	1.3 Permitting	Permit Processing Efficiency	Average processing time for different types of permits (residential, commercial, industrial).
			Digitalization of permitting systems (online applications, e-permit adoption).
			Citizen/business satisfaction surveys with permitting services
	1.4 Planning	Land Use and Development Efficiency	Density metrics (population per km², floor area ratio).
			Percentage of land effectively zoned for residential, commercial, industrial, and recreational use.
	1.5 Economic Development	Economic Productivity	GDP per capita
		Employment and Job Quality	Employment rate (or unemployment rate)
		Inclusive Growth and Income Equality	Share of severely materially deprived persons -%
D2.2 Socio-cultural development			
	2.1 Education	Educational Attainment and Literacy Rates	Reduction in dropout rates at various educational stages.
			Percentage of residents completing primary, secondary, and tertiary education.
		Equity and Inclusion	Number of Children 0-4 in day care (publ.&priv) per 1000 children 0-4
	2.2 Health	Access to Healthcare	Universal health coverage index
		Health Outcomes	Inequality in healthy life expectancy
			Healthy life expectancy at birth.
	2.3 Social Services	Efficiency and Coordination	Improve service delivery
		Equity and Inclusion	Reduction in social inequalities over time.
		Social Protection	Innovation in the pension system design (e.g. interactions public-private)
	2.4 Civic life	Cultural and Public Space Vitality	Public spaces in this city such as markets, squares, pedestrian areas: level of satisfaction
		Representation and Equity in Decision-Making	Women's political empowerment index
		Social Cohesion and Trust	You feel safe in this city: level of agreement
	2.5 Culture	Access to Cultural Infrastructure	Cultural facilities such as concert halls, theatres, museums and libraries in the city: level of satisfaction
			Number of (tourism) available beds per 1000 residents
		Cultural Participation and Engagement	Number of museum visitors (per year)

	2.6 Emergency Services	Coverage and Accessibility	Adoption of emergency digital platforms
			Availability of specialized emergency services (e.g., trauma units, disaster response teams)
		Response Times	Avg. response time for emergencies
	2.7 Public Order, Policing and Criminal Justice	Crime Rates and Public Safety	Variations in prison population rate / Change in incarcerated individuals per 100,000 residents.
			Number of murders and violent deaths
		Public perception and satisfaction surveys regarding policing.	Change in trust in the justice system / Annual change in population expressing trust in justice.
D2.3 Environment			
	3.1 Core Environment	Air Quality Improvement	Annual mean concentrations of PM2.5 and NO_2
		Carbon and Energy Efficiency	Change of share of buildings meeting green building standards
		Green Space and Biodiversity Access	Percentage of urban area covered by green/blue spaces
	3.2 Utilities (energy)	Sustainability and Efficiency	Energy losses in transmission and distribution (% of total energy).
			Share of renewables in city energy mix
			Reduced energy consumption per capita
	3.3 Utilities (water)	Access and Coverage	Percentage of households with access to safe, piped water.
			Daily Water Consumption (litres per capita)
		Reliability and Efficiency	Water loss reduction
	3.5 Waste	Waste Collection Coverage and Efficiency	Compliance with national environmental and sanitation standards.
		Waste Diversion and Recycling	Total municipal waste generation decreased
			Share of undifferentiated waste reduced
D2.4 Urban Governance and Administration			
	4.1 Democratic engagement	Electoral Participation and Representation	Share of women, youth, minorities in city councils
			Voter turnout in local and regional elections
		Transparency, Accountability, and Trust	Public trust in local government (% of residents expressing trust)
	4.2 General Administration	Institutional Capacity and Management	Organizational structure and management
			Human resources management and capacity
		Strategic Leadership and Coordination	Strategic planning and vision

Appendix E – Preliminary insights from ECLI Cities

Below follows an overview of the preliminary insights that come from two surveys that were run in 2025 with cities interested in the European City Leadership Initiative and those that are part of its first cohort. The first survey, the Expression of Interest Survey, was completed by 60 cities as part of an initial invitation to submit a city's interest in the ECLI Executive Education offer. This survey ran throughout April 2025.The second survey, the CGI Questionnaire with initially 31 cities, was completed as a part of the ECLI Executive Education onboarding process throughout August 2025.

CGI Approaches

Insights on CGI approaches include the maturity of public sector innovation practice, its formalisation and the need for improvement from internal processes to outcomes.

How does your city currently approach City Government Innovation? Please select the option that best describes how this innovation is understood and supported within your city administration. [# of cities]	
Source: CGI Questionnaire, August 2025	
We **have not yet developed** a clear city government innovation approach or structure	0
We pursue CGI **informally, without a written strategy**, but with an openness to experimentation in some teams or projects	13
We have CGI strategies or initiatives in **specific departments or policy areas**, but no cross-cutting organisation-wide approach.	9
We have a **formal, organisation-wide CGI strategy** that guides work across most or all departments and is supported by dedicated leadership or resources	5
Other	3

Does your city administration have an innovation team? If yes, where does it sit within the city administration? By innovation team, we mean a group of people that is tasked with supporting city government innovation activities within the city administration as a main or major part of their work. [# of cities]	
Source: CGI Questionnaire, August 2025	
No – we don't have an innovation team or staff at the moment	5
Yes – based in the **Mayor's office or political cabinet**	1
Yes – part of the **executive office or office of the city manager**	3
Yes – sits within a **specific department or directorate**	7
Yes – as a **standalone innovation unit or agency**	1
No central team, but innovation staff or functions are **spread across departments**	7
We work through **cross-department innovation taskforces or working groups**	2
Other	4

What is city government innovation helping your city administration do better? [[# of cities– multiple mentions]	
Source: CGI Questionnaire, August 2025	
Improving service delivery	22
Engaging and collaborating with more diverse stakeholders	20
Cost saving and efficiency within the public sector	18
Anticipating and managing future challenges	16
Improving internal government operations	14
Democratising decision-making, giving voice to vulnerable communities	12
Improving resident outcomes	12

Simplifying administrative procedures for firms and residents	11
Generating new sources of revenue or resources for the city	5
Servicing current obligations	3
Other	1

How would you say your city administration is doing with regards to meeting your stated city government innovation goals? [# of cities]	
Source: CGI Questionnaire, August 2025	
Too early/cannot yet say	6
It is going **well** – We are meeting many or most innovation goals	3
It is going **so-so** – We are meeting some innovation goals but not others	15
It is going **poorly** – We are meeting few or no innovation goals	2
Other	4

Does your city administration undertake a systematic assessment or evaluation of the impact of your city government innovation efforts? [Single select]	
Source: CGI Questionnaire, August 2025	
Yes, we systematically evaluate our innovation strategy and outcomes	1
We evaluate **some elements of our innovation strategy** but not outcomes	8
We evaluate **some outcomes** but not our innovation strategy	13
No, we don't evaluate our innovation strategy or our innovation programme outcomes	3
Too early/cannot yet say	2
Don’t know/not applicable	2

CGI Competencies

For CGI Competencies, cities were asked to rank their preferred training for building CGI competencies. Respondents were provided with ten distinct options as well as an ‘Other’ option and asked to rank them in order from 1-10, where 1 represented the most beneficial training and 10 represented the least beneficial. We received 31 responses from ECLI Cohort 01 Cities plus one additional city to this question that are summarised below:

CGI Competency Set	**Types of Training** [ranks by cities]	**Rank 1**	**Rank 2**	**Rank 3**	**Avg.**
	Source: CGI Questionnaire, August 2025				
A - Leadership and strategic competencies	**Mission-oriented innovation** (e.g., working toward bold city-level missions that guide multi-actor, multi-year innovation efforts)	6	3	3	4.74
A - Leadership and strategic competencies	**Organisational change within the city administration** (e.g. cross-departmental working, reforming internal processes, building staff capabilities, new governance models)	6	2	2	5.42
A - Leadership and strategic competencies	**Rethinking the city’s approach to financing and delivery** (e.g., alternative financing models, social impact bonds, procurement reform, emergency funding mechanisms)	0	3	3	7.00
B - Collaborative and communicative competencies	**Engaging residents in new ways** (e.g. citizen engagement dashboards, participatory budgeting, citizen assemblies, co-creation with citizens)	6	2	1	4.45

B - Collaborative and communicative competencies	**Rethinking the city's approach to collaboration and open innovation** (e.g., partnerships with universities, private businesses, NGOs, other levels of government)	2	3	3	5.45
C - Technical and methodological competencies	**Digital and data-driven innovation and analytics** (e.g., data analytics, predictive analytics, open data, AI, data visualisation, mining large datasets, evidenced-based policy making)	4	8	6	3.58
C - Technical and methodological competencies	**Policy and regulatory innovation** (e.g. agile policymaking, novel economic policy instruments, behavioural/nudging policy, understanding barriers to change)	2	1	5	5.90
C - Technical and methodological competencies	**Foresight methods, prospective exercises, scenario planning**. (e.g., future trend analysis, long-term scenario development, resilience stress testing)	1	1	4	6.84
D - Cognitive and creative competencies	**Human-centred design of public services and policy interventions** (e.g. citizen-centric design, user research and testing, process automation, public service contracting)	3	6	3	4.64
D - Cognitive and creative competencies	**Trying untested approaches or taking risks** (e.g., testing unproven ideas, launching prototypes, pilots to address urban challenges)	1	2	1	6.65

CGI Policy Domains and Action Types

The Expression of Interest Survey provided an initial overview on CGI Actions since 2010 for which 60 Cities rated the strength of CGI by action type (higher ratings represent greater strength).

How would you rate the strength of government innovation in your city across the following key areas of public sector innovation over the past 15 years? *Source: Expression of Interest Survey, April 2025*	**Average Rating**	**Standard Variation**
(1) Democratic and civic innovation (e.g. citizen engagement dashboards, participatory budgeting, citizen assemblies, co-creation with citizens)	3.35	0.82
(2) Administrative and organisational innovation (e.g., internal process improvements, new workforce models, new governance models)	3.16	0.86
(3) Finance and procurement innovation (e.g. outcome-based procurement, private action financing and new own-source revenue streams)	2.95	0.88
(4) Digital and data-driven innovation (e.g., predictive analytics, evidence-based decision-making, data-sharing platforms, open data, AI, digital services)	2.85	0.99
(5) Policy and regulatory innovation (e.g., agile policymaking, novel economic policy instruments, behavioural/nudging policy)	2.89	0.88
(6) Public service innovation (e.g., citizen-centric design, process automation, public service contracting)	3.10	0.96

For capturing CGI Policy Domains and Action Types, cities were asked to describe the most transformative city government innovation action that they had undertaken in recent years. This could be linked to a specific project, initiative, policy change, or new way of working that significantly changed how the city addresses challenges, employs policy or delivers services. Below follows a coding of the 29 responses into CGI Domains (left) and CGI Action Types (right):

Transformative Innovation: CGI Policy Domains *Source: CGI Questionnaire, August 2025*	
General Administration	16
Planning	7
Environment	7
Social Services	6
Housing	5
Transport	5
Economic Development	4
Waste	3
Civic Life	2
Health	2
Culture	1
Democratic Engagement	1
Emergency Services	1
Education	1

Transformative Innovation: CGI Action Types *Source: CGI Questionnaire, August 2025*	
(1) Urban democratic and civic innovation	6
(2) City administrative and organisational innovation	9
(3) Urban finance and procurement innovation	4
(4) City-level digital and data-driven innovation	5
(5) Urban policy and regulatory innovation	1
(6) City service innovation	4

CGI Triggers: Crises, Emergencies and Uncertainties

For capturing crisis and emergency related CGI Triggers, cities were asked to describe up to three innovations in response to a major crisis, emergency or uncertainty over the past 15 years. Cities were asked to specify the type of innovation and how exactly it was prompted by a crisis. The table below summarise the coded the responses by CGI Action Types (one per innovation) and CGI Policy Domains (multiple per innovation):

Overview of responses to CGI Major Crises questions	
Number of cities that reported at least one crisis and innovation	27
Number of crises reported	56
Number of innovations that were sparked by crises reported	76
Innovations sparked by crises: CGI Action Types	
(1) Urban democratic and civic innovation	11
(2) City administrative and organisational innovation	14
(3) Urban finance and procurement innovation	9
(4) City-level digital and data-driven innovation	20
(5) Urban policy and regulatory innovation	12
(6) City service innovation	10

Innovations sparked by crises: CGI Policy Domains	
General Administration	25
Health	15
Economic Development	9
Environment	8
Emergency Services	8
Water	6
Education	6
Transport	5
Energy	4
Housing	4
Social Services	4
Civic Life	4
Planning	3
Democratic Engagement	2
Culture	2
Waste	1

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