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Designing Collaborative Governance and Innovation Trajectories for Urban and Regional Transitions: The Role of Boundary Objects, Entrepreneurial Ecosystems, and Grassroots Institutionalisation

Gabriella Esposito

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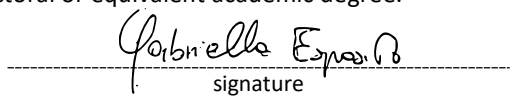
Declaration:

Hereby I declare that this doctoral thesis, my original investigation and achievement, submitted for the doctoral degree at the University of Turin and at the Tallinn University of Technology, has not been submitted for a doctoral or equivalent academic degree.

Gabriella Esposito



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TALLINNA TEHNIKAÜLIKOOL
DOKTORITÖÖ
78/2025

Koostööpõhise valitsemise ja innovatsiooniradade kujundamine linnaliste ja piirkondlike üleminekute kontekstis: piiriobjektid, ettevõtlusökosüsteemid ja rohujuuretasandi institutsionaliseerimine

Gabriella Esposito Doktoritöö

November 2025

KIRJASTUS

Editor's Note

This volume is the outcome of a doctoral research project conducted under a joint supervision agreement between the University of Turin and Tallinn University of Technology. The work presented herein explores the intersection of collaborative governance, entrepreneurial innovation, and grassroots institutionalisation within the broader context of urban and regional transitions towards sustainability.

The core objective of this research is twofold. First, it seeks to contribute to theoretical advancements by conceptualising governance as a dynamic, multi-level, and co-evolutionary system capable of responding to societal complexity and long-term transition imperatives. Second, it aims to provide actionable insights for policymakers, public administrators, civic innovators, and researchers engaged in shaping sustainable urban and regional futures.

Structured as a cumulative dissertation, the book comprises three peer-reviewed journal articles, each addressing a specific research question while collectively contributing to a broader analytical and conceptual framework. These contributions are complemented by transversal reflections, integrative thematic syntheses, and empirical insights that establish coherence across distinct yet interrelated strands of inquiry.

The first article provides a systematic literature review on the role of boundary objects (BOs) in people-centred smart cities, shedding light on how these artefacts mediate stakeholder collaboration and participatory governance. The second article introduces the Nested-Cyclical Model (NeCyM), a conceptual framework for understanding co-evolutionary processes between governance, innovation, and entrepreneurship in digitally mediated ecosystems. The third article offers an empirical investigation into the New European Bauhaus initiative, highlighting the value tensions and institutional ambiguities that grassroots projects face when translating normative frameworks into action.

While this thesis consolidates its primary contributions across these three core studies, it also lays the groundwork for further inquiry. Two ongoing research papers, on participatory AI governance and collaborative readiness, build upon the theoretical foundations established herein, extending the investigation into contemporary domains such as digital transformation, algorithmic governance, and institutional capacity.

I would like to express my gratitude to the scholars, practitioners, and civic actors who informed and inspired this work. I also wish to thank my doctoral supervisors and colleagues whose guidance has been instrumental throughout this academic journey. It is my hope that this volume not only advances academic discourse but also contributes meaningfully to the co-creation of more just, inclusive, and resilient governance systems.

Contents

List of Publications

The list of the author's publications, on the basis of which the thesis has been prepared:

I **Paper1** - Esposito, G, Bertello, A., Mora, L. (2025)
How do boundary objects influence people-centred smart cities? A systematic literature review
Review of Managerial Science (2025)
https://doi.org/10.1007/s11846-025-00835-8

II **Paper2** - Esposito, G., Amitrano C., Troise C., Yahiaoui D. (2025)
Conceptualising Governance Pathways for Digital Entrepreneurial Ecosystems: A Nested-Cyclical Framework
International Entrepreneurship and Management Journal (2025)

III **Paper3** - Esposito, G., De Bernardi, P., Bertello, A. and Vrontis, D. (2025)
Value tensions and actionable knowledge in grassroots innovation: a study of invitational ambiguity and implementation challenges
Journal of Knowledge Management, Vol. 29 No. 2, pp. 372–392
https://doi.org/10.1108/JKM-04-2024-0385

Author's Contribution to the Publications

Contribution to the papers in this thesis are:

I **First and Corresponding Author - How do boundary objects influence people-centred smart cities? A systematic literature review**

Gabriella Esposito led the design and execution of this study, formulating the research question, developing the conceptual framework, and constructing the analytical model. She designed the methodology based on a systematic literature review (SLR) following the PRISMA protocol and carried out the qualitative coding and synthesis of the selected sources. In addition to drafting the manuscript, she refined the structure and language, managed the submission and peer-review process, and coordinated inputs from co-authors to ensure a cohesive and high-quality publication.

II **First and Corresponding Author - Governance Pathways for Digital Entrepreneurial Ecosystems: A Nested-Cyclical Framework**

Gabriella Esposito was responsible for the full conceptual development of the study, including the formulation of the research question, the design of the theoretical framework, and the development of the Nested-Cyclical governance model. She adopted a conceptual methodology grounded in literature across innovation, entrepreneurship, governance, and digital transformation, and conducted the qualitative analysis of key theoretical contributions. She authored the initial manuscript, refined it for clarity and rigour, managed the peer-review process, and integrated co-authors' contributions throughout the development of the final version.

III **First and Corresponding Author - Value tensions and actionable knowledge in grassroots innovation: a study of invitational ambiguity and implementation challenges**

Gabriella Esposito conceived and designed the study, defining the research question, theoretical framework, and analytical model. She selected a qualitative embedded multi-case study approach, designed and implemented the research instruments, and led the data collection and analysis. She performed the qualitative coding of interviews and developed visual and tabular outputs to synthesise findings. Gabriella drafted the manuscript, managed the submission and review process, and ensured the integration of co-authors' contributions, shaping a coherent and methodologically robust final paper.

Abbreviations

AI	Artificial Intelligence
BO	Boundary Object
CG	Collaborative Governance
DT	Digital Technology
EE	Entrepreneurial Ecosystem
EU	European Union
ICT	Information and Communication Technology
JRC	Joint Research Centre
MLP	Multi Level Perspective
NEB	New European Bauhuas
NeCyM	Nested-Cyclical Mode
NIS	National Innovation System
PRISMA	Preferred Reporting Items for Systematic reviews and Meta-Analyses
SLR	Systematic Literature Review
RQ	Research Question
WOS	Web of Science

1 Introduction

Contemporary urban and regional systems are undergoing profound transformations driven by the converging pressures of digitalisation, climate change, and deepening socio-economic inequalities. These challenges transcend sectoral and disciplinary boundaries, necessitating not only technological solutions but also governance approaches that are adaptive, inclusive, and capable of coordinating complex systems of action across various scales. In this evolving context, understanding how governance interacts with innovation and stakeholder engagement has become a critical concern for both scholars and policymakers (Ansell et al, 2008; Emerson et al, 2012; Fung, 2015; Haagensen, 2024, Mazzucato, 2018). However, while the literature on collaborative governance (CG), digital transformation (DT), and participatory innovation is expanding, significant knowledge gaps persist. In particular, the mechanisms through which collaborative tools, institutional frameworks, and normative values are operationalised in real-world settings remain underexplored, especially across multi-scalar environments ranging from people-centred cities to entrepreneurial innovation ecosystems and grassroots, community-led initiatives (Nicolini et al., 2021; Peters and Pierre, 1998; Roysen et al., 1994; Sørensen and Torfing, 2009 and 2011; Wirtz and Müller, 2023). There is a pressing need for integrative approaches that can elucidate how governance systems evolve, interact, and adapt across such diverse yet interconnected domains. This doctoral research is situated at this critical juncture. It advances a multi-scalar and interdisciplinary perspective on governance for innovation, aiming to bridge the conceptual and practical dimensions of collaborative action in the context of digital and ecological transitions. By combining theoretical development with empirical exploration, the thesis addresses three main cross-cutting research questions:

(RQ1) How do collaborative tools and artefacts facilitate participatory governance and knowledge exchange across various innovation context, from cities to grassroots initiatives?

(RQ2) In what ways do governance mechanisms evolve in response to digital transformation, stakeholder agency, and entrepreneurial dynamics within urban and regional innovation ecosystems?

(RQ3) How can multi-level governance frameworks facilitate the institutionalisation of value-driven innovation, ensuring that normative goals such as sustainability, inclusion, and aesthetics are translated into actionable practices?

The three cross-cutting research questions proposed in this thesis have been meticulously designed to reflect the cumulative and integrative nature of the research journey. They encapsulate the complex interplay between governance, innovation, participation, and value translation across various levels of analysis, ranging from artefacts and collaborative tools to institutional frameworks and ecosystem-wide dynamics (Ansell and Gash, 2008; Bianchi et al., 2021; Hossain, 2016; Meijer A, Bolívar, 2016; Mora et al., 2023; Nilssen, 2019; Rhodes, 1996; Ruhlandt, 2018; Schot and Steinmueller, 2018). The rationale for selecting these questions lies in their capacity to bridge the three published papers and to articulate a coherent line of inquiry that fosters both theoretical advancement and practical relevance.

The first research question—*How do collaborative tools and artefacts facilitate participatory governance and knowledge exchange across diverse innovation contexts, from cities to grassroots initiatives?* arises directly from the conceptual foundations established in **Paper 1**. It examines the enabling role of boundary objects (BOs) as mediators of participation and co-creation in people-centred cities. However, this inquiry extends beyond the city context by acknowledging the presence and significance of similar tools (such as design-led artefacts, digital platforms, and collaborative spaces) in grassroots and community-led initiatives, as explored in **Paper 3**. Consequently, the question lays the groundwork for understanding how material and discursive tools shape and enhance collaborative engagement across various domains and scales.

The second question—*In what ways do governance mechanisms evolve in response to DT, stakeholder agency, and entrepreneurial dynamics across urban and regional innovation ecosystems?*—derives from the theoretical model developed in **Paper 2** (the Nested-Cyclical Model, NeCyM). It positions governance not as a fixed structure but as a dynamic, iterative process co-produced by multiple actors in response to technological and institutional shifts. This question is cross-cutting in nature, as it facilitates the integration of empirical insights from **Paper 3**, which highlights the necessity of adaptive governance to manage tensions in grassroots projects, and **Paper 1**, which demonstrates how tools like BOs can drive change at the institutional interface. This question underpins the thesis's central claim that governance systems must evolve to remain inclusive, responsive, and context-sensitive.

The third question—*How can multi-level governance frameworks support the institutionalisation of value-driven innovation, ensuring that normative goals such as sustainability, inclusion, and aesthetics are translated into actionable practices?* addresses the challenges explored in **Paper 3**, where value tensions arise in the operationalisation of grassroots innovation. It also reflects the normative aspirations embedded in both **Paper 1** and **Paper 2**, which emphasise the necessity for governance systems that not only foster innovation but are also groundded in shared public values. This question is particularly pertinent to policy implementation and aligns with the empirical contexts examined in the conference proceedings related to the New European Bauhaus (NEB), providing a pathway for connecting high-level ambitions to local experimentation and institutional embedding.

Together, these three questions offer a robust framework for a doctoral thesis that is both theoretically grounded and practically impactful. They facilitate a layered analysis that encompasses: the *artefactual and operational level* (**RQ1**), the *systemic and institutional level* (**RQ2**), and the *normative and policy level* (**RQ3**).

This layered approach reinforces the thesis's contribution to the fields of CG, urban innovation, and sustainability transitions. It also ensures that the research provides not only conceptual clarity but also actionable insights for policymakers, designers, and community innovators striving for inclusive and adaptive governance in an era of uncertainty and change.

1.1 Research Structure and Contributions

Paper 1 investigates the role of BOs, which areconceptual or material artefacts such as living labs, participatory platforms, and collaborative documents, in facilitating communication, knowledge exchange, and stakeholder alignment in people-centred

cities. Through a SLR following the PRISMA protocol (Liberati, 2009), the paper addresses a critical gap in the urban governance literature by conceptualising how BOs can be designed to balance flexibility and structure, engagement and clarity, as well as inclusivity and efficiency. It provides both a theoretical and practical framework for integrating BOs into city strategies aimed at fostering inclusive innovation.

Paper 2 introduces the *NeCyM*, a conceptual framework that reconceptualises the co-evolution of governance, innovation, and entrepreneurship within digitalised innovation ecosystems. In contrast to linear, top-down models, the NeCyM presents governance as a generative and reflexive system shaped by iterative feedback, shared ownership, and stakeholder-driven learning. Drawing on insights from entrepreneurial ecosystem (EE) theory, CG, and DT, the model offers an integrated structure to guide policy design and institutional reform across innovation districts, cities, and regional platforms.

Paper 3 extends and grounds the conceptual insights of the first two papers through an empirical analysis of *community-led innovation within multi-level governance arrangements*, using the NEB initiative as a case study (NEB EU, 2023). It focuses on how grassroots projects operationalise normative values such as sustainability, aesthetics, and inclusion, while exploring the tensions that arise from ambiguous roles, institutional expectations, and local agency. Drawing on collective action theory (Ostrom, 1990) and recent frameworks in grassroots innovation, the study examines the capacity of collaborative tools and adaptive governance mechanisms—conceptualised in the previous papers—to support inclusive innovation in practice. This final paper serves as both a validation and contextual refinement of the NeCyM and BO frameworks, specifically within decentralised and participatory settings.

1.2 Aims and Objectives

The overarching objective of this thesis is to enhance both theoretical and practical knowledge *regarding the design and sustainability of governance systems that support innovation which is context-sensitive, inclusive, and adaptive to complexity.* The thesis pursues four interrelated aims: (1) to develop conceptual and analytical frameworks that integrate governance, innovation, and stakeholder engagement across multiple levels; (2) to investigate how collaborative artefacts and participatory tools function within dynamic governance environments; (3) to explore the interaction between policy design, institutional arrangements, and grassroots practices in shaping innovation trajectories; and (4) to provide practical guidance for policy and governance reform aimed at fostering inclusive and sustainability-oriented innovation.

1.3 Theoretical Contribution and Practical Relevance

Together, the three papers contribute to a multi-layered theoretical perspective and a practice-informed framework for designing governance systems that can address the challenges of today's complex innovation environments. The dissertation makes several key contributions to the literature: (1) It introduces novel conceptual models, specifically, the *BO framework* and the *NeCyM model*, that integrate stakeholder interaction,

institutional dynamics, and entrepreneurial agency; (2) It enhances understanding of *how participatory instruments can be embedded in institutional processes* across diverse spatial and governance contexts; (3) It offers empirical insights into *how normative policy values are translated into practical action* within community-led initiatives, highlighting the conditions necessary for inclusive, context-sensitive innovation.

Ultimately, this thesis addresses the pressing need to transcend procedural or technocratic notions of governance. It advocates for a *reconceptualisation of governance as a co-evolutionary and enabling process, one that can align strategic ambitions with local agency while navigating the inherent tensions of transformation.* By providing both theoretical advancement and practical orientation, this research contributes to the development of more democratic, resilient, and innovative urban and regional futures.

2 Literature Review - Framing Governance for Innovation in Complex Systems

The governance of innovation in increasingly complex, dynamic, and interdependent urban and regional environments necessitates a fundamental rethinking of traditional policy and institutional paradigms (Ansell and Gash, 2008; Bianchi et al., 2012; Emerson et al., 2012; Meijer and Bolívar, 2016; Rhodes, 1996; Sørensen and Torfing, 2011). In response to the mounting pressures of climate change, DT, and social inequality, scholars across various fields, including urban studies, entrepreneurship, sustainability science, and public administration, have advocated for adaptive, participatory, and decentralised governance models that promote inclusive innovation and stakeholder engagement. However, despite this shared ambition, the related research traditions often remain fragmented, exhibiting limited theoretical integration and cross-scalar coherence.

This literature review amis to bridge these silos by promoting a *multi-scalar and interdisciplinary understanding of CG*. It achieves this by examining three critical and interrelated thematic areas, each corresponding to one of the core contributions of this thesis: (1) BOs and their role in people-centred cities; (2) entrepreneurial governance and innovation ecosystems; and (3) grassroots innovation and collective action within multi-level institutional arrangements. Collectively, these perspectives inform the development of conceptual models and empirical analyses that investigate how governance systems co-evolve with innovation practices and how normative values are translated into action.

2.1 Boundary Objects and People-Centred Cities

The concept of BOs, first introduced by Star and Griesemer (1989), describes artefacts, models, or discursive tools that facilitate coordination across distinct knowledge domains or "social worlds." BOs are characterised by their dual nature: they are robust enough to maintain shared meaning while being flexible enough to be interpreted differently by diverse stakeholders (Benn and Martin, 2010; Benn et al., 2013; Caccamo et al., 2023; Marheineke et al., 2016). Initially developed within the sociology of science, the BO framework has since gained prominence in organisation studies, innovation research, and, more recently, urban governance. In the urban context, BOs are increasingly recognised as essential components of participatory urban planning and innovation governance (Haagensen, 2024; Hawkins et al., 2017; Karaba et al., 2023). Tools such as living labs, citizen assemblies, participatory platforms, and digital co-creation environments serve as boundary infrastructures that mediate interactions between municipal authorities, private actors, civil society organisations, and citizens. However, while these tools are often celebrated for their potential to foster inclusion and innovation, there remains a lack of systematic analysis regarding their design principles, governance functions, and implementation challenges within urban ecosystems (Nicolini et al., 2012; Shepherd et al., 2023; Wirtz and Müller, 2023).

This thesis addresses the conceptual gap by developing a typology of BOs tailored to people-centred cities, with attention to the trade-offs between integration and simplicity, engagement and exclusion, and adaptability and coherence. It argues that BOs, when intentionally designed and strategically deployed, can enhance stakeholder alignment and reinforce adaptive governance capacities in complex urban environments.

2.2 Governance, Innovation, and Entrepreneurial Ecosystems

Innovation and entrepreneurship are widely recognised as engines of transformation in cities, regions, and economies. Foundational theories, such as Schumpeter's model of *creative destruction* (1934) and the National Innovation Systems (NIS) framework (Freeman & Perez, 1988), have historically regarded innovation as a macro-level process shaped by national policy and institutional arrangements. More recent developments have shifted the focus towards territorially embedded EEs that emerge from networks of interdependent actors, institutions, and resources (Stam & van de Ven, 2021; Wurth et al., 2022). Complementing these meso-level perspectives, effectuation theory (Sarasvathy, 2001) introduces a micro-level understanding of entrepreneurial agency, highlighting how actors navigate uncertainty and co-create opportunities through available means, partnerships, and iterative experimentation. However, these perspectives often overlook the governance structures that either enable or constrain innovation across scales. In parallel, governance theory has evolved from hierarchical models of state control towards frameworks that emphasise collaborative, networked, and integrative forms of coordination (Chaudhary et al., 2024; Rhodes, 1996; Emerson et al., 2012). Notable models such as Ansell and Gash's (2008) CG Framework and Emerson's Integrative Framework provide structured accounts of how public and private actors co-create policy and manage shared resources. Yet, these models frequently treat digitalisation and entrepreneurship as external contingencies, rather than as embedded forces shaping the evolution of governance from within.

This thesis addresses a theoretical gap by developing the NeCyM, a novel framework that positions governance, entrepreneurship, and innovation as co-evolving processes. The NeCyM captures the recursive and adaptive nature of innovation systems, emphasising feedback loops, decentralised coordination, and institutional learning as fundamental mechanisms for systemic change (Bianchi et al., 2021). It offers a flexible tool for analysing governance transformation in urban, regional, and digitally mediated ecosystems.

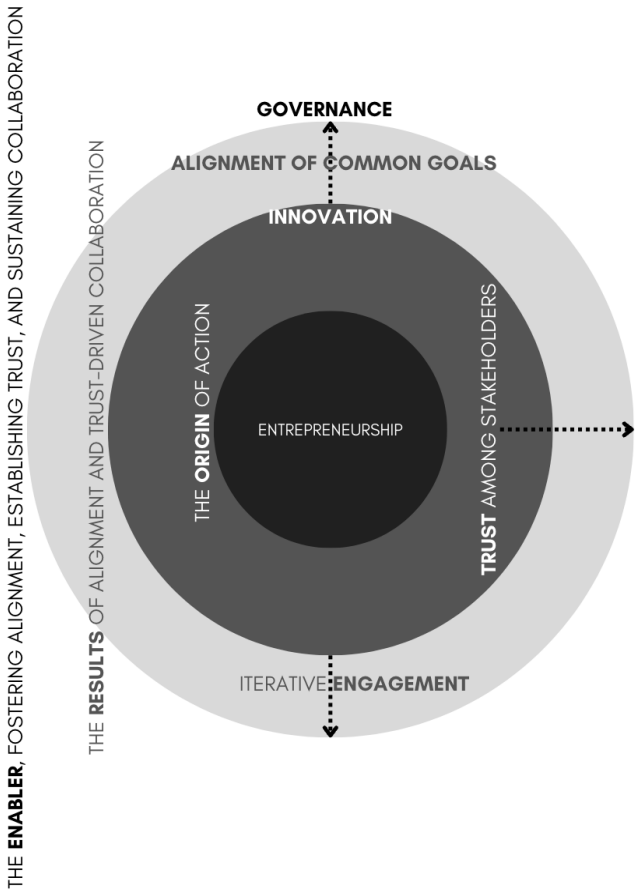

Fig.1 NeCyM for Entrepreneurial Innovation (Source: Author's own elaboration, 2025)

2.3 Grassroots Innovation and Collective Action under Multi-Level Governance

The third strand of literature explores grassroots innovation, defined as community-led, value-driven initiatives that aim to address social and environmental challenges outside conventional market or state structures (Engels et al., 2019; Hossain, 2016; Roysen et al., 2024; Seyfang & Smith, 2007). These initiatives often emerge in response to systemic exclusion or unmet needs and emphasise local knowledge, social justice, and sustainability. Conceptual frameworks such as the Grassroots Innovation Movement (Smith et al., 2014), the Inclusive Innovation Framework (Heeks et al., 2013), and the Multi-Level Perspective on socio-technical transitions (Geels, 2002; 2019) underscore the role of grassroots actors in introducing alternative innovation trajectories. In practice, however, grassroots projects face numerous challenges in translating normative values—such as sustainability, inclusion, and aesthetics—into actionable structures. These tensions are evident in EU-level initiatives such as the NEB, which seek to mobilise community-led innovation while operating within institutionalised governance frameworks

(Seyfang and Haxeltine, 2012; Sørensen E, Torfing, 2011). To address these dynamics, Ostrom's (1990) theory of collective action and commons governance provides valuable insights into how communities manage shared resources through self-organisation, norm enforcement, and adaptive rules. However, empirical applications of these frameworks in the context of urban innovation remain limited. This thesis builds on Ostrom's work to analyse the institutional ambiguity, role misalignment, and participatory tensions that shape grassroots engagement under multi-level governance regimes.

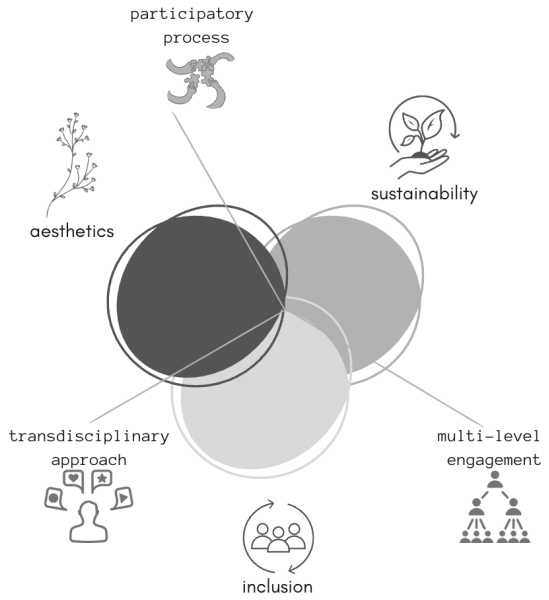

Fig.2 NEB framework (Source: Author's own elaboration, 2025)

2.4 Towards an Integrative Perspective: Research Gap

Across the three thematic domains explored in this thesis, BOs in people-centred cities, governance in digital EEs, and value operationalisation in grassroots innovation—there emerges a unifying and underexplored research gap.

There is a lack of understanding regarding how collaborative tools, entrepreneurial agency, and normative policy values are effectively mobilised and integrated within multi-level governance systems to promote inclusive, adaptive, and sustainability-oriented innovation.

More specifically, the literature highlights the following interrelated gaps:

- **BOs**, although increasingly recognised as facilitators of stakeholder engagement and knowledge exchange, remain under-theorised regarding their capacity to support adaptive governance and multi-actor coordination across spatial and institutional scales in city environments.

- **Governance and innovation frameworks** frequently adopt siloed or linear perspectives, negleting to consider the recursive and co-evolutionary dynamics between EEs, DT processes, and institutional learning and adaptation.

- The **translation of normative values**, such as sustainability, aesthetics, and inclusion, into actionable knowledge within community-led initiatives is inadequately conceptualised, particularly at the intersection of grassroots agency and top-down regulatory and policy frameworks.

- Most existing models inadequately address the complexity of **multi-level governance**, often overlooking the vertical and horizontal interplay between micro-level collaborative artefacts, meso-level institutional mechanisms, and macro-level policy architectures.

In response, this thesis presents an integrative and multi-scalar analytical perspective that reconceptualises governance not as a static institutional arrangement, but as a dynamic, iterative process of negotiation, experimentation, and shared value creation. It contributes to bridging theoretical and empirical silos by providing new insights into *how CG can be designed and enacted to foster more inclusive and resilient innovation ecosystems across various sectors, territories, and levels of governance.*

3 Methodology - A Multi-Layered Strategy

This doctoral research adopts a cumulative, multi-method approach that reflects the complexity and multi-scalar nature of the governance and innovation phenomena under investigation. Each paper employs a distinct methodological design aligned with its specific research objective, while collectively contributing to the thesis's overarching aim: to advance an integrative understanding of how collaborative tools, institutional structures, and value frameworks interact to shape governance and innovation across urban and regional contexts.

The research is guided by a multi-faceted strategy that combines:

(Paper1) a **SLR** to ground the analysis in current knowledge and identify conceptual gaps;

(Paper 2) a **conceptual modelling approach** to developing an original framework that integrates innovation, entrepreneurship, and governance;

(Paper 3) an **embedded qualitative case study** that empirically explores how these dynamics manifest in practice within a multi-level governance environment.

3.1 Methodology and Methods

Paper 1 – Systematic Literature Review (SLR)

To investigate the role of BOs in people-centred cities, **Paper 1** employs a SLR following the PRISMA protocol (Liberati et al., 2009; Tranfield et al., 2003). This methodological choice ensures rigor, transparency, and replicability in the review process, reducing bias and enabling a structured synthesis of both theoretical and empirical literature (Behl et al., 2022; Centobelli et al., 2020). The review focused on identifying how BOs—particularly collaborative tools and spaces—facilitate innovation, engagement, and knowledge sharing in city governance. The search protocol was applied to the Scopus and Web of Science databases, yielding an initial corpus of 3,113 articles. After applying inclusion and exclusion criteria and conducting full-text screening, a final sample of 39 high-quality journal articles was selected, covering the period from 2014 to 2024 and focusing on the fields of business and management. Data analysis was conducted through qualitative content analysis, employing open and axial coding to identify key themes related to Bos' governance functions and design characteristics of BOs (Strauss & Corbin, 1998; Secinaro et al., 2022). Inductive and deductive coding cycles were utilised to extract insights regarding how BOs support collaborative practices in city initiatives. This method facilitated the development of a typology of BOs and a conceptual framework to inform their strategic deployment in urban governance settings.

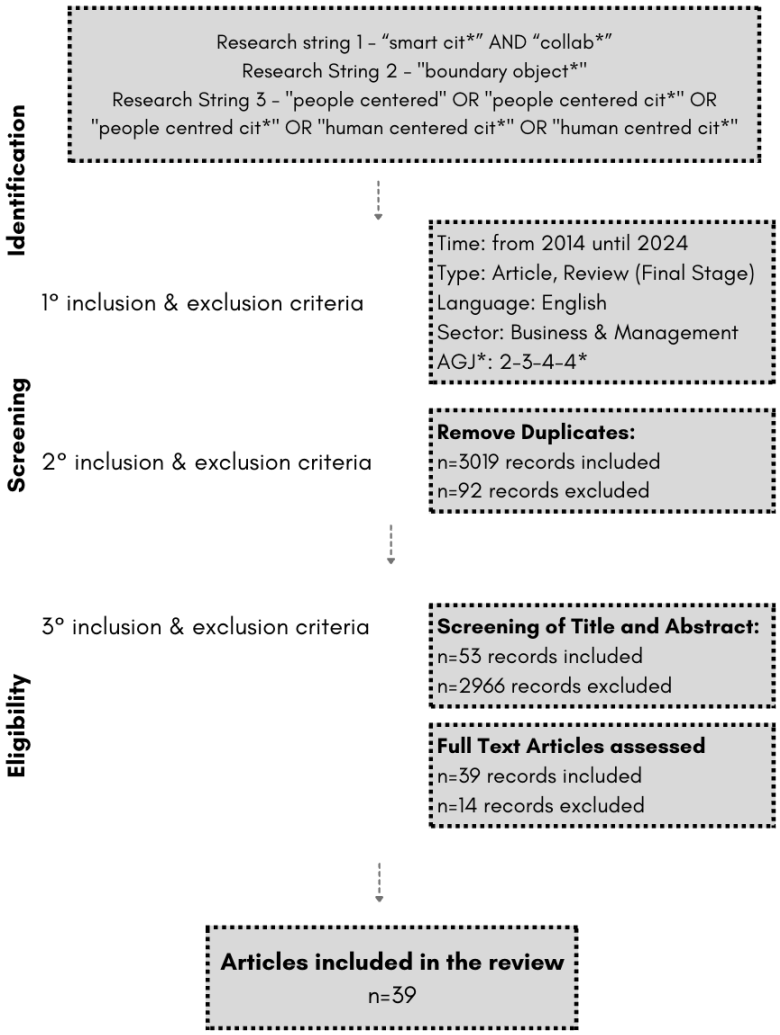

Fig.3 PRISMA protocol (Source: Author's own elaboration, 2025)

Paper 2 – Conceptual Modelling and Abductive Theorisation

Paper 2 develops the NeCyM framework of entrepreneurial innovation through a conceptual research design grounded in the abductive logic of theory building (Donaldson et al., 2021; Schiavone et al., 2022). The methodology unfolds in three interrelated stages:

- *Purposive literature review*: The study conducts a purposive literature review, drawing from both foundational and emerging work in innovation studies, entrepreneurship theory (including effectuation and EEs), DT, and governance.

The selection criteria emphasised theoretical relevance, conceptual clarity, and representativeness across disciplines (Guerrero & Espinoza-Benavides, 2021; Liyanaarachchi et al., 2024).

- *Thematic synthesis and framework integration*: An iterative coding and clustering process was employed to identify common constructs, conceptual tensions, and theoretical gaps within the reviewed literature. Key dimensions (governance, entrepreneurship, innovation) were integrated to illustrate their dynamic interdependence in digitally mediated ecosystems.
- *Abductive Theorisation:* The model was developed through iterative engagement with the literature, complemented by illustrative empirical examples, to conceptualise governance as a co-evolving, recursive system. Particular attention was paid to multi-level feedback loops, stakeholder co-creation, and institutional adaptability (Donaldson et al., 2021; Schiavone et al., 2022).

This methodology supports the development of a generalisable yet context-sensitive framework that bridges theory and practice, thereby laying the foundation for future empirical validation and application in policy and governance design.

Paper 3 – Embedded Qualitative Case Study

Paper 3 adopts an exploratory qualitative research design, employing an embedded case study approach (Yin, 2009) to investigate how grassroots innovation initiatives translate abstract policy values—such as those of the NEB—into practical actions. The NEB initiative serves as the primary case, with nine prize-winning projects acting as embedded units of analysis. This approach facilitates the exploration of value tensions, role ambiguity, and governance complexity from both bottom-up (project-level) and top-down (policy-level) perspectives. Data were collected through a multi-stage process:

- An online self-assessment survey was distributed to NEB finalist projects;
- Secondary data obtained from project fiches, websites, and social media platforms;
- Semi-structured interviews were conducted with nine project leaders and two representatives from the NEB Joint Research Centre (JRC).

Interviews were conducted online, recorded with consent, and transcribed for analysis. The questions explored how NEB values were interpreted, implemented, and sustained over time, as well as the perceived support from institutional actors. Thematic saturation was employed to determine the adequacy of the sample. Data analysis followed the Gioia methodology (Gioia et al., 2012), which involved three stages: (1) first-order concepts (informant-centric codes), (2) second-order themes (researcher-centric categories), and (3) aggregate dimensions. This method facilitates the development of grounded theory and enhances the transparency and rigor of inductive insights, making it well-suited for exploratory studies within complex governance environments.

Table I - PhD Thesis Methodological Frame

Paper	Research Problem	Aim/Purpose	Research Strategy and Data Collection Methods	Level of Analysis	Main Research Questions
Paper 1	Lack of systematic understanding of how boundary objects (BOs) facilitate innovation and engagement in people-centred cities.	To synthesise literature and develop a framework on the role of BOs in urban innovation.	Systematic Literature Review (SLR) using PRISMA protocol; qualitative content analysis of 39 articles.	Conceptual and empirical literature on cities and BOs.	What role do BOs play in fostering innovation, engagement, and knowledge exchange in people-centred cities?
Paper 2	Insufficient conceptual integration of governance, innovation, and entrepreneurship in digitally transforming ecosystems.	To develop a conceptual model (NeCyM) that captures co-evolutionary dynamics of governance and innovation.	Conceptual modelling; purposive literature review and iterative theoretical synthesis across disciplines.	Theoretical/conceptual level: integration of multi-level governance, entrepreneurship, and innovation.	How do governance, DT, and entrepreneurial agency co-evolve in shaping innovation ecosystems?
Paper 3	Limited empirical knowledge of how grassroots initiatives operationalise normative values within multi-level governance frameworks.	To explore how community-led projects interpret and implement NEB values, and the governance tensions they face.	Exploratory qualitative case study; self-assessment survey, secondary data analysis, semi-structured interviews.	Empirical level: grassroots project-level and institutional-level (NEB/JRC) perspectives.	How do community-led entrepreneurial initiatives operationalise collective knowledge and normative values within multi-level governance systems?

3.2 Research Design Alignment

This cumulative dissertation employs a multi-method research design, strategically structured to address three interrelated research questions.

(RQ1) How do collaborative tools and practices influence the design and implementation of inclusive governance in urban innovation contexts?

(RQ2) How can entrepreneurial agency and digital transformation be integrated into governance frameworks to foster resilient, co-creative innovation ecosystems?

(RQ3) How are normative values (e.g., sustainability, inclusion, and aesthetics) translated into actionable knowledge across multi-level governance contexts, within community-led initiatives?

The thesis comprises three distinct yet interconnected studies, each employing a complementary methodological approach:

- **Paper 1** employs a **SLR** to map and conceptualise the role of BOs in people-centred cities. Through qualitative coding and thematic synthesis, this paper establishes the conceptual groundwork for understanding collaborative artefacts and their role in participatory governance.
- **Paper 2** adopts a **conceptual theory-building approach**, developing the NeCyM for Entrepreneurial Innovation. Drawing on an integrative synthesis of governance, innovation, and entrepreneurship literature, it constructs a dynamic, multi-level framework for understanding how co-evolutionary processes emerge in digital ecosystems.
- **Paper 3** employs a **qualitative, embedded multiple case study methodology**, grounded in interviews, document analysis, and stakeholder narratives from grassroots projects in the NEB. It empirically investigates how institutional ambiguity and value tensions are navigated in bottom-up innovation initiatives within the broader context of EU policy.

Together, these methodological approaches ensure triangulation across theory development, conceptual refinement, and empirical application. The design facilitates an iterative dialogue between theory and practice, capturing the complexity of governance and innovation dynamics within both structured policy frameworks and emergent grassroots experimentation. By bridging conceptual exploration with real-world validation, the dissertation provides a robust, context-sensitive contribution to contemporary scholarship on governance and innovation.

4 Findings

This section presents the core results of the three key research papers that underpin this doctoral thesis. Each paper provides a distinct analytical perspective on CG, innovation, and stakeholder engagement across various urban contexts and scales. Although the thematic focuses of the papers differ, ranging from BOs in city governance to EEs and grassroots innovation, they collectively offer a coherent and multi-layered understanding of how inclusive, adaptive, and context-sensitive governance systems can be cultivated. The subsequent sub-sections summarise the main findings and implications of each paper.

Paper 1: Boundary Objects in People-Centred Cities

This paper presents a systematic review of the role of BOs in fostering innovation, engagement, and resource sharing within the context of cities. It identifies living labs, collaborative communities, ICT tools, and participatory mechanisms as key artefacts that connect diverse stakeholder groups. The findings demonstrate that *BOs serve as facilitators of inclusive and adaptive governance*; however their effectiveness is contingent upon clarity, alignment, and the ability to balance flexibility with structure. This study establishes the conceptual foundation for understanding how artefacts support deliberative processes and cross-sectoral collaboration in people-centred urban environments.

Paper 2: Governance Pathways for Digital Entrepreneurial Ecosystems

The second paper introduces the NeCyM as a conceptual framework that integrates innovation theory, entrepreneurship studies, and CG. It reconceptualises governance as a recursive, multi-scalar process shaped by entrepreneurial action, institutional feedback loops, and adaptive learning. The study addresses a critical gap in governance models that often overlook digital entrepreneurship as an endogenous driver of institutional transformation. Through this model, the paper provides an i*ntegrated perspective for analysing the interplay between EEs and governance dynamics in the context of complexity and digitalisation*.

Paper 3: Value Tensions and Actionable Knowledge in Grassroots Innovation

The third paper investigates how community-led initiatives operationalise normative policy values (such as inclusion, aesthetics, and sustainability) within participatory urban innovation contexts. Employing a qualitative methodology grounded in the NEB, the study identifies three primary barriers to implementation: role misalignment, invitational ambiguity, and value conflicts. These barriers hinder the translation of policy ideals into actionable practices. The paper provides empirical evidence on *how governance ambiguity and stakeholder heterogeneity shape the lived experience of bottom-up innovation and highlights the necessity for enabling frameworks that support iterative negotiation and value alignment*.

4.1 How Do Boundary Objects Influence People-Centred Cities? A Systematic Literature Review - Overview about the Research Results

This paper aims to explore how BOs support the development of people-centred cities by enabling collaboration, innovation, and participatory urban governance. The research investigates the extent to which BOs function as mediating structures and tools that facilitate interaction among diverse urban stakeholders.

4.1.1 Main Findings of Paper 1

Through a SLR following PRISMA protocols, this paper categorises BOs into collaborative spaces and tools across three primary functions: innovation, sharing, and engagement. Key BOs include living labs, collaborative communities, innovation networks, ICT platforms, blockchain-based tools, and participatory budgeting mechanisms. The findings highlight how BOs facilitate stakeholder integration, resource mobilisation, and collective problem-solving, while also identifying critical tensions related to inclusion, complexity, and governance flexibility. Tables 2–5 (see *Annex 1 - Research Paper 1* for comprehensive tables) provide a detailed mapping of BO types, illustrating their operational roles and contextual challenges.

4.1.2 Theoretical Contributions - Paper 1

The paper presents three key theoretical contributions: (1) It conceptualises BOs as both structured and adaptive mechanisms within people-centred city initiatives, thereby extending *BO theory in the realm of urban governance scholarship*; (2) it articulates the *paradoxes inherent in designing BOs*, including the tension between rigidity and flexibility, integration and complexity, and engagement and exclusion; (3) it develops a framework for evaluating BOs based on to attributes such as clarity, alignment, involvement, empowerment, and democratization, thereby contributing to theory-building at the intersection of collaboration, innovation, and urban systems thinking.

4.1.3 Practical Implications - Paper 1

The paper offers actionable insights for policymakers and urban practitioners. It advocates for the strategic use of BOs to develop more inclusive and adaptive urban initiatives by selecting tools that align with the specific goals and context of each urban intervention. Practical recommendations include *investing in stakeholder ICT literacy, fostering living labs as innovation incubators, and designing flexible yet structured governance mechanisms*. The research also underscores the importance of *balancing formal and informal structures to ensure both accountability and responsiveness in participatory processes*. The framework presented in Table 6 serves as a decision-support guide for implementing BOs in various urban settings.

4.2 Conceptualising Governance Pathways for Digital Entrepreneurial Ecosystems: A Nested-Cyclical Framework - Overview about the Research Results

This paper introduces and elaborates on the NeCyM, a novel conceptual framework that captures the *co-evolutionary dynamics between governance, innovation, and entrepreneurship*. The aim is to explore how these dimensions interact within digital EEs to support resilience, adaptability, and inclusive transformation, in response to the complexities of digitalisation, and sustainability imperatives.

4.2.1 Main Findings - Paper 2

The paper conceptualises EEs as cyclical and dynamic systems, in which governance is not a static background variable but rather an embedded, evolving force that co-shapes innovation and entrepreneurial action. The model distinguishes three interdependent dimensions: (1) *Entrepreneurship* as the agentic force that catalyses action, adapts institutions, and embeds innovation into scalable practices through experimentation and risk management; (2) *Innovation* as a collaborative, systemic process enabled by DT, mutual learning, and feedback loops that redefine governance and value creation; (3) *Governance* as a reflexive, enabling infrastructure for coordination, legitimacy, and long-term system alignment—capable of learning and transforming through entrepreneurial engagement and digital co-creation.

4.2.2 Theoretical Contributions - Paper 2

The NeCyM makes several original contributions to the fields of governance, entrepreneurship, and innovation studies:

1. Theoretically integrates diverse streams, including Effectuation Theory, the EE perspective, CG, and the Multi-Level Perspective (MLP), into a unified and adaptive model.
2. Reconceptualises governance as a transformational and co-evolving element, rather than merely a top-down enabler, positioning entrepreneurial agency and digital feedback as intrinsic drivers of institutional change.
3. This framework bridges the micro, meso, and macro levels by illustrating how individual experimentation (micro), ecosystem design (meso), and policy co-creation (macro) interact in iterative cycles of adaptation.
4. Advances governance theory by challenging linear, hierarchical, and stability-focused paradigms, proposing a decentralised, feedback-driven, and collaborative structure that is suitable for digital ecosystems.

4.2.3 Practical Implications - Paper 2

NeCyM provides a strategic and diagnostic framework for policymakers, urban practitioners, and ecosystem facilitators.

- For policymakers, it supports the design of regulatory sandboxes, participatory innovation councils, and inclusive funding schemes—emphasising the governance of transformation rather than mere administration.

- For innovation ecosystems, it identifies tools such as civic incubators, Artificial intelligence (AI) dashboards, blockchain systems, and participatory platforms (e.g., Decidim) to enhance transparency, co-creation, and scalability.
- For digital and territorial strategy, it emphasises application across various contexts—urban, rural, digitally advanced, and underserved regions—by promoting modularity, decentralisation, and cross-sector alignment.
- The model also emphasises the importance of systemic integration tools (e.g., systems design workshops, ecosystem maps, and scenario planning) to visualise and operationalise feedback and co-evolution.

4.3 Value Tensions and Actionable Knowledge in Grassroots Innovation: A Study of Invitational Ambiguity and Implementation Challenges - Overview about the Research Results

This study explores how grassroots innovation projects within the NEB framework address the challenge of translating aspirational policy values—sustainability, aesthetics, and inclusion—into actionable knowledge. This research examines the dual dynamics of value tensions and institutional misaligned, analysing how "invitational ambiguity" embedded in top-down policy design interacts with the realities of bottom-up implementation in community-led initiatives.

4.3.1 Main Findings - Paper 3

Two major findings emerge from this qualitative study:

1. **Tensions between NEB values**: Although the NEB framework articulates its three core values as synergistic, their practical realisation often proves problematic. Projects reported contradictions, such as conflicts between environmental sustainability and accessibility, or between aesthetic coherence and inclusive decision-making.
2. **Misalignments in institutional expectations**: The study reveals significant divergences between the NEB's strategic use of open-ended guidance and the expectations of grassroots projects for structured, hands-on support. The intended flexibility of "invitational ambiguity" often led to frustration, unmet expectations, and a perceived lack of institutional responsiveness.

These findings demonstrate that grassroots initiatives contend not only with resource limitations but also with the ambiguity inherent in value interpretation and role definition, demanding adaptive strategies for managing institutional uncertainty.

4.3.2 Theoretical Implications - Paper 3

This study offers several theoretical contributions:

- It advances the concept of *invitational ambiguity*, demonstrating its double-edged character: while enabling broad participation and interpretive flexibility, it can complicate implementation when expectations diverge.

- It extends Ostrom's collective action theory by analysing how ambiguous value framing and role expectations affect self-organisation, conflict resolution, and trust in community governance.
- It contributes to scholarship on *value integration in innovation management* by showing how aspirational values may conflict at the implementation stage and how local actors negotiate these trade-offs.
- It introduces the notion of *practical value conflict* into the governance and innovation literature, arguing that rhetorical alignment must be accompanied by procedural and institutional adaptability to be effective.

4.3.3 Practical Implications - Paper 3

The study provides actionable recommendations for practitioners, policymakers, and programme designers:

- *For practitioners,* it calls for adaptive frameworks and inclusive monitoring tools to help navigate trade-offs between competing values, while preserving the core identity of grassroots initiatives.
- *For policymakers,* it recommends the creation of decentralised support hubs, improved communication protocols, and iterative feedback mechanisms to bridge the gap between policy vision and local implementation. Policies should recognise value pluralism and permit flexible interpretations of compliance. *For managers,* it highlights the need for post-award engagement, mentorship structures, and better alignment between administrative timelines and the organic rhythms of community projects to prevent disillusionment and attrition.

4.4 Cross-Cutting Theoretical and Empirical Themes

This section synthesises the conceptual and empirical insights from the three research papers, structured around four overarching themes. These themes highlight recurring mechanisms, tensions, and innovations that underpin CG in urban transformations and EEs.

4.4.1 Collaborative Tools and Artefacts

All three papers underline the pivotal role of collaborative tools and artefacts in mediating governance innovation. **Paper 1** identifies boundary objects (BOs)—such as living labs, digital platforms, and cooperation protocols—as essential infrastructures for stakeholder coordination. **Paper 2** highlights co-creation mechanisms like participatory platforms, civic incubators, and regulatory sandboxes that stimulate iterative learning in complex ecosystems. **Paper 3** extends this by examining how participatory design practices within grassroots projects localise and reinterpret ambiguous policy values. Across the cases, these artefacts are not passive instruments but active interfaces through which governance becomes operational, adaptive, and negotiable. They act as anchoring mechanisms that foster alignment, while allowing for contestation and flexibility.

4.4.2 Multi-Level Governance Complexity

A shared insight is the necessity of conceptualising governance as a multi-scalar, co-evolutionary system. **Paper 1** shows how tools like innovation networks operate between local actors and broader city agendas. **Paper 2** formalises this through the NeCyM model, where nested, cyclical feedback loops connect governance, entrepreneurship, and innovation across spatial and temporal scales. **Paper 3** brings this to life through grassroots initiatives navigating the ambiguities of EU-level narratives and local realities. Collectively, the findings advocate for analysing governance not as a fixed institutional level but as a dynamic interplay of actors, artefacts, and rules across scales.

4.4.3 Normative Values and Institutionalisation

Normative values, such as sustainability, inclusion, and aesthetics, emerge as foundational yet contested elements across all studies. **Paper 3** highlights how semantic ambiguity surrounding these values facilitates mobilisation but creates friction during implementation. **Paper 1** reveals how normative commitments embedded in BOs structure participation in city projects. **Paper 2** frames these values as central to mission-oriented institutional transformation. Across the board, the research suggests that institutionalising values requires more than strategic alignment: it demands reflexive governance, context-sensitive tools, and an architecture capable of accommodating pluralism and iterative learning.

4.4.4 Entrepreneurial Agency and System Adaptation

The fourth theme addresses the role of entrepreneurial agency in driving institutional complexity and enabling systemic adaptation. In **Paper 2**, entrepreneurial actors are portrayed as institutional entrepreneurs driving change through iteration and coalition-building. **Paper 1** shows how actors mobilise BOs to generate shared understanding and collaborative intent. **Paper 3** provides rich empirical evidence of community-based entrepreneurs translating EU narratives into locally relevant initiatives. Across all studies, entrepreneurial agency is seen not as heroic individualism but as relational and embedded within enabling ecosystems. Together, these four themes directly address the thesis's overarching research questions:

(RQ1) How do collaborative tools and platforms shape stakeholder engagement and coordination in people-centred governance systems?

(RQ2) In what ways do institutional, entrepreneurial, and technological dynamics co-evolve to support adaptive governance in digitally mediated ecosystems?

(RQ3) How do normative value tensions influence the institutionalisation and operationalisation of grassroots innovation?

The papers answer these questions in distinct empirical and conceptual ways, but their synthesis reveals a broader insight: *collaborative governance is most effective when anchored in inclusive artefacts, embedded in multi-level systems, grounded in normative adaptability, and activated by distributed entrepreneurial agency*. This contributes an integrated understanding of governance in complex transition contexts and provides a pathway for more responsive, adaptive, and value-driven innovation systems.

5 Theoretical and Practical Implications

To consolidate the overarching contributions of this thesis, *Table II* synthesises its principal theoretical insights alongside corresponding implications for practice and policy. Drawing on the cross-cutting themes identified across the three empirical papers, the table illustrates how collaborative tools, entrepreneurial agency, and value-driven governance shape the transformation of urban innovation ecosystems. Governance is reconceptualised not as a static or hierarchical construct, but as an *evolving infrastructure informed by iterative processes, distributed agency, and institutional learning*. At the same time, the synthesis offers actionable guidance for urban policymakers, ecosystem enablers, and EU-level frameworks, such as the NEB and the Cities Mission, on *designing participatory structures, aligning incentives, and developing adaptive governance mechanisms capable of navigating complexity and delivering inclusive, sustainable outcomes.*

Table II - PhD Thesis Theoretical and Practical Implications

Dimension	**Theoretical Implications**	**Implications for Practice and Policy**
Governance as Adaptive Infrastructure	Reframes governance as a dynamic, co-evolutionary system shaped by entrepreneurial action, technological mediation, and iterative engagement. Challenges traditional static or linear models of governance.	Urban policymakers and EU-level initiatives (e.g., Mission Cities, NEB) should promote regulatory sandboxes, adaptive planning processes, and institutional flexibility to foster innovation.
Collaborative Tools and Boundary Objects	Confirms the role of boundary objects and co-creation tools as mediators of institutional translation and stakeholder alignment. Highlights the importance of design in enabling participation and governance experimentation.	Municipalities and innovation ecosystems should adopt boundary-spanning artefacts—such as living labs and platform-based participatory tools—to bridge policy–practice gaps and foster inclusive dialogue.
Normative Values and Value Tensions	Highlights the tensions between abstract normative values (e.g., inclusion, sustainability, aesthetics) and their operationalisation in practice. Extends Ostrom's framework to value-driven governance.	EU-level frameworks (e.g., NEB) should incorporate adaptive mechanisms to manage value pluralism, support context-specific interpretation, and enable conflict negotiation during implementation.
Entrepreneurial Ecosystems and Institutional Change	Extends ecosystem theory by embedding entrepreneurial agency as a key driver of governance transformation, beyond purely economic perspectives. Introduces	Ecosystem enablers (cities, regions, civic actors) should integrate entrepreneurial practices into governance structures through civic

Dimension	Theoretical Implications	Implications for Practice and Policy
	the NeCyM as a framework for analysing innovation–governance co-evolution.	incubators, public–private labs, and open innovation platforms.
Multi-Level and Hybrid Governance Models	Advances a multi-scalar perspective of collaborative governance, connecting micro-level tools, meso-level coordination mechanisms, and macro-level institutional incentives.	Policy frameworks should align funding schemes, participatory processes (e.g., citizen assemblies), and monitoring systems to enhance coherence and accountability across governance scales.

6 Closing Remarks

This thesis has explored the interplay between collaborative governance, entrepreneurial innovation, and grassroots institutionalisation across urban and regional transitions. Through a multi-paper dissertation format, it addressed the overarching research aim of understanding *how collaborative tools, institutional structures, and normative value frameworks shape innovation dynamics across different territorial and governance contexts*. The three core research papers collectively contributed to this aim from complementary perspectives. **Paper 1** provided a conceptual synthesis of boundary objects (BOs) as translational tools in people-centred cities, shedding light on their role in enabling cross-sector collaboration and participatory governance. **Paper 2** introduced the NeCyM framework of Entrepreneurial Innovation, offering a dynamic and co-evolutionary model linking governance, innovation, and entrepreneurship within digitally mediated ecosystems. **Paper 3** grounded these conceptual insights in practice, by examining how grassroots innovation projects under the NEB initiative navigate value tensions, institutional ambiguity, and implementation challenges in translating aspirational policy into action. A cross-cutting analysis of the three papers revealed linked themes, including the *mediating role of collaborative artefacts, the complexity of multi-level governance, and the adaptive function of entrepreneurial agency*. The thesis illustrated how these dimensions interact to influence governance transformation, collective learning, and ecosystem resilience. The triangulation of systematic literature review, theoretical modelling, and empirical case analysis provided methodological depth and breadth.

This doctoral research lays a strong foundation for *further inquiry into innovation-oriented governance systems*. Two ongoing research projects further extend this agenda by applying the thesis's conceptual contributions to emergent governance challenges in the digital and climate policy domains.

The first ongoing research, *"The Governance Curve: When Public Engagement Unlocks the Value of AI in Digital Governance"*, investigates how municipal Digital Governance Readiness (DGR) and public engagement in AI governance (PEAI) jointly influence the perceived usefulness of AI tools in climate policymaking. Based on original cross-national survey data, the study reveals a non-linear—specifically, inverse U-shaped—relationship between DGR and AI usefulness, in which both underdeveloped and overly complex digital infrastructures reduce perceived value. Crucially, high levels of civic participation offset this effect, supporting a more linear and positive perception of AI. Drawing on Mutual Adaptation Theory and Collaborative Governance Theory, the paper proposes a *co-adaptive governance model that emphasises the iterative interplay between institutional capacity, participatory engagement, and technological deployment.* The preliminary findings contribute to *debates on smart governance and participatory AI by positioning civic inclusion not as a normative add-on, but as a strategic condition for digital policy effectiveness*.

The second ongoing research, *"Advancing Collaborative Governance: Conceptualising Collaborative Readiness through Motivation, Engagement, and Capacity"*, introduces the emerging concept of *Collaborative Governance Readiness (CGR) as a dynamic, system-level condition that enables sustained collaboration in complex environments.* Using the Gioia methodology and empirical data from European climate governance initiatives, the study identifies five cross-cutting enablers—shared goals and incentives,

trust, leadership, transparency, and the availability of human and financial resources—that mediate the triadic relationship among motivation, engagement, and capacity for joint action (ndr. collaborative governance theoretical dimension). The CGR framework builds on and extends collaborative governance theory by offering *a diagnostic tool to assess and strengthen inclusive, adaptive ecosystems*. It shifts the focus from static institutional design to a more *process-oriented and relational understanding of governance readiness, with direct applications for cities implementing mission-oriented and transition-driven strategies*.

Together, these ongoing studies reinforce the theoretical and practical relevance of this doctoral work. They provide continuity in the *investigation of complex governance systems and advance a stakeholder-responsive approach to public innovation.* By linking adaptive digital transformation with participatory capacity-building, both projects offer actionable insights for developing inclusive and context-sensitive governance models capable of addressing 21st-century challenges—from climate change to urban inequality, misinformation and digital trust, multi-level governance coordination for green transitions. The next phase of this research trajectory will deepen interdisciplinary inquiry across innovation studies, governance theory, and digital transformation, while informing both EU-level policy frameworks and place-based governance practices. This thesis thus concludes not with closure, but with a renewed invitation to continue exploring how collaborative and entrepreneurial governance can shape more resilient, just, and future-oriented societies.

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PhD Thesis References

Ansell, C., and Gash, A. (2008). Collaborative Governance in Theory and Practice. Journal of Public Administration Research and Theory, 18(4), 543–571. https://doi.org/10.1093/jopart/mum032

Benn S, Martin A (2010) Learning and change for sustainability reconsidered: a role for boundary objects. Acad Manag Learn Educ 9(3):397–412. https://doi.org/10.5465/amle.9.3.zqr397

Benn S, Edwards M, Angus-Leppan T (2013) Organizational learning and the sustainability community of practice: the role of boundary objects. Organ Environ 26(2): 184–202. https://doi.org/10.1177/1086026613489559

Bianchi, C., Nasi, G., and Rivenbark, W. C. (2021). Implementing collaborative governance: models, experiences, and challenges. Public Management Review, 23(11), 1581–1589. https://doi.org/10.1080/14719037.2021.1878777

Caccamo M, Pittino D, Tell F (2023) boundary objects, knowledge integration, and innovation management: a systematic review of the literature. Technovation 122:102645. https://doi.org/10.1016/j.technovation.2022.102645

Chaudhary, S., Kaur, P., Ferraris, A., Bresciani, S., and Dhir, A. (2024). Connecting entrepreneurial ecosystem and innovation. Grasping at straws or hitting a home run? Technovation, 130, 102942. https://doi.org/10.1016/j.technovation.2023.102942

Echebarria C, Barrutia JM, Aguado-Moralejo I (2021) The Smart City journey: a systematic review and future research agenda. Innov Eur J Soc Sci Res 34(2):159–201. https://doi.org/10.1080/13511610.2020.1785277

Emerson, K., and Nabatchi, T. (2015). Evaluating the Productivity of Collaborative Governance Regimes: A Performance Matrix. Public Performance and Management Review, 38(4), 717-747. https://doi.org/10.1080/15309576.2015.1031016

Emerson, K., Nabatchi, T., and Balogh, S. (2012). An Integrative Framework for Collaborative Governance. Journal of Public Administration Research and Theory, 22(1), 1–29. https://doi.org/10.1093/jopart/mur011

Engels F, Wentland A, Pfotenhauer SM (2019) Testing future societies? Developing a framework for test beds and living labs as instruments of innovation governance. Res Policy 48(9):103826. https://doi.org/10.1016/j.respol.2019.103826

Ferraro, F., Etzion, D. and Gehman, J. (2015), "Tackling grand challenges pragmatically: robust action revisited", Organization Studies, Vol. 36 No. 3, pp. 363-390, doi: 10.1177/0170840614563742.

Fung, A. (2015). Putting the Public Back into Governance: The Challenges of Citizen Participation and Its Future. Public Administration Review, 75(4), 513–522. https://doi.org/10.1111/puar.12361

Geels, F.W. (2019), (2019), "Socio-technical transitions to sustainability: a review of criticisms and elaborations of the Multi-Level perspective", Current Opinion in Environmental Sustainability, Vol. 39, pp. 187–201, doi: 10.1016/j.cosust.2019.06.009

Haagensen N (2024) Boundary objects in complex governance systems: collective action clauses in European sovereign debt governance. J Eur Publ Policy 31(2): 586–609. https://doi.org/10.1080/13501763.2022.2143867

Hawkins B, Pye A, Correia F (2017) Boundary objects, power, and learning: the matter of developing sustainable practice in organizations. Manag Learn 48(3):292–310. https://doi.org/10.1177/1350507616677199

Hossain, M. (2016), "Grassroots innovation: a systematic review of two decades of research", Journal of Cleaner Production, Vol. 137, pp. 973-981, doi: 10.1016/j.jclepro.2016.07.140.

Karaba F, Roehrich JK, Conway S, Turner J (2023) Information sharing in public-private relationships: the role of boundary objects in contracts. Public Manag Rev 25(11):2166–2190. https://doi.org/10.1080/14719037.2022.2065344

Kuziemski, M., and Misuraca, G. (2020). AI governance in the public sector: Three tales from the frontiers of automated decision-making in democratic settings. Telecommunications Policy, 44(6), 101976. https://doi.org/10.1016/j.telpol.2020.101976

Mazzucato, M. and Perez C. (2015). Innovation as growth policy. In J. Fagerberg, S. Laestadius and B. R. Martin (Eds.), The Triple Challenge for Europe: Economic Development, Climate Change, and Governance. Oxford University Press: Oxford, UK, pp. 229–264

Mazzucato, M. (2018), "Mission-oriented innovation policies: challenges and opportunities", Industrial and Corporate Change, Vol. 27 No. 5, pp. 803–815, doi: 10.1093/icc/dty034.

Marheineke M, Habicht H, Möslein KM (2016) Bridging knowledge boundaries: the use of boundary objects in virtual innovation communities. R&D Manag 46(S3):1084–1094. https://doi.org/10.1111/radm.12216

Meijer A, Bolívar MPR (2016) Governing the Smart City: a review of the literature on smart urban governance. Int Rev Adm Sci 82(2):392–408. https://doi.org/10.1177/0020852314564308

Mora L, Gerli P, Ardito L, Messeni Petruzzelli A (2023) Smart City governance from an innovation management perspective: theoretical framing, review of current practices, and future research agenda. Technovation. https://doi.org/10.1016/j.technovation.2023.102717

Nambisan, S., Wright, M., and Feldman, M. (2019). The digital transformation of innovation and entrepreneurship: Progress, challenges and key themes. Research Policy, 48(8), 103773. https://doi.org/10.1016/j.respol.2019.03.018

Nesti G, Graziano PR (2020) The democratic anchorage of governance networks in smart cities: an empirical assessment. Public Manag Rev 22(5):648–667. https://doi.org/10.1080/14719037.2019.1588355

Nicolini D, Mengis J, Swan J (2012) Understanding the role of objects in cross-disciplinary collaboration. Organ Sci 23(3):612–629. https://doi.org/10.1287/orsc.1110.0664

Nilssen M (2019) To the Smart City and beyond? Developing a typology of smart urban innovation. Technol Forecast Soc Chang 142:98–104. https://doi.org/10.1016/j.techfore.2018.07.060

Peters, B. G., and Pierre, J. (1998). Governance Without Government? Rethinking Public Administration. Journal of Public Administration Research and Theory, 8(2), 223–243. https://doi.org/10.1093/oxfordjournals.jpart.a024379

Rhodes, R. A. W. (1996). The New Governance: Governing without Government Political studies, 44(4), 652–667. https://doi.org/10.1111/j.1467-9248.1996.tb01747.x

Roysen, R., Bruehwiler, N., Kos, L., Boyer, R. and Koehrsen, J. (2024), "Rethinking the diffusion of grassroots innovations: an embedding framework", Technological Forecasting and Social Change, Vol. 200, p. 123156, doi: 10.1016/j.techfore.2023.123156.

Ruhlandt RWS (2018) The governance of smart cities: a systematic literature review. Cities 81:1–23

Sapsed J, Salter A (2004) Postcards from the edge: local communities, global programs and boundary objects. Organ Stud 25(9):1515–1534. https://doi.org/10.1177/0170840604047998

Schot, J., and Steinmueller, W. E. (2018). Three frames for innovation policy: RandD, systems of innovation and transformative change. Research Policy, 47(9), 1554–1567. https://doi.org/10.1016/j.respol.2018.08.011

Seyfang, G. and Haxeltine, A. (2012), "Growing grassroots innovations: exploring the role of communitybased initiatives in governing sustainable energy transitions", Environment and Planning C: Government and Policy, Vol. 30 No. 3, pp. 381–400, doi: 10.1068/c10222.

Shepherd DA, Seyb SK, George G (2023) Grounding business models: cognition, boundary objects, and business model change. Acad Manag Rev 48(1):100–122. https://doi.org/10.5465/amr.2020.0173

Sørensen E, Torfing J (2009) Making governance networks effective and democratic through metagovernance. Public Adm 87(2):234–258. https://doi.org/10.1111/j.1467-9299.2009.01753.x

Sørensen E, Torfing J (2011) Enhancing collaborative innovation in the public sector. Adm Soc 43(8):842–868. https://doi.org/10.1177/0095399711418768

Wirtz BW, Müller WM (2023) An integrative collaborative ecosystem for smart cities—a framework for organizational governance. Int J Public Adm 46(7):499–518. https://doi.org/10.1080/01900692.2021.2001014

Zuzul TW (2019) "Matter Battles": cognitive representations, boundary objects, and the failure of collaboration in two smart cities. Acad Manag J 62(3):739–764. https://doi.org/10.5465/amj.2016.0625

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Abstract

Designing Collaborative Governance and Innovation Trajectories for Urban and Regional Transitions: The Role of Boundary Objects, Entrepreneurial Ecosystems, and Grassroots Institutionalisation

This PhD thesis is motivated by the urgent need to understand how governance systems can support inclusive and sustainable urban transitions in the face of complex challenges, such as digital transformation, climate adaptation, and socio-economic inequality. While collaborative governance and innovation have gained prominence in policy and academic discourse, limited attention has been paid to the dynamic interplay between collaborative tools, institutional structures, and value frameworks across multiple levels of governance. This thesis seeks to address this gap. The central *research problem* focuses on how collaborative mechanisms—such as boundary objects, entrepreneurial ecosystems, and grassroots innovations—can shape adaptive, inclusive, and value-driven governance. Three cross-cutting research questions guide the inquiry: (1) How do collaborative artefacts facilitate participatory governance and stakeholder engagement? (2) How do institutional frameworks and governance arrangements evolve in response to bottom-up and digitally enabled innovation? (3) How are normative values operationalised and institutionalised across diverse governance settings?

Methodologically, this is a paper-based dissertation that employs a multi-method and cross-disciplinary approach. The first paper is a systematic literature review that examines the role of boundary objects in people-centred Cities. The second paper introduces the Nested-Cyclical Model (NeCyM) to conceptualise the co-evolution of governance, innovation, and entrepreneurship in digital ecosystems. The third paper provides empirical insights through a multi-case study of New European Bauhaus grassroots projects, exploring the translation of aspirational values into actionable knowledge. The *findings* demonstrate that collaborative artefacts and entrepreneurial agency can foster institutional adaptability, while value tensions in grassroots innovation highlight the need for ongoing negotiation and support structures. Together, the three studies contribute an integrated understanding of how governance can evolve as a flexible, participatory, and value-sensitive system. The thesis offers three *key contributions*: (1) a theoretical advancement through the NeCyM framework; (2) methodological pluralism through synthesis, conceptualisation, and case-based inquiry; and (3) practical guidance for urban policymakers and EU-level initiatives, including the New European Bauhaus and Cities Mission, to design more inclusive, resilient, and innovation-driven governance models.

Lühikokkuvõte

Koostööpõhise valitsemise ja innovatsiooniradade kujundamine linnaliste ja piirkondlike üleminekute kontekstis: piiriobjektid, ettevõtlusökosüsteemid ja rohujuuretasandi institutsionaliseerimine

Käesoleva doktoritöö motivatsioon tuleneb kasvavast vajadusest mõista, kuidas valitsemissüsteemid saavad toetada kaasavaid ja jätkusuutlikke linnalisi üleminekuid olukorras, kus ühiskond seisab silmitsi digitaalse ümberkujundamise, kliimamuutuste ja sotsiaal-majandusliku ebavõrdsuse väljakutsetega. Kuigi koostööpõhise valitsemise ja innovatsiooni tähtsus on kasvanud nii poliitilises kui ka teaduslikus diskursuses, on senini vähe uuritud, kuidas koostöövahendid, institutsionaalsed struktuurid ja väärtusraamistikud omavahel mitmetasandilises valitsemises suhestuvad. See doktoritöö püüab seda lünka täita.

Töö keskne probleem käsitleb seda, kuidas koostööpõhised mehhanismid – nagu piiriobjektid (boundary objects), ettevõtluse ökosüsteemid ja rohujuuretasandi innovatsioonid – saavad kujundada paindlikke, kaasavaid ja väärtuspõhiseid valitsemisviise. Uuringut raamivad kolm läbivat uurimisküsimust: (1) Kuidas hõlbustavad koostööartefaktid osalusvalitsemist ja sidusrühmade kaasamist? (2) Kuidas arenevad institutsioonilised raamistikud ja juhtimiskorraldused vastusena alt-üles ja digitaalselt toetatud innovatsioonile? (3) Kuidas on normatiivseid väärtusi võimalik rakendada ja institutsionaliseerida erinevates valitsemiskontekstides?

Metodoloogiliselt on tegemist artiklipõhise doktoritööga, mis kasutab mitmemeetodilist ja ristdistsiplinaarset lähenemist. Esimene artikkel on süstemaatiline kirjanduse ülevaade piiriobjektide rollist inimese-keskse tes nutilinnades. Teises artiklis tutvustatakse pesastatud tsüklilist (*Nested-Cyclical*) mudelit (*NeCyM*), et kontseptualiseerida juhtimise, innovatsiooni ja ettevõtluse koosarengut digitaalsetes ökosüsteemides. Kolmas artikkel tugineb mitme juhtumiuuringu empiirilistele andmetele Uue Euroopa Bauhausi rohujuuretasandi projektidest, keskendudes väärtuste elluviimisele praktikas.

Uurimistulemused näitavad, et koostöövahendid ja ettevõtlusagentuursus võivad soodustada institutsionaalset kohanemisvõimet, samas kui väärtuskonfliktid rohujuuretasandil tõstavad esile kestvate läbirääkimiste vajaduse ja toetavate tugistruktuuride olulisuse. Tervikuna aitavad need kolm uuringut kaasa integreeritud arusaamale sellest, kuidas valitsemine saab areneda paindliku, osaluspõhise ja väärtustundliku süsteemina.

Väitekirja peamised panused on: (1) teoreetiline edasiarendus NeCyM-raamistiku kaudu; (2) metodoloogiline mitmekesisus sünteesimise, kontseptualiseerimise ja juhtumipõhise uurimise kaudu ning (3) praktilised soovitused linnavalitsemiseks ja EL-tasemel algatuste – nagu Uus Euroopa Bauhaus ja Missioonilinnad – kujundamiseks.

Appendix 1 - Research paper 1

Esposito, G., Bertello, A., Mora, L. et al. (2025)
How do boundary objects influence people-centered smart cities? A systematic literature review
Review of Managerial Science. https://doi.org/10.1007/s11846-025-00835-8

1 Introduction

In recent years, the concept of Boundary Objects (BOs) has emerged as a critical focus area in urban planning and Smart City development (Benn and Martin 2010; Shepherd et al. 2023; Williams et al. 2019). BOs are artifacts, documents, or concepts that serve as interfaces between different knowledge domains and facilitate communication and collaboration among diverse groups. Initially developed in the social sciences to bridge gaps between different communities of practice (Dar 2018; Fox 2011; Green 2011; Hawkins et al. 2017; Sapsed and Salter 2004), BOs have become increasingly relevant in addressing the complex multi-stakeholder environment of urban governance (Mora et al. 2023a). This study explores the intersection of BOs and people-centered Smart Cities to understand how these objects influence innovation, engagement, and sharing in urban initiatives. People-centered Smart Cities represent a new paradigm in urban development that emphasizes citizens' active participation in planning and decision-making processes (Saldert 2024; Zuzul 2019). Specifically, this study investigates the role of BOs, particularly collaborative tools and spaces, in enhancing the effectiveness of urban governance in people-centered Smart Cities. The focus was on identifying best practices and theoretical frameworks that could support the creation of cohesive and adaptive urban environments. This study is particularly concerned with how these collaborative tools and spaces can be harnessed to promote sustainable and inclusive urban development, thereby making cities more responsive to residents' needs.

The context of this research is grounded in the increasing complexity of urban environments, where diverse stakeholders, including government agencies, private sector entities, local communities and international organizations, must collaborate to address intricate urban challenges. In this context, BOs are increasingly viewed as essential arrangements for fostering collaboration and innovation, allowing stakeholders to effectively address urban challenges. Despite the extensive study of BOs across various disciplines, a notable gap exists in the literature regarding their specific applications in people-centered Smart Cities. Although prior research has examined BOs in organizational contexts, their role in urban governance, particularly in fostering innovation and engagement within Smart Cities, remains underexplored. This study addresses this gap by examining how BOs can be utilized to enhance collaborative governance in people-centered Smart Cities, thereby contributing to a more nuanced understanding of how urban initiatives can be managed more effectively. To achieve the research objectives, this study employed a Systematic Literature Review (SLR), which is a rigorous method for synthesizing existing knowledge on the topic. The SLR was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) protocol (Liberati 2009), which ensures a transparent and replicable process. Through a systematic review and analysis of scholarly articles sourced from

reputable databases such as Scopus and Web of Science, this study identifies key insights and theoretical perspectives on the role of BOs in Smart City governance. This methodological approach not only enhances the reliability of the findings but also provides a comprehensive exploration of the subject matter. The findings reveal that BOs, such as collaborative tools and spaces, play a critical role in fostering innovation, stakeholder engagement, and knowledge and resourse sharing in people-centered Smart Cities. These objects enable collaboration by offering the necessary structure and flexibility to align diverse perspectives and interests. Moreover, this study emphasizes the importance of designing BOs that are adaptable to the evolving needs of urban environments, ensuring their continued effectiveness in facilitating collaboration as conditions change. In conclusion, this study advances the discourse on Smart City governance by demonstrating how BOs can be strategically leveraged to enhance the inclusivity and sustainability of urban initiatives. This study provides a framework for understanding the role of BOs in people-centered Smart Cities and offers valuable insights for both practitioners and scholars. Additionally, it identifies several avenues for future research, including the need for the empirical validation of this theoretical model and the exploration of BOs in various geographic and cultural contexts. This study contributes to the broader goal of developing responsive, resilient, and people-centered urban environments.

2 Theoretical background—boundary objects and cities

Over the past four decades, the concept of “boundary objects” has gained significant importance in the fields of business and management, as well as in broader social sciences (Yakura 2002; Zikic and Voloshyna 2023; Zuzul 2019). This theoretical construct was initially introduced to describe artifacts or concepts that facilitate communication between different social worlds and has been extensively explored in more than 1,000 scholarly articles published in authoritative journals (Benn et al. 2013; Cohen 2012; Döring and Ratter 2015; MacGillivray and Franklin 2015; Pilon-Summons et al. 2022; van Pelt et al. 2015). Recent literature has increasingly focused on the application of knowledge management principles in BOs, highlighting their role in facilitating governance approaches, decision-making, innovation, and participatory practices (Dar 2018; Fox 2011; Green 2011; Hawkins et al. 2017; Sapsed and Salter 2004). This reflects an emerging trend in which BOs are not only passive intermediaries, but also active components in promoting collaborative innovation and inclusive decision-making in complex urban and organizational contexts (Caccamo 2023; Karaba et al. 2023). This evolving concept aligns with the broader push toward human-centered urban development that emphasizes the integration of diverse stakeholder perspectives in shaping sustainable and resilient cities. A BO is defined as an artifact, document, term, or concept that serves as an interface between different knowledge domains, facilitating communication and collaboration between groups. The concept of BOs was first introduced by Star and Griesemer (1989). They defined BOs as entities that are adaptable to different viewpoints and are sufficiently robust to maintain a common identity across these viewpoints, thus facilitating collaboration and communication among diverse groups of stakeholders. These objects possess the flexibility to be interpreted differently in different social worlds, while maintaining sufficient consistency to be recognized and used by all parties involved. This dual characteristic allows BOs to act as mediating tools

that help stakeholders with different perspectives and expertise collaborate effectively, bridging gaps in understanding and promoting innovation (Marheineke et al. 2016). Researchers in these fields have pointed out that BOs are critical in environments characterized by high levels of complexity and diversity, such as interdisciplinary projects or multi-stakeholder initiatives (Spee and Jarzabkowski 2009). They function by providing a shared reference point that supports the negotiation, alignment and integration of disparate knowledge bases and interests, thereby enabling cohesive and productive interactions. This concept emphasizes the importance of context specificity and adaptability, as BOs must evolve to meet the changing needs of the groups to which they connect (Haagensen 2024). This adaptability is critical in dynamic environments, such as business innovation, where rapid changes in technology and market conditions require agile and responsive forms of coordination and collaboration (Harvey and Chrisman 1998).

In recent years, the application of BOs in urban settings has gained significant attention in the fields of management and innovation, particularly within the context of people-centered cities (Zuzul 2019). BOs, initially conceptualized to facilitate communication and collaboration across different social worlds or communities of practice, have proven instrumental in addressing the complex and often fragmented landscape of urban governance and planning (Dolmans et al. 2023). Several articles in business, management, and social sciences journals have contributed to this discourse, with an emerging focus on governance approaches and participatory planning processes (Camboim et al. 2019; Mora et al. 2023a; Nielsen et al. 2019; Nilssen 2019). Thematically, the literature underscores the relevance of BOs in facilitating urban development and planning, particularly through participatory approaches that engage diverse stakeholders in the decision-making processes. This body of work not only highlights the theoretical significance of BOs in urban studies but also emphasizes their practical utility in fostering more inclusive and adaptive urban governance frameworks. People-centered cities prioritize citizens' involvement in the planning and development of urban spaces (Gleeson 2022). They aim to harness local knowledge and insights to address urban challenges and improve their quality of life. By incorporating citizen input and fostering collaborative problem solving, people-centered cities reflect a similar ethos of knowledge sharing and co-creation (Dameri and Ricciardi 2015; Rizzo et al. 2021; Sandulli et al. 2017). Underscoring the importance of harnessing collective knowledge and engaging diverse stakeholders to drive innovation and address complex challenges (Snow et al. 2016), BOs in people-centered cities can create platforms for citizen engagement, where communities collaboratively work on urban solutions and innovations. Hence, the concepts of community engagement and empowerment become more evident when members foster a deep sense of belonging and participation. People-centered urban planning emphasizes empowering citizens and ensures their active participation in city development (Mora et al. 2019). It seeks to create environments in which residents feel connected with and engaged in their city’s development processes. Adaptive learning and innovation processes in people-centered cities are a means of collaborative problem solving and iterative development (Dolmans et al. 2023). Both emphasize the importance of continuous learning and adaptation to foster innovation and address complex challenges. Therefore, innovation in people-centered cities often emerges from the

collaborative efforts of citizens and stakeholders who work together to address urban issues and improve city life (Barrutia et al. 2022).

The conceptual framework for Smart City initiatives outlined in the UN Habitat Report (Managing Smart Cities Beckers et al. 2023), identifies three core dimensions that underpin the governance of Smart City initiatives: strategy, collaborative ecosystem, and technology. Building on our research gap and theoretical background, the collaborative ecosystem pillar is crucial (Wirtz and Müller 2023), as it encompasses the governance mechanisms necessary for managing the involvement of diverse stakeholders (Yahia et al. 2021). These mechanisms can be categorized into two main themes: innovation partnerships and their formation. Innovation partnerships, which drive the advancement of Smart City projects (Abella et al. 2017; Dupont et al. 2015; Ferraris et al. 2018; Richter et al. 2015), are divided into cross and intra-sector partnerships. Cross-sector partnerships typically involve collaborations between entities from different sectors, such as municipal governments and private companies (Ferraris et al. 2020), facilitating resource and expertise sharing. In contrast, intra-sector partnerships involve collaborations within the same sector, such as between national and local governments to ensure coherent policy implementation and operational practices. The formation of innovation partnerships involves a range of strategies and tools designed to organize and manage these collaborations. This includes establishing agreements that clarify the roles and responsibilities of partners and employing tools and strategies to build consensus among participants (Mora et al. 2019; Oschinsky et al. 2022). Additionally, creating collaborative spaces and resources, such as hackathons and living labs (Bertello et al. 2022; Leite 2022; Nguyen et al. 2022), is essential for engaging various stakeholders and fostering a participatory approach to urban innovation and development (Velsberg et al. 2020). The key participatory tools and methods include public consultations, public meetings, citizens' assemblies, co-creation workshops, participatory budgeting, hackathons, application contests, bootcamps, living labs, incubators, and accelerators.

In our research, we investigated the question, How do boundary objects, such as collaborative tools and spaces, impact innovation, engagement, and sharing in people-centered smart cities?. The focus is on understanding how these BOs—specifically collaborative tools and spaces—facilitate effective governance in urban initiatives (Wirtz and Müller 2023). We examine how these elements contribute to knowledge and resource sharing, enhance stakeholder engagement, and drive innovation, to support a cohesive and adaptive approach to urban development (Bernardi and Diamantini 2018). By identifying the best practices and frameworks, we seek to understand how these practices influence cities and urban development, thereby ensuring their sustainability and inclusivity (Correia et al. 2024). Through this exploration, we aim to advance the discourse on governance by building responsive and resilient urban environments.

3 Methodology

SLR is a structured and essential method for thoroughly analyzing and synthesizing research findings in a specific field (Behl et al. 2022). By integrating both qualitative and quantitative methodologies, SLR ensures a comprehensive and unbiased evaluation of

the literature, thus improving the overall quality and reliability of the review process (Centobelli et al. 2020; Chauhan et al. 2022; Haefner et al. 2021; Molina-Azorín et al. 2009; Muñoz and Cohen 2018). This methodological framework helps minimise bias, reduce errors and establish clear and replicable steps for knowledge synthesis, which in turn improves the validity and generalisability of findings (Kraus et al. 2020; Leonidou et al. 2018; Tranfield et al. 2003; Wang and Chugh 2014). The SLR methodology allows researchers to build on existing knowledge, enabling them to "stand on the shoulders of giants," and produce insightful and impactful research results (Massaro et al. 2016). We employed a content analysis literature review, which is particularly suited to integrating theoretical perspectives and key findings relevant to our research question. This approach allowed us to conduct a thorough examination of each study, providing a detailed analysis of both the theoretical underpinnings and empirical results (Baregheh et al. 2009; Bhimani et al. 2019; Centobelli et al. 2020; Gomes et al. 2018; Haefner et al. 2021; Marikyan et al. 2019). By focusing on the influence of BOs, such as collaborative tools and spaces, on Smart City dynamics we extracted and synthesized relevant insights from each paper, thereby enhancing our theoretical understanding.

This SLR adheres to the PRISMA Protocol (Liberati 2009) and involves a meticulous full-read and detailed review of each selected study (Batista et al. 2021; Behl et al. 2022; Huovila et al. 2022; Kajol et al. 2022; Kraus et al. 2022, 2024; Lim et al. 2019; Sauer & Seuring 2023). This rigorous process enables us to identify and enhance the nuanced ways in which BOs influence Smart City dynamics. To ensure thoroughness, our search protocol (Fig. 1) began with the formulation of three separate search strings. The first search string addressed the central topic of Smart City (Echebarria et al. 2021) and collaboration-related terms. The second string addressed boundary objects, and the third focused on people-centered cities. The use of truncation in the second string, denoted by the asterisk, allowed for capturing variations of these terms, including collaboration and collaborative or plural terms such as cities (Christofi et al. 2019).

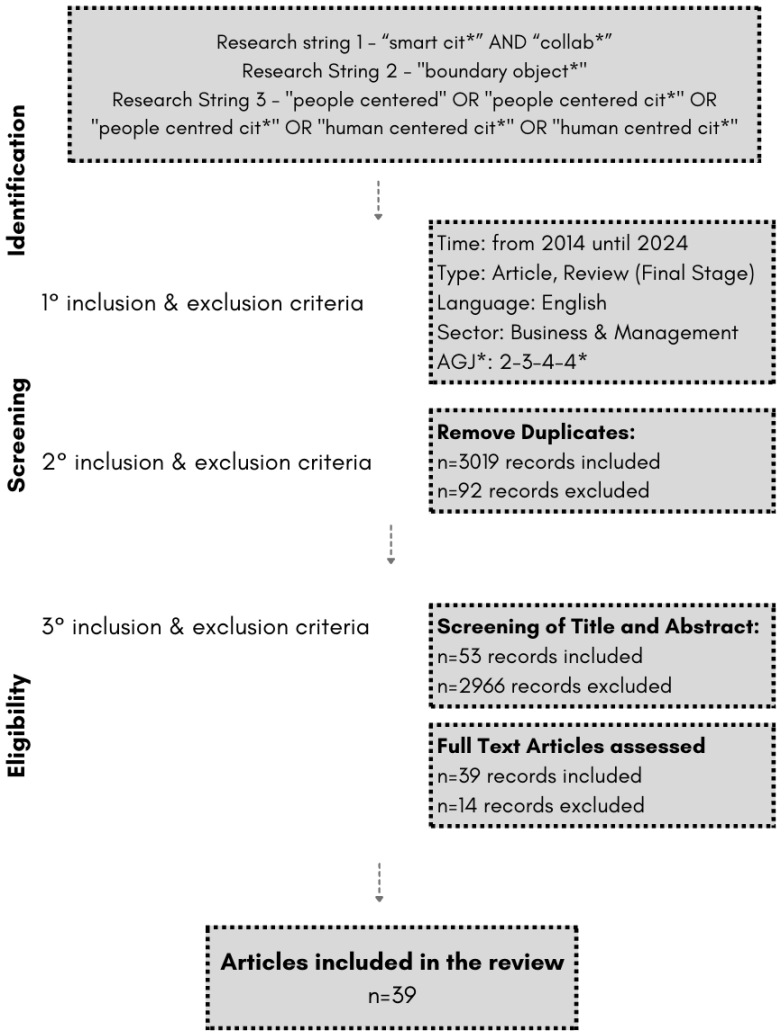


Fig.1 - PRISMA protocol (own elaboration based on Mishra and Mishra 2023)

Following these steps (see the first inclusion and exclusion criteria in Fig. 1), our search generated an initial sample of 3,113 articles from Scopus and Web of Science. We refined the search to include only articles and reviews in Business and Management research, excluded book chapters and conference proceedings, and specified English as the publication language. We also limited the time frame to articles published between 2014 and 2024 and included only those from Academic Journal Guide (AJG) journals 2-3-4-4*. After removing duplicates and applying our second inclusion and exclusion criteria, we obtained a sample of 3,019 articles. The next step (Eligibility in Fig. 1) involved a detailed screening process, assessing the relevance of each article based on its title and abstract, resulting in 53 articles being included in this study. Articles that did not directly address

our research question were excluded (n = 2,966 articles). For articles with uncertain relevance, the main author performed a full-text review to ensure consistent evaluation, which led to a final set of 39 articles (Fig. 1). Our protocol also involved comparing our findings with those of other significant literature reviews on collaborative arrangements within Smart Cities. This comparative analysis, summarized in Table 1, helps contextualize our study within the existing body of work and confirms the necessity of SLR. This approach aligns with practices observed in similar studies, such as the systematic reviews by Gomes et al. (2018), Lim et al. (2019), Ruhlandt (2018), and Schiavone et al. (2019). These studies began with a broad dataset and then applied stringent criteria to derive a manageable and relevant sample to ensure that the analysis is based on relevant and high-quality data. The SLR included in our sample (Table 1) were removed from our research observations because they did not contribute to the conversation on BOs and people-centered Smart Cities.

Title	Author(s)	Sample Nr	Focus of Analysis	Research Goal
Citizen engagement body of knowledge–A fuzzy decision maker for index-term selection in built environment projects.	(Zarei & Nik-Bakht, 2021)	1092	Urban development	Conceptualize and categorize the existing body of knowledge of citizen engagement for smart city infrastructure;
Driving elements to make cities smarter: Evidence from European projects	(Camboim et al., 2019)	110	Multi-stakeholder governance	Clarify the smart city concept and its dimensions
Smart city governance from an innovation management perspective: Theoretical framing, review of current practices, and future research agenda	(Mora et al., 2023)	138	Governance practices	Examine the governance dimensions of smart city transitions
Smart city reporting: A bibliometric and structured literature review analysis to identify technological opportunities and challenges	(Secinaro et al., 2022)	357	Smart city sustainability	Identify the outcomes in smart city reporting for developing collaborative governance and sustainable resource allocation through disruptive technologies

Title	Author(s)	Sample Nr	Focus of Analysis	Research Goal
for sustainable development				
The landscape and evolution of urban planning science	(Haghani et al., 2023)	100.00.00	Urban planning	Determine divisions, temporal trends and influential references and actors of urban planning
Understanding the sharing economy and its implication on sustainability in smart cities	(Akande et al., 2020)	22	Smart city sustainability	Drivers of the sharing economy
The present study		39	Boundary Objects Impact on Cities	Identify Boundary Objects-such as collaborative tools and spaces- and their influence on shaping people-centred Smart cities

Table 1- Systematic literature reviews in our sample [own elaboration based on Zarei and Nik-Bakht (2021)]

SLR data analysis followed a structured approach to ensure a comprehensive understanding of the selected studies. The main author conducted a qualitative thematic analysis of each article, focusing on BOs and their categories, collaborative tools and spaces. Any disagreements regarding categorization and conceptualization were resolved through constructive discussions among all authors, ensuring consensus in data interpretation. The analysis began with open coding, which involved assessing each article's research focus, hypotheses, and key findings (Secinaro et al. 2022). Inductive and deductive approaches were applied iteratively to reinforce the robustness of the analysis. Initially, open coding was used to identify categories within the data, followed by axial coding to refine the categories and establish connections between them (Strauss and Corbin 1998). This process uncovered both positive and negative attributes associated with BOs. In addition to categorizing BOs, the analysis explored how these

objects contributed to the urban development of people-centered Smart Cities. Each full paper is meticulously reviewed to determine the role of BOs within specific categories and how their influence on the dynamics of Smart City development. This comprehensive approach ensures that our findings are detailed and closely aligned with the research question, thus providing a nuanced understanding of how BOs enhance innovation, engagement, and sharing in Smart Cities.

4 Findings

To address our research question we conducted a systematic review of relevant literature. We identify key examples in which BOs, including innovation networks (Leite 2022), living labs, collaborative communities (Snow et al. 2016), and Information and Communication Technology (ICT) tools, significantly impact sharing, innovation, and engagement processes. These BOs play a critical role in enhancing stakeholder engagement and driving innovation by bridging diverse expertise. For instance, innovation networks and living labs (Nguyen et al. 2022) act as collaborative spaces that foster stakeholder involvement. Collaborative communities leverage shared platforms for collective innovation, while governance networks (Nesti and Graziano 2020) and participatory tools like blockchain-based platforms (Marsal-Llacuna 2020) and participatory budgets (Pansera et al. 2023) support collaborative sharing and resource management. Additionally, formal agreements (Zuzul 2019), ICT literacy (Curşeu et al. 2021), and platform urbanism (van der Graaf and Balloon 2019) act as collaborative tools that spur engagement and technological innovation Public procurement for innovation (Van Winden and Carvalho 2019) and urban crowdfunding (Steils et al. 2021) further illustrate how structured mechanisms mobilize resources and encourage collaborative problem solving. These findings (Table 2) underscore the vital role of BOs in shaping effective collaboration and advancing people-centered Smart City development.

Boundary Object (BO)	Boundary Object (BO) Category	The role of the BO in the urban development of people-centred smart city
Innovation Network	Collaborative Space	Engagement
Living Lab	Collaborative Space	Engagement
Collaborative Community	Collaborative Space	Innovation
Governance Network	Collaborative Space	Sharing
Cooperation Agreement	Collaborative Tool	Engagement
Formal Contracts and Project Documentation	Collaborative Tool	Engagement
ICT Literacy	Collaborative Tool	Engagement
Living Lab	Collaborative Tool	Innovation
Platform Urbanism	Collaborative Tool	Innovation
Public Procurement For Innovation (PPI)	Collaborative Tool	Innovation
Research Design	Collaborative Tool	Innovation
Technology	Collaborative Tool	Innovation
Urban Crowdfunding	Collaborative Tool	Innovation
Blockchain-Based Community-Driven Tool	Collaborative Tool	Sharing
Participatory Budget	Collaborative Tool	Sharing

Table 2-Findings Boundary Objects

4.1 Innovation

Innovation in Smart Cities refers to the introduction of novel ideas, technologies, and processes that enhance the functionality, efficiency, and inclusivity of the urban environment. This involves deploying advanced technologies and creating new value propositions that address urban challenges and improve residents' quality of life (Chesbrough 2004, 2003; Chesbrough et al. 2006; Christensen et al. 2017, 2006). IIn people-centered Smart Cities, innovation fosters engagement, sustainability, and adaptability through inclusive and collaborative approaches. This perspective emphasizes the need for innovations that are aligned with the diverse needs of urban populations. This section explores the role of BOs in urban development, focusing on collaborative communities, living labs, platform urbanism, public procurement of innovation, and urban crowdfunding. BOs foster innovation by enabling resource exchange and facilitating practical experimentation. Our findings (Table 3) highlight their roles in integrating innovative practices into urban development, thus contributing to responsive and inclusive smart-city environments.

The influence of "Innovation" in the urban development of people-centered smart cities	BO Category	Positive Influence	Negative Influence
Collaborative Community	Collaborative Space	Enhances collective problem-solving and innovation through collaborative exchange	Compromises innovation outcomes due to misalignment and communication challenges.
Living Lab	Collaborative Tool	Bridges theory and practice by integrating user feedback for socially relevant solutions	Risk of overlooking social complexities and challenges in coordinating diverse stakeholder interests
Platform Urbanism	Collaborative Tool	Enhances urban planning by integrating diverse inputs and addressing emerging challenges through data analysis	Raises concerns over data privacy, digital inequality, and the commercialisation of public spaces
Public Procurement For Innovation (PPI)	Collaborative Tool	Facilitates innovation by connecting public sector buyers with suppliers, defining procurement challenges, and aligning stakeholder interests	Hindered by bureaucratic rigidity, risk aversion, and misalignment with the dynamic needs of innovative firms, limiting its effectiveness
Research Design	Collaborative Tool	Facilitates structured yet flexible collaboration, enabling effective dialogue and co-creation among diverse stakeholders	Misalignment with practical constraints and insufficient stakeholder integration can obstruct collaboration and hinder successful implementation
Technology	Collaborative Tool	Enables integration and collaboration by supporting real-time data sharing and community engagement	It can create gaps between technological ideals and practical urban needs and may be exploited for political gain, overshadowing genuine innovation

The influence of "Innovation" in the urban development of people-centered smart cities	BO Category	Positive Influence	Negative Influence
Urban Crowdfunding	Collaborative Tool	Fosters transparency and boosts active citizen involvement in urban development, enhancing the connection between residents and authorities	Demands careful management to effectively integrate diverse contributions and maintain participant engagement throughout the process

Table 3 Findings: boundary object—innovation

4.1.1 Collaborative space: collaborative community

In urban development, a "collaborative community" acts as a key BO and collaborative space, defined as a collection of stakeholders, including citizens, businesses, and municipal leaders, working toward shared goals (Fjeldstad et al. 2012). It integrates diverse perspectives and resources to enhance collective problem solving and innovation (Star and Griesemer 1989). Initiatives such as Smart Aarhus utilize resources such as "Open Data Aarhus" to foster collaboration. The effectiveness of a collaborative community depends on maintaining engagement and managing diverse interests (Kramer 1990). Misalignments in goals or communication challenges may limit innovation outcomes (Eisenhardt and Schoonhoven 1996). Thus, although valuable for driving urban innovation, the impact of collaborative communities relies on effective stakeholder management and alignment.

4.1.2 Collaborative tool: living lab

Living labs are key BOs in urban development and serve as collaborative tools that support innovation and citizen engagement. Defined as user-centered innovation environments, living labs integrate diverse stakeholders—such as technology providers, end users, researchers, and city authorities—into their development process (Schuurman et al. 2016). They create a shared fulcrum for collaboration, while maintaining flexibility in integrating contributions (Paskaleva et al. 2015). Living labs facilitate practical experimentation, bridging theoretical research and urban needs (Hartley et al. 2013). By involving citizens in co-creation, living labs ensure that innovations are socially relevant (Paskaleva and Cooper 2019), increasing the likelihood of successful implementation. Despite their advantages, living labs face challenges; an emphasis on technology may overshadow their social aspects (Veeckman and Graaf 2015). Success depends on service managers' ability to coordinate diverse interests and manage co-production processes (Paskaleva and Cooper 2018).

4.1.3 Collaborative tool: platform urbanism

Platform urbanism focuses on digital platforms that play a critical role in urban development and management. This model integrates digital platforms that provide browsing services, social networks, and e-commerce into urban space organizations (Gillespie 2010; Srnicek 2017). As a BO, it facilitates collaboration among public authorities, private companies, and citizens (Komninos and Mora 2018). Platforms such as Waze demonstrate how user-generated data connects commuters with urban planners, enhancing traffic management. Platform urbanism fosters innovation by incorporating diverse perspectives into planning (Hagiu 2014). It improves the information exchange among stakeholders, and promotes participatory urban management (Livingstone 2010). However, challenges persist, such as data privacy, unequal access to technology, and potential commercialization of public spaces (Mansell 2012). Successful integration requires addressing these challenges and creating inclusive digital platforms serving the public goods.

4.1.4 Collaborative tool: public procurement for innovation

Public Procurement for Innovation (PPI) is a critical BO and collaborative tool in urban innovation, and is defined as a strategic mechanism that stimulates innovation through public procurement processes. It can facilitate innovation-driven economic development (Edler et al. 2005; Edler and Georghiou 2007) and address societal challenges (Coenen et al. 2015; Mazzucato 2018). PPI facilitates interactions among stakeholders such as public sector agencies, private companies, and technology developers (Uyarra and Flanagan 2010), thus creating a structured yet flexible space for collaboration. This occurs through facilitating, configuring, and brokering functions (Stewart and Hyysalo 2008). Despite their potential, PPI face limitations, such as bureaucratic rigidity and risk aversion (Edler and Yeow 2016). Misalignments between procurement objectives and innovative firms' needs can limit successful outcomes (Edquist and Zabala-Iturriagagoitia 2012; European Union 2023). The challenges of market readiness and stakeholder coordination further undermine PPI effectiveness. Collectively, these issues highlight the systemic constraints that affect PPI's role in driving urban innovation.

4.1.5 Collaborative tool: research design

Research design acts as a BO, and facilitates collaboration and innovation in urban development. This is a systematic approach used to investigate phenomena and generate actionable insights (Archer et al. 1981; Bayazit 2004). As a BO, the research design provides an adaptable framework that supports collaboration among stakeholders, thus enabling effective dialogue and co-creation (Paroutis et al. 2014). Success depends on addressing evolving stakeholder needs; misalignments or insufficient feedback integration can hinder collaboration and innovation (Liedtka 2018). Process ambiguity can also create obstacles in implementation. While valuable for driving innovation, the effectiveness of research design relies on its adaptability to stakeholder needs and the management of complexity.

4.1.6 Collaborative tool: technology

In urban development, technology serves as a significant BO and collaborative tool. Technology, defined as the application of scientific knowledge for practical purposes, plays a pivotal role in facilitating innovation (Meijer and Bolívar 2016). As a BO, it provides a common reference for stakeholders—including municipal authorities,

businesses, and citizens, to effectively engage in urban initiatives (Albino et al. 2015; Holland 2008). Technological platforms support real-time data sharing and collaborative decision-making, which are essential for addressing complex urban challenges (Nilssen 2019). However, misalignment between technological capabilities and urban needs can lead to discrepancies between goals and outcomes. The strategic use of technology for political gain may overshadow genuine innovation (Batty 2013; Huizingh 2011). Therefore, although technology can drive advancements in Smart Cities, its success in promoting innovation relies on its integration into broader governance strategies.

4.1.7 Collaborative tool: urban crowdsourcing

Urban crowdsourcing or citizen sourcing, is an important BO and collaborative tool in urban development (Steils et al. 2021). Defined as the outsourcing of tasks to the public through digital platforms (Renault and Boutigny 2014), it integrates citizens into urban innovation stages, thus allowing residents, businesses, and public authorities to contribute to their expertise (Etgar 2008; Nam 2012a). By leveraging collective intelligence, crowdsourcing promotes innovation and enhances urban services (Spring 2003). As a BO, it provides a framework for interaction among stakeholders (Bagherzadeh et al. 2021; Bresciani et al. 2018; Du et al. 2014). Platforms such as Open Data Aarhus facilitate idea exchanges and feedback, strengthening the bond between residents and municipal authorities (Nam 2012b). Success depends on managing stakeholder interactions and effectively integrating contributions. Challenges such as varying involvement levels and robust management needs can affect the overall initiative success (Faems et al. 2005; Liu et al. 2020). Although crowdsourcing offers valuable insights, careful orchestration is necessary to ensure effective input and participant engagement (Steils and Hanine 2019).

4.2 Sharing

The concept of sharing is crucial in developing human-centered Smart Cities, shaping urban environments through collaborative and inclusive practices. This section explores how various BOs, including governance networks, blockchain-based community-driven tools, and participatory budgets act as sharing catalysts in urban contexts. Governance networks serve as collaborative spaces, facilitating the exchange of ideas and resources among diverse stakeholders, thereby enhancing collective decision making. Blockchain-based community tools ensure transparency and trust in sharing processes through decentralized record-keeping. Participatory budgets empower citizens to engage in financial decision-making, fostering a sense of ownership and inclusivity. By examining these BOs, our research findings (Table 4) revealed their collective contributions to equitable and responsive urban development, reinforcing the importance of sharing in creating human-centered Smart Cities.

The influence of "Sharing" in the urban development of people-centered smart cities	BO Category	Positive Influence	Negative Influence
Governance Network	Collaborative Space	Facilitates stakeholder collaboration by providing a structured framework for sharing knowledge and resources, thereby enhancing collective problem-solving and policy development	May suffer from limited democratic legitimacy and transparency, as they can exclude broader citizen participation, reinforce existing power imbalances, and face challenges in maintaining coherence and equitable representation of stakeholder interests
Blockchain-Based Community-Driven Tool	Collaborative Tool	By decentralising authority, this tool enhances citizen participation and engagement, fostering a more inclusive and participatory governance structure in urban initiatives	Challenges related to technology maturity and the integration complexity with existing urban systems can hinder effective implementation and adoption
Participatory Budget	Collaborative Tool	Facilitates equitable resource distribution and collaborative engagement, aiming to democratise resource allocation and foster inclusive decision-making processes	Projects influenced by political figures may receive preferential treatment, potentially sidelining grassroots initiatives. This misalignment can erode trust and hinder effective resource sharing. Additionally, bureaucratic complexities may conflict with the flexibility needed for innovative urban solutions, reducing responsiveness to dynamic challenges

Table 4 Findings: boundary object—sharing

4.2.1 Collaborative space: governance network

Governance networks are pivotal BOs in urban development and Smart City initiatives, facilitating interaction among diverse stakeholders (Nesti and Graziano 2020). Defined as stable patterns of social relations among mutually dependent actors clustering around policy problems and resources (Klijn and Koppenjan 2014), these networks coordinate efforts across public, private, and civil society sectors to address urban challenges and drive innovation. They provide a structured framework for stakeholders to share knowledge, resources, and ideas, enhancing collective problem-solving (Sørensen and Torfing 2009). However, governance networks face limitations; critics argue that they often lack democratic legitimacy, excluding broader citizen participation and reinforce power imbalances (Papadopoulos 2012). Participant selection and decision-making processes can be opaque, undermining transparency and accountability (Klijn and Skelcher 2007). The informal nature of these networks may lead to challenges in maintaining coherence and ensuring equitable representation of stakeholder interests (Vanolo 2014). Although, while governance networks enable dynamic interactions, they must be carefully designed to address the inclusivity and transparency of effective urban development.

4.2.2 Collaborative tool: blockchain based community tool

Blockchain-based community-driven tools are pivotal in urban development, as exemplified by initiatives such as the People's Smart City Dashboard (PSCD) (Marsal-Llacuna 2020). Blockchain technology enhances transparency and collective decision-making through its decentralized nature, allowing peer-to-peer interactions without a central authority (Marsal-Llacuna 2018). The PSCD promotes a community-centered approach, enabling citizens to implement and govern Smart City agendas (Swan and de Filippi 2017). As a BO, this tool connects residents, public authorities, and private entities, providing a transparent platform for collaboration (Star and Griesemer 1989). It decentralizes authority, enabling citizens to contribute directly to and manage urban initiatives, thus addressing issues of low involvement and adoption in traditional Smart City models (Hughes 2017). The blockchain's decentralized structure promotes equitable access to information and decision-making, facilitating resource distribution (Sun et al. 2016). However, challenges such as technological development stages and integration complexities persist in existing urban systems (Dos Santos 2017; Manski 2017). Overcoming these obstacles is essential for the successful implementation and management of diverse stakeholder interactions (Wheeler 2017). Despite these challenges, blockchain holds significant potential for transforming urban governance by enhancing community participation and shared decision making.

4.2.3 Collaborative tool: participatory budget

A participatory budget is a significant BO in urban development, serving as a collaborative tool that facilitates the sharing of resources and knowledge among stakeholders (Pansera et al. 2023). It is a democratic process in which citizens decide how to allocate a portion of public funds and ensure their distribution according to community priorities (Cardullo and Kitchin 2019). This approach enables community members to propose, discuss, and vote on projects, thereby enhancing the transparency and inclusivity of resource allocation. However, participatory budgets face challenges limiting their effectiveness as BOs. For example, neighborhood security applications may be hindered by higher-level agencies reallocating funds to avoid project duplication (Mora et al.

2017), thereby undermining the budget's role in empowering communities (León and Rosen 2021). Political factors can lead to the preferential treatment of projects endorsed by influential figures, sidelining grassroots initiatives and eroding trust in the process (Balestrini et al. 2017; Martin et al. 2018). Additionally, bureaucratic complexities and the formalization required for participatory budgeting can clash with the flexibility needed for innovative solutions, reducing responsiveness to dynamic urban challenges (Arellano-Gault et al. 2013). While participatory budgets aim to democratize resource distribution and foster engagement, institutional pressures and political biases can compromise their effectiveness, thus highlighting the need for mechanisms that balance clarity and flexibility in urban development contexts.

4.3 Engagement

In human-centered Smart Cities, engagement is crucial for effective urban development. This section examines how various BOs, categorized as collaborative spaces and tools, foster stakeholders engagement. Innovation networks and living labs provide dynamic environments that facilitate interaction and knowledge exchange, driving collaborative problem solving and innovation. By contrast, cooperation agreements, formal contracts, and ICT literacy serve as collaborative tools, establishing essential frameworks and competencies for active participation. By analyzing these elements (Table 5), we elucidated how structured engagement mechanisms advance inclusive and adaptive urban environments, enhancing the effectiveness and sustainability of Smart City initiatives.

The Influence of "Engagement" in the Urban Development of people-centered Smart Cities	BO Category	Positive Influence	Negative Influence
Innovation Network	Collaborative Space	Innovation networks offer a structured environment that facilitates the sharing of insights and collaborative solution development, integrating diverse technological, social, and economic perspectives to address complex urban challenges.	The effectiveness of innovation networks can be limited by coordination difficulties, power imbalances, and governance challenges.
Living Lab	Collaborative Space	Living Labs fosters user-centred innovation by integrating diverse perspectives and interests into real-world contexts, enhancing collaborative engagement across various sectors in urban development.	Power imbalances and challenges in incentivising participation and managing diverse stakeholder interests can undermine the collaborative ethos and lead to inefficiencies in achieving impactful outcomes.
Cooperation Agreement	Collaborative Tool	Cooperation agreements establish clear terms and goals, which enhances commitment and resource allocation by aligning efforts and reducing ambiguity.	The formalization of cooperation agreements can introduce rigidity, limiting the flexibility required for adaptive and innovative urban projects, and potentially increasing governance complexity.
Formal Contracts and Project Documentation	Collaborative Tool	Formal contracts and project documentation provide a structured framework that clearly defines responsibilities and deliverables, facilitating coordination and integration of diverse perspectives in urban	The rigidity of formal contracts and documentation can hinder adaptability to evolving project conditions, potentially leading to conflicts if stakeholders cannot amend terms to meet

The Influence of "Engagement" in the Urban Development of people-centered Smart Cities	BO Category	Positive Influence	Negative Influence
		development projects.	changing needs.
ICT Literacy	Collaborative Tool	ICT literacy empowers citizens to actively engage in and contribute to smart city initiatives, enhancing their ability to interact with digital platforms and leverage technology for personal and communal development.	Low ICT literacy can create a digital divide, excluding less technologically adept individuals from participating in and benefiting from smart city initiatives, which may exacerbate social and economic inequalities.

Table 5 Findings: boundary object—engagement

4.3.1 Collaborative space: innovation network

Innovation networks are vital BOs in urban development and act as collaborative spaces engaging diverse stakeholders (Leite 2022). Defined as stable patterns of social relations among mutually dependent actors around policy problems and resources (Klijn and Koppenjan 2014), these networks pool knowledge and resources from various sectors to drive technological and social advancements. They enable collaboration between government bodies, private enterprises, and civic groups to address urban challenges and seize innovation opportunities (Alberti and Pizzurno 2017; Möller and Halinen 2017). In Smart Cities, innovation networks create structured environments for interaction and co-creation, integrating technological, social, and economic perspectives to tackle complex urban issues. However, challenges such as conflicts from diverse stakeholder interests and coordination difficulties may hinder effective decision making. Power imbalances can lead to inequitable contributions (Bouncken and Fredrich 2016), while concerns about representativeness and transparency can undermine effectiveness (Sørensen and Torfing 2009). In addition, managing complex interactions can lead to fragmentation if not integrated with broader governance structures (Gavetti 2012; Papadopoulos 2012). Collectively, these challenges suggest that while innovation networks offer promise for urban development, their effectiveness is constrained by coordination issues and governance challenges.

4.3.2 Collaborative space: living lab

Living labs are experimental environments designed to foster real-life innovation through active collaboration among diverse stakeholders, including citizens, researchers, and businesses. They aim to create user-centered solutions by involving participants early in

the innovation process, co-creating solutions, and simulating real-world contexts (Almirall and Wareham 2011; Eriksson et al. 2005). Similar to BOs, living labs integrate multiple perspectives to facilitate engagement across sectors in urban development (Bergvall-Kareborn and Stahlbrost 2009; Leminen et al. 2015). This setup is particularly valuable for addressing complex urban issues by incorporating technological, social, and economic perspectives (Feurstein et al. 2008). However, living labs have significant limitations, including power imbalances that can overshadow less influential participants (Engels et al. 2019; Kähkönen 2014). Challenges in incentivizing participation and managing diverse interests can lead to inefficiencies (Nguyen and Marques 2022). However, coordinating multiple actors may hinder cohesive and impactful outcomes (Hossain 2018). Therefore, although living labs provide valuable platforms for innovation, their effectiveness as BOs is limited by structural and operational challenges.

4.3.3 Collaborative tool: cooperation agreement

Cooperation agreements are crucial in urban development and serve as a formal framework that facilitates stakeholder engagement by delineating roles, responsibilities, and expectations (Dolmans et al. 2023). This document structures collaborative efforts by setting explicit terms for investments and processes, and enhancing commitment (Bryson et al. 2006). Such agreements are vital for securing resources and support by aligning efforts with clear goals (Torfing 2019). However, formalization in cooperation agreements can introduce rigidity, constraining the flexibility required for innovative urban projects (Dolmans et al. 2023). As projects transition from exploratory phases to rigid frameworks, this rigidity can conflict with their initial innovative nature (Mazzucato 2013). Bureaucratic hurdles can also impede decision-making and complicate implementation (Edler and Georghiou 2007). Moreover, adherence to established practices may misalign innovative objectives with entrenched organizational practices, leading to inefficiencies (Wegrich 2019). Therefore, while cooperation agreements provide structure and reduce uncertainty, they must balance formalization with flexibility to effectively support dynamic urban development (Sørensen and Torfing 2011).

4.3.4 Collaborative tool: contracts and project documentation

In urban development, formal contracts and project documentation (masterplans, proformas, financial decks, and design prototypes) play crucial roles as collaborative tools, thus contributing uniquely to stakeholder engagement and project alignment (Zuzul 2019). Formal contracts establish foundational agreements that clearly define stakeholders' responsibilities and provide a structured framework for coordination and expectations. While effective, their rigidity can hinder adaptability to changing project conditions, potentially creating conflicts if stakeholders struggle to amend the terms (Seidel and O'Mahony 2014). Project master plans offer a comprehensive vision for development, guide the overall direction, and ensure alignment among diverse actors (Weick et al. 2005). However, inherent ambiguities can lead to misunderstandings and disagreements, thus complicating collaboration. Proformas and financial decks provide critical financial planning projections, aligning stakeholders with the expectations essential for project viability. Nevertheless, their static nature can fail to reflect the dynamic urban development landscape, risking misalignment if financial assumptions are not updated. Design prototypes facilitate the visualization and testing of ideas, allowing stakeholders to refine concepts (Nicolini et al. 2012). While fostering innovation and

feedback, prototypes can become contentious if they do not meet design constraints, leading to confusion (Townsend 2013). Although BOs are essential for integrating perspectives in complex urban projects, their effectiveness depends on their adaptability and responsiveness to the dynamic nature of Smart City initiatives (Boland and Tenkasi 1995).

4.3.5 Collaborative tool: ICT literacy

In urban development, ICT literacy serves as a significant BO, facilitating engagement by providing a common framework for interaction and collaboration (Curşeu et al. 2021). Defined as the ability to use and understand ICTs for problem-solving and communication (Shelton and Lodato 2019), ICT literacy encompasses technical skills and digital competencies necessary for navigating modern urban environments. As a BO, ICT literacy supports citizen engagement by enabling participation in Smart City initiatives. It empowers individuals to interact with digital platforms and access essential services for personal and professional growth (Ramaswami et al. 2016). Highly ICT-literate individuals can engage in roles that drive innovation and enhance a city's technological and economic capacities (Martin et al. 2018). However, lower ICT literacy can create barriers to participation and exacerbate social and economic inequalities (Graham 2002). This divide may hinder effective contributions to urban development, leading to disparities in the benefits of Smart City initiatives. Moreover, the rapid evolution of digital technologies can pressure individuals to maintain their current skills, risking the exclusion of those who are unable to adapt (Stromquist 2019). Therefore, while ICT literacy facilitates engagement and collaboration, it also highlights the need for inclusive strategies that address digital inequalities and support continuous skill development, ensuring that all citizens participate fully in Smart City opportunities.

5 Discussion and conclusions

The findings of this research provide substantial insights into the far-reaching implications for policymakers, practitioners, and scholars engaged in the development and management of people-centered Smart Cities. By illustrating the influence of BOs such as collaborative spaces and tools, on innovation, sharing and engagement, this study reveals how these elements shape the effectiveness and inclusiveness of urban initiatives. For practitioners, the findings offer guidance for creating supportive structures and policies to improve stakeholder collaboration and resource utilization. These insights can be used to implement effective strategies for community engagement and technological integration. Scholars have a refined understanding of how the theoretical concepts in Smart City development translate into practical outcomes, paving the way for further research and theoretical advances in this ever-evolving field.

5.1 Implications for scholars

When designing BOs for people-centered Smart Cities, several inherent paradoxes must be carefully navigated to ensure effective results. One of the most important contradictions is the balance between flexibility and rigidity. Flexibility is crucial to adapting BOs to changing urban conditions and for integrating new knowledge. However, excessive flexibility can undermine the structures necessary for coordination and clarity. Therefore, BOs should be designed to provide a robust structure that accommodates

iterative changes and allows for adaptability without compromising the overall structure, which is essential for effective management and alignment. Another significant paradox is related to integration and complexity. Integration seeks to bring together different perspectives and inputs in order to foster a comprehensive approach to urban development. However, this process can lead to increased complexity, potentially overwhelming the participants and complicating BO management. To resolve this paradox, it is essential to design BOs that facilitate integration while maintaining process simplicity. This approach ensures an effective combination of different inputs without introducing unnecessary complexity that can hinder its usability and practical applications. Moreover, a balance between engagement and exclusion is crucial. Engagement empowers stakeholders by actively involving them in the process, enhancing collaboration and innovation. Conversely, if not managed properly, engagement efforts may inadvertently lead to exclusion, and some groups may be left out or marginalized. Therefore, BOs must be designed with inclusive features that promote broad participation and address potential barriers, ensuring that the benefits of involvement are distributed and that no group is unfairly excluded. When outlining objects for people-centered Smart Cities, several key considerations must guide the process to maximize the effectiveness and mitigate potential challenges (Table 6).

Positive Attribute	Negative Attribute	Design
Integration	Discrepancy	A boundary object should provide mechanisms for ongoing feedback and adjustments to maintain alignment among stakeholders and reduce discrepancies. It should integrate diverse inputs while adapting to evolving needs
Engagement	Exclusion	To foster engagement and prevent exclusion, boundary objects should be designed with inclusive features that facilitate broad participation and address barriers to entry. Accessibility and user support should be integral to their design.
Clarity	Complexity	Boundary objects should balance providing clear, structured guidelines and maintaining enough flexibility to accommodate dynamic conditions. Avoid excessive rigidity that could complicate management and adaptation.
Alignment	Misalignment	Regularly review and adjust the boundary object to ensure continuous alignment with stakeholder goals and project objectives. Facilitate open communication channels to address and rectify misalignments early.
Empowerment	Oversight	Ensure that boundary objects provide equitable opportunities for participation and decision-making. Implement checks to prevent domination and promote fair representation of all stakeholders.
Democratisation	Exclusivity	Design boundary objects with features that support broad access and participation. Create inclusive processes that welcome diverse inputs and prevent exclusivity.

Table 6 Boundary object attribute for people-centered smart cities

Integration is a key attribute that ensures a harmonious combination of perspectives and inputs to address complex urban problems. A well-conceived BO facilitates this integration by providing continuous feedback mechanisms and adjustments that align stakeholder objectives and reduce divergence. Involvement is a crucial factor in this process. An effective BO empowers stakeholders by actively involving them in the urban development process and fostering collaboration and innovation. To this end, BOs should include inclusive features that support broad participation and address barriers to entry, thereby improving the bonds between residents and municipal authorities. Clarity in the design helps establish clear expectations and responsibilities, facilitates coordination, and reduces misunderstandings. However, the challenge is avoiding excessive complexity. Although clarity is essential, it must be balanced with the flexibility to adapt to changing conditions and provide new insights. A well-designed BO must provide structured guidelines while remaining adaptable to changing needs. Alignment among objectives, processes, and stakeholders improves consistency and reduces conflict. To maintain alignment and ensure that stakeholders' interests are consistently met, regular reviews and adjustments of the BO are necessary. Effective communication channels

must be established to identify and correct misalignments promptly. Empowerment through BOs enables stakeholders to assume ownership of their roles and contribute effectively to urban development. To avoid power imbalances and ensure fair representation, the BOs must be designed to promote equal participation and prevent a single group from dominating the process. Democratization ensures that all stakeholders have equal opportunities to participate and influence outcomes. BOs must include mechanisms that support broad access and prevent exclusivity, thereby promoting an inclusive environment in which diverse contributions are welcomed and valued.

5.2 Implications for practitioners

The findings of this study have significant implications for practitioners involved in advancing Smart City initiatives. First, the strategic use of BOs-such as living labs, innovation networks, and blockchain-based tools, has emerged as a critical factor in fostering collaborative environments and optimizing innovation processes. Policymakers can leverage these objectives to design and implement policies that improve public engagement and streamline collaborative efforts, thereby improving the overall effectiveness of Smart City projects. Furthermore, this study highlighted the importance of improving resource allocation. By understanding the role of collaborative tools and spaces in driving urban development, practitioners can efficiently target resources. This approach involves prioritizing initiatives that effectively harness BOs to increase public participation and foster innovation, ensuring that investments are aligned with Smart City development goals. Finally, promoting inclusiveness is essential for creating equitable Smart City projects. Policies should encourage the integration of collaborative spaces to facilitate the active participation of diverse stakeholder groups. This inclusiveness ensures that Smart City initiatives not only meet the needs of all community members but also reflect their aspirations, leading to more balanced and representative urban development. By incorporating these insights, practitioners can improve the impact and sustainability of Smart City strategies. By effectively using BOs, such as collaborative communities and ICT tools, they can significantly improve stakeholder engagement, facilitate innovation and streamline project management processes. These practices are crucial to foster a collaborative environment that supports dynamic and effective urban development. This study provides a valuable framework for the selection and integration of BOs into urban development initiatives. Practitioners can use our emerging framework (Table 6) to select and adapt tools according to the specific requirements of their projects. This tailor-made approach ensures that BOs are optimally aligned with the project objectives, thereby maximizing their impact on engagement and innovation. Capacity building is essential for the successful implementation of BOs. Practitioners should invest in ICT stakeholder training and create strong governance structures that support collaborative processes. By building these capacities, practitioners can improve the effectiveness of BOs and ensure that collaborative efforts are well supported, leading to more successful and sustainable Smart City dynamics.

5.3 Research limitations and avenues for future research

In the realm of people-centered Smart Cities, it is imperative to recognize the limitations of the current research and identify potential avenues for future exploration. Despite the

valuable insights provided, this study has several limitations that may affect the generalizability and depth of its findings. For example, the scope of the research may be limited by the specific contexts and case studies examined, which may not fully represent the diverse range of Smart City initiatives worldwide. Furthermore, while this study addresses various aspects of BOs and their role in improving urban development, it may not capture all the complexities involved in implementing people-centered approaches. Acknowledging these limitations opens opportunities for further research, including exploring different geographical contexts, broadening the types of BOs studied, and analyzing their long-term impact on Smart City initiatives.

The scope of the literature review was constrained by the selection of sources from specific databases (SCOPUS and WoS) and the availability of relevant studies in the management and social science research streams. This selection bias may have resulted in an incomplete representation of the existing research, potentially overlooking significant contributions that could have influenced or complemented the findings. Second, this study has notable contextual limitations. The case studies and examples examined predominantly focus on specific geographic regions or types of Smart City initiatives (mainly in northern Europe instead of the south of the world). This regional concentration may limit the generalizability of the findings to other locations with distinct socioeconomic, cultural, or political contexts. Similarly, this research might emphasize certain sectors or governance models that could restrict the applicability of the insights to other areas of urban development. Methodologically, the reliance on qualitative analysis through a systematic literature review introduces potential bias and subjectivity. The absence of empirical data such as surveys or case studies further limits the ability to directly assess the impact of BOs on Smart City development and citizen engagement.

Finally, the dynamic and rapidly evolving nature of Smart City projects and practices presents challenges. The findings of this study may quickly become outdated as new BOs and collaborative tools and spaces emerge or as existing ones undergo significant changes. To address these limitations, future research should consider expanding the range of sources included in the literature reviews, incorporating empirical data to validate the findings, and exploring diverse geographical and sectoral contexts. In addition, efforts to harmonize definitions and conceptual frameworks across disciplines could enhance the coherence and applicability of research on BOs in Smart City development. Based on the insights gained from this study, several promising avenues for future research have emerged. First, longitudinal studies can analyze the evolution of BOs over time and assess their long-term impact on Smart City initiatives. This approach provides valuable insight into the sustainability and changing roles of BOs as urban environments and technologies develop. Second, comparative studies across geographical and cultural contexts could improve our understanding of how BOs function in different contexts. By examining Smart Cities in different regions, researchers can identify specific challenges and opportunities, leading to more personalized and effective urban strategies. As mentioned earlier, another critical area is the empirical validation of theoretical models. Therefore, testing existing theories on BOs through empirical methods such as surveys and case studies would help confirm their practical implications and refine existing conceptual and theoretical frameworks. This approach bridges the

gap between theory and practice, and offers workable insights for implementation. As technology advances, exploring the impact of emerging technologies on BOs has become critical. Research could focus on how innovations such as artificial intelligence, blockchain and IoT interact with BOs and influence collaborative processes, shedding light on their evolving role in Smart Cities. Developing citizen-centered assessment frameworks is another important direction. By creating and testing frameworks that incorporate feedback from urban residents, researchers can better understand how BOs influence citizen engagement and satisfaction, thereby leading to more effective and responsive Smart City solutions. Interdisciplinary research that combines insights from fields such as urban studies, information systems, and organizational behavior can offer a more comprehensive view of BOs. This interdisciplinary approach addresses the complexity of BOs and their role in promoting collaboration and innovation in Smart Cities. In addition, examining how BOs influence decision-making and governance could provide valuable insights for policymakers. Research could explore how BOs facilitate or hinder decision-making processes, stakeholder coordination, and policy implementation in Smart Cities.

Finally, the evaluation of collaborative processes facilitated by BOs is a key area for future research. Studying best practices and strategies for improving stakeholder cooperation could improve collaborative models and their impact on innovation and engagement. Additionaly, it is essential to understand the other challenges and limitations of BOs. Research should focus on identifying common pitfalls and developing strategies to overcome obstacles to effective collaboration and innovation, thereby improving the design and implementation of BOs. These future research directions have the potential to significantly advance our understanding of BOs in Smart City development by offering valuable knowledge to scholars and practitioners committed to creating more effective and inclusive urban environments.

References

Abella A, Ortiz-de-Urbina-Criado M, De-Pablos-Heredero C (2017) A model for the analysis of data-driven innovation and value generation in smart cities' ecosystems. Cities 64:47–53

Akande A, Cabral P, Casteleyn S (2020) Understanding the sharing economy and its implication on sustainability in smart cities. J Clean Prod 277:124077

Alberti FG, Pizzurno E (2017) Oops, i did it again! Knowledge leaks in open innovation networks with start-ups. Eur J Innov Manag 20(1):50–79. https://doi.org/10.1108/EJIM-11-2015-0116

Albino V, Berardi U, Dangelico RM (2015) Smart cities: definitions, dimensions, performance, and initiatives. J Urban Technol 22(1):3–21. https://doi.org/10.1080/10630732.2014.942092

Almirall E, Wareham J (2011) Living labs: arbiters of mid- and ground-level innovation. Technol Anal Strateg Manag 23(1):87–102. https://doi.org/10.1080/09537325.2011.537110

Archer, Jacques R, Powell JA (1981) A view of the nature of the design research. 30–47

Arellano-Gault D, Demortain D, Rouillard C, Thoenig J-C (2013) Bringing public organization and organizing back in. Organ Stud 34(2):145–167. https://doi.org/10.1177/0170840612473538

Bagherzadeh M, Markovic S, Bogers M (2021) Managing open innovation: a project-level perspective. IEEE Trans Eng Manag 68(1):301–316. https://doi.org/10.1109/TEM.2019.2949714

Balestrini M, Rogers Y, Hassan C, Creus J, King M, Marshall P (2017) A city in common: a framework to orchestrate large-scale citizen engagement around urban issues. In: Proceedings of the 2017 CHI conference on human factors in computing systems, 2282–2294. https://doi.org/10.1145/3025453.3025915

Baregheh A, Rowley J, Sambrook S (2009) Towards a multidisciplinary definition of innovation. Manag Decis 47(8):1323–1339. https://doi.org/10.1108/00251740910984578

Barrutia JM, Echebarria C, Aguado-Moralejo I, Apaolaza-Ibáñez V, Hartmann P (2022) Leading Smart City projects: government dynamic capabilities and public value creation. Technol Forecast Soc Chang 179:121679

Batista M, Goyannes Gusmão Caiado R, Gonçalves Quelhas OL, Brito Alves Lima G, Leal Filho W, Rocha Yparraguirre IT (2021) A framework for sustainable and integrated municipal solid waste management: barriers and critical factors to developing countries. J Clean Prod 312:127516. https://doi.org/10.1016/j.jclepro.2021.127516

Batty M (2013) Big data, smart cities and city planning. Dialogues Hum Geogr 3(3):274–279. https://doi.org/10.1177/2043820613513390

Bayazit N (2004) Investigating design: a review of forty years of design research. Des Issues 20(1):16–29

Beckers D, Gerli P, Mora L (2023) Managing Smart City governance–a playbook for local and regional governments (UN-Habitat HS/060/20E). United Nations Human Settlements Programme (UN-Habitat)

Behl A, Jayawardena N, Pereira V, Islam N, Del Giudice M, Choudrie J (2022) Gamification and e-learning for young learners: a systematic literature review, bibliometric analysis, and future research agenda. Technol Forecast Soc Chang 176:121445

Benn S, Martin A (2010) Learning and change for sustainability reconsidered: a role for boundary objects. Acad Manag Learn Educ 9(3):397–412. https://doi.org/10.5465/amle.9.3.zqr397

Benn S, Edwards M, Angus-Leppan T (2013) Organizational learning and the sustainability community of practice: the role of boundary objects. Organ Environ 26(2):184–202. https://doi.org/10.1177/1086026613489559

Bergvall-Kareborn B, Stahlbrost A (2009) Living lab: an open and citizen-centric approach for innovation. Int J Innov Reg Dev 1(4):356–370. https://doi.org/10.1504/IJIRD.2009.022727

Bernardi M, Diamantini D (2018) Shaping the sharing city: an exploratory study on Seoul and Milan. J Clean Prod 203:30–42

Bertello A, Bogers MLAM, De Bernardi P (2022) Open innovation in the face of the COVID-19 grand challenge: insights from the Pan-European hackathon 'EUvsVirus.' R&D Manag 52(2):178–192. https://doi.org/10.1111/radm.12456

Bhimani H, Mention A-L, Barlatier P-J (2019) Social media and innovation: a systematic literature review and future research directions. Technol Forecast Soc Change 144:251–269. https://doi.org/10.1016/j.techfore.2018.10.007

Boland RJ, Tenkasi RV (1995) Perspective making and perspective taking in communities of knowing. Organ Sci 6(4):350–372

Bouncken RB, Fredrich V (2016) Learning in coopetition: alliance orientation, network size, and firm types. J Bus Res 69(5):1753–1758. https://doi.org/10.1016/j.jbusres.2015.10.050

Bresciani S, Ferraris A, Del Giudice M (2018) The management of organizational ambidexterity through alliances in a new context of analysis: Internet of Things (IoT) Smart City projects. Technol Forecast Soc Chang 136:331–338. https://doi.org/10.1016/j.techfore.2017.03.002

Bryson JM, Crosby BC, Stone MM (2006) The design and implementation of cross-sector collaborations: propositions from the literature. Public Adm Rev 66(s1):44–55. https://doi.org/10.1111/j.1540-6210.2006.00665.x

Caccamo M, Pittino D, Tell F (2023) boundary objects, knowledge integration, and innovation management: a systematic review of the literature. Technovation 122:102645. https://doi.org/10.1016/j.technovation.2022.102645

Camboim GF, Zawislak PA, Pufal NA (2019) Driving elements to make cities smarter: evidences from European projects. Technol Forecast Soc Chang 142:154–167

Cardullo P, Kitchin R (2019) Being a 'citizen' in the Smart City: up and down the scaffold of smart citizen participation in Dublin. Ireland Geojournal 84(1):1–13

Centobelli P, Cerchione R, Chiaroni D, Del Vecchio P, Urbinati A (2020) Designing business models in circular economy: a systematic literature review and research agenda. Bus Strateg Environ 29(4):1734–1749. https://doi.org/10.1002/bse.2466

Chauhan C, Parida V, Dhir A (2022) Linking circular economy and digitalisation technologies: a systematic literature review of past achievements and future promises. Technol Forecast Soc Chang 177:121508. https://doi.org/10.1016/j.techfore.2022.121508

Chesbrough HW (2003) Open innovation: the new imperative for creating and profiting from technology. Harvard Business Press, Brighton

Chesbrough H (2004) Managing open innovation. Res Technol Manag 47(1):23–26. https://doi.org/10.1080/08956308.2004.11671604

Chesbrough H, Vanhaverbeke W, West J (2006) Open innovation: researching a new paradigm. OUP, Oxford

Christensen CM, Baumann H, Ruggles R, Sadtler TM (2006) Disruptive innovation for social change. Harvard Bus Rev 84(12):94–101

Christensen C, Raynor M, McDonald R (2017) What is disruptive innovation? Harvard business review. https://hbr.Org/2015/12/what-is-disruptive-innovation>, 5(5)

Christofi M, Vrontis D, Thrassou A, Shams SR (2019) Triggering technological innovation through cross-border mergers and acquisitions: a micro-foundational perspective. Technol Forecast Soc Chang 146:148–166

Coenen L, Hansen T, Rekers JV (2015) Innovation policy for grand challenges. An economic geography perspective. Geogr Compass 9(9):483–496. https://doi.org/10.1111/gec3.12231

Cohen A (2012) Rescaling environmental governance: watersheds as boundary objects at the intersection of science, neoliberalism, and participation. Environ Plann Econ Space 44(9):2207–2224. https://doi.org/10.1068/a44265

Correia D, Vagos C, Marques JL, Teixeira L (2024) Fulfilment of last-mile urban logistics for sustainable and inclusive smart cities: a case study conducted in Portugal. Int J Log Res Appl 27(6):931–958. https://doi.org/10.1080/13675567.2022.2130211

Curşeu PL, Semeijn JH, Nikolova I (2021) Career challenges in smart cities: a sociotechnical systems view on sustainable careers. Hum Relat 74(5):656–677. https://doi.org/10.1177/0018726720949925

Dameri RP, Ricciardi F (2015) Smart City intellectual capital: an emerging view of territorial systems innovation management. J Intellect Cap 16(4):860–887. https://doi.org/10.1108/JIC-02-2015-0018

Dar S (2018) De-colonizing the boundary-object. Organ Stud 39(4):565–584. https://doi.org/10.1177/0170840617708003

Dolmans SAM, Van Galen WPL, Walrave B, Den Ouden E, Valkenburg R, Romme AGL (2023) A dynamic perspective on collaborative innovation for Smart City development: the role of uncertainty, governance, and institutional logics. Organ Stud 44(10):1577–1601. https://doi.org/10.1177/01708406231169422

Döring M, Ratter B (2015) 'Heimat' as a boundary object? Exploring the potentialities of a boundary object to instigate productive science-stakeholder interaction in North Frisia (Germany). Environ Sci Policy 54:448–455. https://doi.org/10.1016/j.envsci.2015.08.009

Dos Santos RP (2017) On the philosophy of bitcoin/blockchain technology: is it a chaotic, complex system? Metaphilosophy 48(5):620–633. https://doi.org/10.1111/meta.12266

Du J, Leten B, Vanhaverbeke W (2014) Managing open innovation projects with science-based and market-based partners. Res Policy 43(5):828–840. https://doi.org/10.1016/j.respol.2013.12.008

Dupont L, Morel L, Guidat C (2015) Innovative public-private partnership to support Smart City: the case of "Chaire REVES." J Strateg Manag 8(3):245–265. https://doi.org/10.1108/JSMA-03-2015-0027

Echebarria C, Barrutia JM, Aguado-Moralejo I (2021) The Smart City journey: a systematic review and future research agenda. Innov Eur J Soc Sci Res 34(2):159–201. https://doi.org/10.1080/13511610.2020.1785277

Edler J, Ruhlandt RWS, Hommen (2005). Innovation and public procurement. Review of Issues at Stake

Edler J, Georghiou L (2007) Public procurement and innovation—resurrecting the demand side. Res Policy 36(7):949–963. https://doi.org/10.1016/j.respol.2007.03.003

Edler J, Yeow J (2016) Connecting demand and supply: the role of intermediation in public procurement of innovation. Res Policy 45(2):414–426. https://doi.org/10.1016/j.respol.2015.10.010

Edquist C, Zabala-Iturriagagoitia JM (2012) Public procurement for innovation as mission-oriented innovation policy. Res Policy 41(10):1757–1769. https://doi.org/10.1016/j.respol.2012.04.022

Eisenhardt KM, Schoonhoven CB (1996) Resource-based view of strategic alliance formation: strategic and social effects in entrepreneurial firms. Organ Sci 7(2):136–150

Engels F, Wentland A, Pfotenhauer SM (2019) Testing future societies? Developing a framework for test beds and living labs as instruments of innovation governance. Res Policy 48(9):103826. https://doi.org/10.1016/j.respol.2019.103826

Eriksson M, Niitamo V-P, Kulkki S (2005) State-of-the-art in utilizing living labs approach to user- centric ICT innovation—A European approach

Etgar M (2008) A descriptive model of the consumer co-production process. J Acad Mark Sci 36(1):97–108. https://doi.org/10.1007/s11747-007-0061-1

European Union GCP (2023) Orientation paper of the urban agenda for the EU greening cities partnership

Faems D, Van Looy B, Debackere K (2005) Interorganizational collaboration and innovation: toward a portfolio approach. J Prod Innov Manag 22(3):238–250. https://doi.org/10.1111/j.0737-6782.2005.00120.x

Ferraris A, Santoro G, Papa A (2018) The cities of the future: hybrid alliances for open innovation projects. Futures 103:51–60. https://doi.org/10.1016/j.futures.2018.03.012

Ferraris A, Santoro G, Pellicelli AC (2020) "Openness" of public governments in smart cities: removing the barriers for innovation and entrepreneurship. Int Entrep Manag J 16(4):1259–1280. https://doi.org/10.1007/s11365-020-00651-4

Feurstein K, Hesmer A, Hribernik K, Thoben K-D, Schumacher J (2008) Living labs: a new development strategy, pp 1–14

Fjeldstad ØD, Snow CC, Miles RE, Lettl C (2012) The architecture of collaboration. Strateg Manag J 33(6):734–750. https://doi.org/10.1002/smj.1968

Fox NJ (2011) Boundary objects, social meanings and the success of new technologies. Sociology 45(1):70–85. https://doi.org/10.1177/0038038510387196

Gavetti G (2012) Perspective—toward a behavioral theory of strategy. Organ Sci 23(1):267–285. https://doi.org/10.1287/orsc.1110.0644

Gillespie T (2010) The politics of 'platforms.' New Media Soc 12(3):347–364. https://doi.org/10.1177/1461444809342738

Gleeson AD, Kosovac A, Fastenrath S, Acuto M, Gleeson B (2022) Fragmentation and urban knowledge: an analysis of urban knowledge exchange institutions. Elsevier

Gomes LADV, Facin ALF, Salerno MS, Ikenami RK (2018) Unpacking the innovation ecosystem construct: evolution, gaps and trends. Technol Forecast Soc Change 136:30–48. https://doi.org/10.1016/j.techfore.2016.11.009

Graham S (2002) Bridging urban digital divides? Urban polarisation and information and communications technologies (ICTs). Urban Stud 39(1):33–56. https://doi.org/10.1080/00420980220099050

Green M (2011) Making development agents: participation as boundary object in international development. In: The government of chronic poverty. Routledge

Haagensen N (2024) Boundary objects in complex governance systems: collective action clauses in European sovereign debt governance. J Eur Publ Policy 31(2):586–609. https://doi.org/10.1080/13501763.2022.2143867

Haefner N, Wincent J, Parida V, Gassmann O (2021) Artificial intelligence and innovation management: a review, framework, and research agenda☆. Technol Forecast Soc Chang 162:120392. https://doi.org/10.1016/j.techfore.2020.120392

Haghani M, Sabri S, De Gruyter C, Ardeshiri A, Shahhoseini Z, Sanchez TW, Acuto M (2023) The landscape and evolution of urban planning science. Cities 136:104261

Hagiu A (2014) Strategic decisions for multisided platforms. MIT

Hartley J, Sørensen E, Torfing J (2013) Collaborative innovation: a viable alternative to market competition and organizational entrepreneurship. Public Adm Rev 73(6):821–830. https://doi.org/10.1111/puar.12136

Harvey F, Chrisman N (1998) Boundary objects and the social construction of GIS technology. Environ Plann Econ Space 30(9):1683–1694. https://doi.org/10.1068/a301683

Hawkins B, Pye A, Correia F (2017) Boundary objects, power, and learning: the matter of developing sustainable practice in organizations. Manag Learn 48(3):292–310. https://doi.org/10.1177/1350507616677199

Holland R (2008) Will the real Smart City please stand up? Creative, progressive or just Entrepreneurial. City 12(3):302–320

Hossain M (2018) Frugal innovation: a review and research agenda. J Clean Prod 182:926–936. https://doi.org/10.1016/j.jclepro.2018.02.091

Hughes K (2017) Blockchain, the greater good, and human and civil rights. Metaphilosophy 48(5):654–665. https://doi.org/10.1111/meta.12271

Huizingh EKRE (2011) Open innovation: state of the art and future perspectives. Technovation 31(1):2–9. https://doi.org/10.1016/j.technovation.2010.10.002

Huovila A, Siikavirta H, Antuña Rozado C, Rökman J, Tuominen P, Paiho S, Hedman Å, Ylén P (2022) Carbon-neutral cities: critical review of theory and practice. J Clean Prod 341:130912. https://doi.org/10.1016/j.jclepro.2022.130912

Kähkönen A-K (2014) The influence of power position on the depth of collaboration. Supply Chain Manag Int J 19(1):17–30. https://doi.org/10.1108/SCM-03-2013-0079

Kajol K, Singh R, Paul J (2022) Adoption of digital financial transactions: a review of literature and future research agenda. Technol Forecast Soc Chang 184:121991. https://doi.org/10.1016/j.techfore.2022.121991

Karaba F, Roehrich JK, Conway S, Turner J (2023) Information sharing in public-private relationships: the role of boundary objects in contracts. Public Manag Rev 25(11):2166–2190. https://doi.org/10.1080/14719037.2022.2065344

Klijn E-H, Koppenjan J (2014) Complexity in governance network theory. Complex Gov Netw 1(1):1. https://doi.org/10.7564/14-CGN8

Klijn E-H, Skelcher C (2007) Democracy and governance networks: compatible or not? Public Adm 85(3):587–608. https://doi.org/10.1111/j.1467-9299.2007.00662.x

Komninos N, Mora L (2018) Exploring the big picture of Smart City research. Sci Reg 17(1):15–38. https://doi.org/10.14650/88815

Kramer R (1990) [Review of review of collaborating: finding common ground for multiparty problems, by B. Gray]. The Academy of Management Review, 15(3):545–547. https://doi.org/10.2307/258026

Kraus S, Breier M, Dasí-Rodríguez S (2020) The art of crafting a systematic literature review in entrepreneurship research. Int Entrep Manag J 16(3):1023–1042. https://doi.org/10.1007/s11365-020-00635-4

Kraus S, Breier M, Lim WM, Dabić M, Kumar S, Kanbach D, Mukherjee D, Corvello V, Piñeiro-Chousa J, Liguori E, Palacios-Marqués D, Schiavone F, Ferraris A, Fernandes C, Ferreira JJ (2022) Literature reviews as independent studies: guidelines for academic practice. RMS 16(8):2577–2595. https://doi.org/10.1007/s11846-022-00588-8

Kraus S, Bouncken RB, Yela Aránega A (2024) The burgeoning role of literature review articles in management research: an introduction and outlook. RMS 18(2):299–314. https://doi.org/10.1007/s11846-024-00729-1

Leite E (2022) Innovation networks for social impact: an empirical study on multi-actor collaboration in projects for smart cities. J Bus Res 139:325–337

Leminen S, Nyström A-G, Westerlund M (2015) A typology of creative consumers in living labs. J Eng Tech Manag 37:6–20. https://doi.org/10.1016/j.jengtecman.2015.08.008

León LFA, Rosen J (2021) Technology as ideology in urban governance. In: Smart spaces and places, Routledge

Leonidou LC, Katsikeas CS, Samiee S, Aykol B (2018) International marketing research: a state-of-the-art review and the way forward. In: Leonidou LC, Katsikeas CS, Samiee S, Aykol B (eds) Advances in global marketing. Springer, Cham, pp 3–33. https://doi.org/10.1007/978-3-319-61385-7_1

Liberati A (2009) The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. Ann Intern Med. https://doi.org/10.7326/0003-4819-151-4-200908180-00136

Liedtka J (2018) Why design thinking works (Harvard Business Review)

Lim Y, Edelenbos J, Gianoli A (2019) Identifying the results of Smart City development: findings from systematic literature review. Cities. https://doi.org/10.1016/j.cities.2019.102397

Liu R, Rindt J, Hart S (2020) How firms learn in NPD networks: the 4S model. Ind Mark Manag 89:446–458. https://doi.org/10.1016/j.indmarman.2020.02.025

Livingstone S (2010) Youthful participation: what have we learned, what shall we ask next?

MacGillivray BH, Franklin A (2015) Place as a boundary device for the sustainability sciences: concepts of place, their value in characterising sustainability problems, and their role in fostering integrative research and action. Environ Sci Policy 53:1–7. https://doi.org/10.1016/j.envsci.2015.06.021

Mansell R (2012) Imagining the internet: communication, innovation, and governance. Oxford University Press

Manski S (2017) Building the blockchain world: technological commonwealth or just more of the same? Strateg Chang 26(5):511–522. https://doi.org/10.1002/jsc.2151

Marheineke M, Habicht H, Möslein KM (2016) Bridging knowledge boundaries: the use of boundary objects in virtual innovation communities. R&D Manag 46(S3):1084–1094. https://doi.org/10.1111/radm.12216

Marikyan D, Papagiannidis S, Alamanos E (2019) A systematic review of the smart home literature: a user perspective. Technol Forecast Soc Change 138:139–154. https://doi.org/10.1016/j.techfore.2018.08.015

Marsal-Llacuna M-L (2018) Future living framework: Is blockchain the next enabling network? Technol Forecast Soc Chang 128:226–234. https://doi.org/10.1016/j.techfore.2017.12.005

Marsal-Llacuna M-L (2020) The people's Smart City dashboard (PSCD): delivering on community-led governance with blockchain. Technol Forecast Soc Chang 158:120150. https://doi.org/10.1016/j.techfore.2020.120150

Martin CJ, Evans J, Karvonen A (2018) Smart and sustainable? Five tensions in the visions and practices of the smart-sustainable city in Europe and North America. Technol Forecast Soc Chang 133:269–278. https://doi.org/10.1016/j.techfore.2018.01.005

Massaro M, Dumay J, Guthrie J (2016) On the shoulders of giants: undertaking a structured literature review in accounting. Account Audit Account J 29(5):767–801

Mazzucato M (2013) Financing innovation: creative destruction vs. destructive creation. Ind Corp Change 22(4):851–867. https://doi.org/10.1093/icc/dtt025

Mazzucato, M. (2018). Mission-Oriented Research & Innovation in the European Union.

Meijer A, Bolívar MPR (2016) Governing the Smart City: a review of the literature on smart urban governance. Int Rev Adm Sci 82(2):392–408. https://doi.org/10.1177/0020852314564308

Mishra V, Mishra MP (2023) PRISMA for review of management literature– method, merits, and limitations– an academic review. In: Rana S, Singh J, Kathuria S (eds) Advancing methodologies of conducting literature review in management domain. Emerald Publishing Limited, pp 125–136. https://doi.org/10.1108/S2754-586520230000002007

Molina-Azorín JF, Claver-Cortés E, López-Gamero MD, Tarí JJ (2009) Green management and financial performance: a literature review. Manag Decis 47(7):1080–1100. https://doi.org/10.1108/00251740910978313

Möller K, Halinen A (2017) Managing business and innovation networks—from strategic nets to business fields and ecosystems. Ind Mark Manag 67:5–22. https://doi.org/10.1016/j.indmarman.2017.09.018

Mora L, Bolici R, Deakin M (2017) The first two decades of smart-city research: a bibliometric analysis. J Urban Technol 24(1):3–27. https://doi.org/10.1080/10630732.2017.1285123

Mora L, Gerli P, Ardito L, Messeni Petruzzelli A (2023b) Smart City governance from an innovation management perspective: theoretical framing, review of current practices, and future research agenda. Technovation. https://doi.org/10.1016/j.technovation.2023.102717

Mora L, Deakin M, Reid A (2019) Strategic principles for Smart City development: a multiple case study analysis of European best practices. Elsevier

Mora L, Appio FP, Foss NJ, Arellano-Gault D, Zhang X (2023) Organizing for Smart City development: Research at the crossroads. Introduction to the special issue. In: Organization studies, Vol. 44(10), pp. 1559–1575, SAGE Publications Sage, London, England. https://journals.sagepub.com/doi/abs/https://doi.org/10.1177/01708406231197815?casa_token=5gyMFWifxyUAAAAA:u3SFjNJX1-Lr6X3fp2vcx0kBf-INhXeI38mvrXkeYXWKOzKj3ny7YpNtf_Lt4q74MVkeq1fHU6FtSw

Muñoz P, Cohen B (2018) Sustainable entrepreneurship research: taking stock and looking ahead. Bus Strateg Environ 27(3):300–322. https://doi.org/10.1002/bse.2000

Nam T (2012a) Citizens' attitudes toward open government and government 2.0. Int Rev Adm Sci 78(2):346–368. https://doi.org/10.1177/0020852312438783

Nam T (2012b) Suggesting frameworks of citizen-sourcing via government 2.0. Gov Inf Q 29(1):12–20. https://doi.org/10.1016/j.giq.2011.07.005

Nesti G, Graziano PR (2020) The democratic anchorage of governance networks in smart cities: an empirical assessment. Public Manag Rev 22(5):648–667. https://doi.org/10.1080/14719037.2019.1588355

Nguyen HT, Marques P (2022) The promise of living labs to the Quadruple Helix stakeholders: exploring the sources of (dis)satisfaction. Eur Plan Stud 30(6):1124–1143. https://doi.org/10.1080/09654313.2021.1968798

Nguyen HT, Marques P, Benneworth P (2022) Living labs: challenging and changing the Smart City power relations? Technol Forecast Soc Chang 183:121866

Nicolini D, Mengis J, Swan J (2012) Understanding the role of objects in cross-disciplinary collaboration. Organ Sci 23(3):612–629. https://doi.org/10.1287/orsc.1110.0664

Nielsen BF, Baer D, Lindkvist C (2019) Identifying and supporting exploratory and exploitative models of innovation in municipal urban planning; key challenges from seven Norwegian energy ambitious neighborhood pilots. Technol Forecast Soc Chang 142:142–153. https://doi.org/10.1016/j.techfore.2018.11.007

Nilssen M (2019) To the Smart City and beyond? Developing a typology of smart urban innovation. Technol Forecast Soc Chang 142:98–104. https://doi.org/10.1016/j.techfore.2018.07.060

Oschinsky FM, Klein HC, Niehaves B (2022) Invite everyone to the table, but not to every course: how design-thinking collaboration can be implemented in smart cities to design digital services. Electron Mark 32(4):1925–1941. https://doi.org/10.1007/s12525-022-00567-7

Pansera M, Marsh A, Owen R, Flores López JA, De Alba Ulloa JL (2023) Exploring citizen participation in Smart City development in Mexico City: an institutional logics approach. Organ Stud 44(10):1679–1701. https://doi.org/10.1177/01708406221094194

Papadopoulos Y (2012) Accountability and multi-level governance: more accountability, less democracy? In: Accountability and European Governance, Routledge

Paroutis S, Bennett M, Heracleous L (2014) A strategic view on Smart City technology: the case of IBM smarter cities during a recession. Technol Forecast Soc Chang 89:262–272. https://doi.org/10.1016/j.techfore.2013.08.041

Paskaleva K, Cooper I (2018) Open innovation and the evaluation of internet-enabled public services in smart cities. Technovation 78:4–14

Paskaleva K, Cooper I (2019) Innovations in co-created Smart City services. In: Bolivar MPR (ed) Setting foundations for the creation of public value in smart cities. Springer, Cham, pp 165–195. https://doi.org/10.1007/978-3-319-98953-2_7

Paskaleva K, Cooper I, Linde P, Peterson B, Götz C (2015) Stakeholder engagement in the Smart City: making living labs work. In: Rodríguez-Bolívar MP (ed) Transforming city governments for successful smart cities. Springer, Cham, pp 115–145. https://doi.org/10.1007/978-3-319-03167-5_7

Pilon-Summons C, Pratt S, Brown PJ, Baumber A (2022) From barriers to boundary objects: rights of nature in Australia. Environ Sci Policy 134:13–22. https://doi.org/10.1016/j.envsci.2022.03.013

Ramaswami A, Russell AG, Culligan PJ, Sharma KR, Kumar E (2016) Meta-principles for developing smart, sustainable, and healthy cities. Science 352(6288):940–943. https://doi.org/10.1126/science.aaf7160

Renault S, Boutigny E (2014) Crowdsourcing citoyen: Définition et enjeux pour les villes. Politiques Et Management Public 31:215–237

Richter C, Kraus S, Syrjä P (2015) The Smart City as an opportunity for entrepreneurship. Int J Entrep Ventur 7(3):211–226. https://doi.org/10.1504/IJEV.2015.071481

Rizzo A, Habibipour A, Ståhlbröst A (2021) Transformative thinking and urban living labs in planning practice: a critical review and ongoing case studies in Europe. Eur Plan Stud 29(10):1739–1757. https://doi.org/10.1080/09654313.2021.1911955

Ruhlandt RWS (2018) The governance of smart cities: a systematic literature review. Cities 81:1–23

Saldert H (2024) Social sustainability for whom? The role of discursive boundary objects in Swedish strategic urban planning. Geoforum 152:104022. https://doi.org/10.1016/j.geoforum.2024.104022

Sandulli FD, Ferraris A, Bresciani S (2017) How to select the right public partner in Smart City projects. R&D Manag 47(4):607–619. https://doi.org/10.1111/radm.12250

Sapsed J, Salter A (2004) Postcards from the edge: local communities, global programs and boundary objects. Organ Stud 25(9):1515–1534. https://doi.org/10.1177/0170840604047998

Sauer PC, Seuring S (2023) How to conduct systematic literature reviews in management research: a guide in 6 steps and 14 decisions. RMS 17(5):1899–1933. https://doi.org/10.1007/s11846-023-00668-3

Schiavone F, Paolone F, Mancini D (2019) Business model innovation for urban smartization. Technol Forecast Soc Chang 142:210–219. https://doi.org/10.1016/j.techfore.2018.10.028

Schuurman D, De Marez L, Ballon P (2016) The impact of living lab methodology on open innovation contributions and outcomes. Technol Innov Manag Rev 6(1):1. https://doi.org/10.22215/timreview/956

Secinaro S, Brescia V, Lanzalonga F, Santoro G (2022) Smart City reporting: a bibliometric and structured literature review analysis to identify technological opportunities and challenges for sustainable development. J Bus Res 149:296–313

Seidel VP, O'Mahony S (2014) Managing the repertoire: stories, metaphors, prototypes, and concept coherence in product innovation. Organ Sci 25(3):691–712. https://doi.org/10.1287/orsc.2013.0879

Shelton T, Lodato T (2019) Actually existing smart citizens: expertise and (non)participation in the making of the Smart City. City 23(1):35–52. https://doi.org/10.1080/13604813.2019.1575115

Shepherd DA, Seyb SK, George G (2023) Grounding business models: cognition, boundary objects, and business model change. Acad Manag Rev 48(1):100–122. https://doi.org/10.5465/amr.2020.0173

Snow CC, Håkonsson DD, Obel B (2016) A Smart City is a collaborative community: lessons from smart Aarhus. Calif Manag Rev 59(1):92–108. https://doi.org/10.1177/0008125616683954

Sørensen E, Torfing J (2009) Making governance networks effective and democratic through metagovernance. Public Adm 87(2):234–258. https://doi.org/10.1111/j.1467-9299.2009.01753.x

Sørensen E, Torfing J (2011) Enhancing collaborative innovation in the public sector. Adm Soc 43(8):842–868. https://doi.org/10.1177/0095399711418768

Spee AP, Jarzabkowski P (2009) Strategy tools as boundary objects. Strateg Organ 7(2):223–232. https://doi.org/10.1177/1476127009102674

Spring J (2003) Educating the consumer-citizen: a history of the marriage of schools, advertising, and media. Routledge. https://doi.org/10.4324/9781410607591

Srnicek N (2017) Platform capitalism. John Wiley & Sons

Star SL, Griesemer JR (1989) Institutional ecology, 'translations' and boundary objects: amateurs and professionals in Berkeley's museum of vertebrate zoology, 1907–39. Soc Stud Sci 19(3):387–420. https://doi.org/10.1177/030631289019003001

Steils N, Hanine S, Rochdane H, Hamdani S (2021) Urban crowdsourcing: stakeholder selection and dynamic knowledge flows in high and low complexity projects. Ind Mark Manag 94:164–173. https://doi.org/10.1016/j.indmarman.2021.02.011

Steils N, Hanine S (2019) Value-added crowdsourcing: digital catalysts for creative contests. In: Managing diversity, innovation, and infrastructure in digital business, pp 160–178. IGI Global. https://doi.org/10.4018/978-1-5225-5993-1.ch008

Stewart J, Hyysalo S (2008) Intermediaries, users and social learning in technological innovation. Int J Innov Manag 12(03):295–325. https://doi.org/10.1142/S1363919608002035

Strauss AL, Corbin JM (1998) Basics of qualitative research: techniques and procedures for developing grounded theory, 2nd edn. Sage Publications, California

Stromquist NP (2019) World development report 2019: the changing nature of work. Int Rev Educ 65(2):321–329. https://doi.org/10.1007/s11159-019-09762-9

Sun J, Yan J, Zhang KZK (2016) Blockchain-based sharing services: what blockchain technology can contribute to smart cities. Financ Innov 2(1):26. https://doi.org/10.1186/s40854-016-0040-y

Swan M, de Filippi P (2017) Toward a philosophy of blockchain: a symposium: introduction. Metaphilosophy 48(5):603–619. https://doi.org/10.1111/meta.12270

Torfing J (2019) Collaborative innovation in the public sector: the argument. Public Manag Rev 21(1):1–11. https://doi.org/10.1080/14719037.2018.1430248

Townsend AM (2013) Smart Cities: big data, civic hackers, and the quest for a New Utopia. W. W. Norton & Company

Tranfield D, Denyer D, Smart P (2003) Towards a methodology for developing evidence-informed management knowledge by means of systematic review. Br J Manag 14(3):207–222. https://doi.org/10.1111/1467-8551.00375

Uyarra E, Flanagan K (2010) Understanding the innovation impacts of public procurement. Eur Plan Stud 18(1):123–143. https://doi.org/10.1080/09654310903343567

van der Graaf S, Ballon P (2019) Navigating platform urbanism. Technol Forecast Soc Change 142:364–372

van Pelt SC, Haasnoot M, Arts B, Ludwig F, Swart R, Biesbroek R (2015) Communicating climate (change) uncertainties: simulation games as boundary objects. Environ Sci Policy 45:41–52. https://doi.org/10.1016/j.envsci.2014.09.004

Van Winden W, Carvalho L (2019) Intermediation in public procurement of innovation: how Amsterdam's startup-in-residence programme connects startups to urban challenges. Res Policy 48(9):103789

Vanolo A (2014) Smartmentality: the Smart City as disciplinary strategy. Urban Stud 51(5):883–898. https://doi.org/10.1177/0042098013494427

Veeckman C, van der Graaf S (2015) The city as living laboratory: empowering citizens with the citadel toolkit. Technol Innov Manag Rev. https://doi.org/10.22215/timreview/877

Velsberg O, Westergren UH, Jonsson K (2020) Exploring smartness in public sector innovation—creating smart public services with the Internet of Things. Eur J Inf Syst 29(4):350–368. https://doi.org/10.1080/0960085X.2020.1761272

Wang CL, Chugh H (2014) Entrepreneurial learning: past research and future challenges. Int J Manag Rev 16(1):24–61. https://doi.org/10.1111/ijmr.12007

Wegrich K (2019) The blind spots of collaborative innovation. Public Manag Rev 21(1):12–20. https://doi.org/10.1080/14719037.2018.1433311

Weick KE, Sutcliffe KM, Obstfeld D (2005) Organizing and the process of sensemaking. Organ Sci 16(4):409–421. https://doi.org/10.1287/orsc.1050.0133

Wheeler S (2017) Visions of contract. J Law Soc 44(S1):S74–S92. https://doi.org/10.1111/jols.12050

Williams A, Whiteman G, Parker JN (2019) Backstage interorganizational collaboration: corporate endorsement of the sustainable development goals. Acad Manag Discov 5(4):367–395. https://doi.org/10.5465/amd.2018.0154

Wirtz BW, Müller WM (2023) An integrative collaborative ecosystem for smart cities—a framework for organizational governance. Int J Public Adm 46(7):499–518. https://doi.org/10.1080/01900692.2021.2001014

Yahia NB, Eljaoued W, Saoud NBB, Colomo-Palacios R (2021) Towards sustainable collaborative networks for smart cities co-governance. Int J Inf Manag 56:102037

Yakura EK (2002) Charting time: timelines as temporal boundary objects. Acad Manag J 45(5):956–970. https://doi.org/10.5465/3069324

Zarei F, Nik-Bakht M (2021) Citizen engagement body of knowledge–a fuzzy decision maker for index-term selection in built environment projects. Cities 112:103137. https://doi.org/10.1016/j.cities.2021.103137

Zikic J, Voloshyna V (2023) Untangling space and career action: migrant career recontextualization in the host city. Acad Manag Discov 9(2):160–186. https://doi.org/10.5465/amd.2020.0156

Zuzul TW (2019) "Matter Battles": cognitive representations, boundary objects, and the failure of collaboration in two smart cities. Acad Manag J 62(3):739–764. https://doi.org/10.5465/amj.2016.0625

Appendix 2 - Research paper 2

Esposito, G., Amitrano, C.C, Troise C., Yahiaoui D. (2025)
Conceptualising Governance Pathways for Digital Entrepreneurial Ecosystems: A Nested-Cyclical Framework
International Entrepreneurship and Management Journal

1 Introduction

The rapidly evolving landscape of entrepreneurial ecosystems is increasingly shaped by digital transformation, a powerful force reshaping value creation and stakeholder interactions (Alghamdi and Agag, 2024). Digital technologies enable innovative business models, streamline operations, and foster novel forms of engagement, thereby laying the groundwork for transformative shifts across entrepreneurial environments (Troise et al., 2023). Recent scholarship has highlighted the central role of innovation within these ecosystems, with particular attention to the interaction among key stakeholders, including entrepreneurs, research institutions, universities, and local communities (Stam and van de Ven, 2021; Chaudhary et al., 2024; Guerrero and Espinoza-Benavides, 2021). Among these, universities have emerged as pivotal actors, influencing stakeholder dynamics (Amitrano and Bifulco, 2024) and facilitating the translation of academic research into impactful industrial innovation (Owen et al., 2024).

Digitalisation is transforming entrepreneurial processes by enhancing innovation and operational efficiency (Zhao and Weng, 2024). Entrepreneurs increasingly leverage digital tools to develop solutions, optimise workflows, and scale their ventures. However, these advantages are often concentrated in regions with robust digital infrastructure, exacerbating the "Matthew effect"—whereby already advantaged regions further consolidate their lead (Zhao and Weng, 2024). Addressing such disparities calls for inclusive regulatory frameworks, including equitable intellectual property regimes and policies that ensure broad access to digital tools (Kuziemski and Misuraca, 2020). Governance structures for digital platforms must also account for contextual constraints and information asymmetries, particularly in rural or underserved areas (Koo and Eesley, 2021).

Academic interest has increasingly turned to the relationship between digital transformation and sustainable development, with entrepreneurship and human capital identified as key enablers of innovation-oriented policy design (Donaldson, 2021; Mendez-Picazo et al., 2024). Governance plays a dual role in this context: facilitating and regulating technology adoption, while shaping the institutional conditions under which digitalisation unfolds. Effective governance—characterised by transparency, political stability, regulatory quality, and rule of law—has been shown to significantly influence entrepreneurial performance (Krueger et al., 2000; Wang and Guo, 2024). E-government initiatives further demonstrate the potential of digitalisation to reduce bureaucratic burdens and foster entrepreneurship by minimising costs, delays, and complexity (Chaves Avila et al., 2014).

Nonetheless, these benefits are contingent on the presence of strong public governance, reliable ICT infrastructure, and high levels of educational attainment (Das and Das, 2022; Ha, 2024). In their absence, digitalisation risks deepening inequality and entrenching regional disparities. Moreover, the interaction between public and entrepreneurial

governance is crucial to shaping innovative digital futures. In advanced economies, entrepreneurial governance can either reinforce or challenge state-led ESG frameworks, influencing how innovation aligns with broader long-term objectives (Kuzey et al., 2023). This complex interplay highlights the need for coordinated strategies that align public and entrepreneurial governance. Digital technologies have a central role in these efforts, facilitating inclusive decision-making and enhancing the legitimacy, efficiency, and social justice of governance systems (Fung, 2015). Yet several barriers remain, including weak institutional leadership, limited citizen participation, and narrow participatory infrastructures (Kuziemski and Misuraca, 2020). The emergence of artificial intelligence (AI) further complicates this landscape. While AI promises enhanced efficiency and informed decision-making, it also raises concerns related to state overreach, privacy infringement, and ethical accountability (Geng and Xue, 2023).

Although extensive research has explored governance, innovation, and digitalisation, their interconnected dynamics within entrepreneurial ecosystems remain under-examined. To address this gap, the present study investigates the following research question: How do innovation, digital transformation, and governance interact to shape and sustain entrepreneurial ecosystems? While the model aspires to conceptual generalisability, it is particularly tailored to digitally enabled, innovation-oriented ecosystems, typically found in urban or regionally networked contexts with moderate-to-high institutional capacity.

To pursue this objective, the paper is structured as follows. The next section outlines the research design, detailing the methodological approach adopted in constructing the conceptual framework. This is followed by a review of the theoretical foundations that inform our analysis. The third section introduces the proposed framework and its core dimensions. The fourth section provides a comparative discussion with existing models, outlining its theoretical contributions. The final section presents the implications of the framework, highlights limitations, and suggests directions for future research.

2 Research design

This conceptual study follows a structured yet iterative research design to ensure methodological transparency and analytical coherence. Consistent with established approaches for conceptual contributions (Abatecola et al., 2022; Donaldson et al., 2021; Schiavone et al., 2022; Shams et al., 2021), the development of the theoretical framework proceeded through three interrelated stages.

The first stage entailed a purposive review of the literature across innovation, entrepreneurship, governance, and digital transformation (Guerrero and Espinoza-Benavides, 2021; Liyanaarachchi et al., 2024). Sources were selected based on three criteria: theoretical relevance (including citation impact and foundational influence), alignment with emerging themes such as digital entrepreneurship and collaborative governance, and cross-disciplinary representativeness, allowing for the integration of insights from diverse academic traditions. Particular emphasis was placed on seminal books and peer-reviewed articles published in leading journals within innovation studies, entrepreneurship research, and public administration.

The second stage involved an iterative thematic synthesis to identify key constructs, recurring patterns, and theoretical tensions. These were clustered into three core dimensions (innovation, entrepreneurship, and governance), each grounded in distinct

yet interconnected theoretical traditions, including effectuation theory, entrepreneurial ecosystem theory, and collaborative governance. The selection and integration of frameworks were guided by their conceptual clarity, relevance to dynamic and digitalised contexts, and their capacity to explain co-evolutionary mechanisms. Frameworks premised on static or state-centric paradigms were deliberately excluded in favour of those emphasising adaptability, decentralisation, and stakeholder co-creation.

The third stage consisted of abductive theorisation and the construction of the proposed conceptual framework, informed by iterative engagement with the literature and illustrative empirical insights. Drawing on theoretical elaboration and cross-framework integration, the model was refined to capture nested interactions and cyclical feedback mechanisms across multiple levels of analysis.

By explicitly outlining these three stages, the research responds to the growing demand for methodological rigour and transparency in conceptual work (Donaldson et al., 2021; Schiavone et al., 2022). This approach not only supports theory building but also lays a foundation for future empirical validation and practical application.

3 Theoretical foundations

Innovation and entrepreneurship

Innovation theory lies at the core of entrepreneurship research, positioning entrepreneurs as key agents in economic development (Wurth et al., 2022). A seminal figure in this discourse, Joseph Schumpeter (1883-1950), described entrepreneurs as drivers of "creative destruction", a process through which innovation disrupts existing market structures. He identified five primary forms of innovation (Fig. 1): the introduction of new products, novel methods of production, access to emerging markets, utilisation of alternative inputs, and the creation of new organisational structures (Carayannis, 2013; Schot and Steinmueller, 2018).

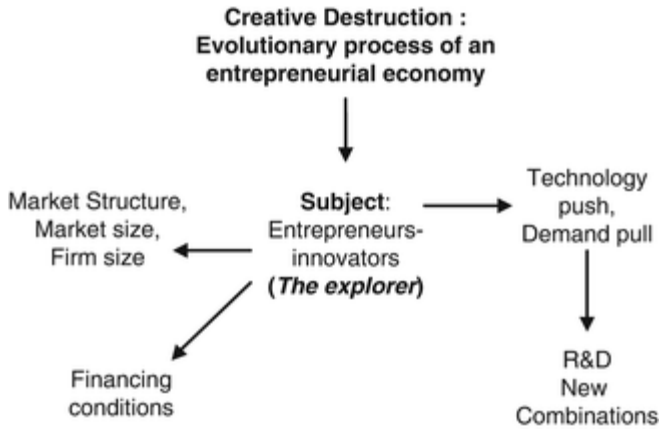


Fig.1 Innovation Theory of Entrepreneurship (Source: Carayannis, 2013, p. 286)

Building on Schumpeter's legacy, scholars such as Freeman and Perez extended innovation theory to the macroeconomics level (Freeman and Perez, 1988; Perez, 1983). Freeman introduced the concept of National Innovation Systems (NIS), which captures

the institutional and policy environment that underpins technological progress. Perez (1983; 2004) explored how technological revolutions trigger systemic shifts in entire industries. Sharif (2006) later critically examined the evolution of the NIS concept, distinguishing its analytical and policy applications, and highlighting its limitations in accounting for decentralised or entrepreneurial forms of innovation.

These developments paved the way for the entrepreneurial ecosystem (EE) perspective, which situates entrepreneurship within a network of interdependent actors and enabling conditions (Brown and Mason, 2017; Stam and van de Ven, 2021; Wurth et al., 2022). EEs are typically embedded within territorial contexts (Fig. 2) and rely on the effective coordination of institutions, resources, and knowledge flows to enable productive entrepreneurship (Donaldson, 2021).

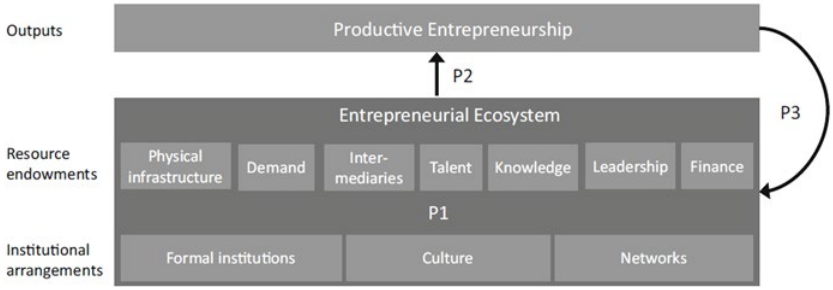


Fig.2 Elements and Outputs of the EE (Source: Stam and Van de Ven, 2021, p. 813)

While Schumpeter offers a macro-level perspective and EE theory operates at the meso-level, Sarasvathy's (2001; 2008) theory of effectuation contributes a micro-level understanding of entrepreneurial behaviour (Reymen et al., 2015). Effectuation reconceptualises entrepreneurial decision-making as a non-linear, adaptive process, where individuals act based on available means, build partnerships, and respond flexibly to contingencies (Fig. 3) (Read and Sarasvathy, 2005). It is underpinned by five principles: the "bird-in-hand" principle (starting with existing resources), "affordable loss" (risk is limited to what one can bear), "crazy quilt" (forming partnerships), "lemonade" (embracing surprises), and "pilot-in-the-plane" (focusing on controllable aspects of the future) (Reuber et al., 2016).

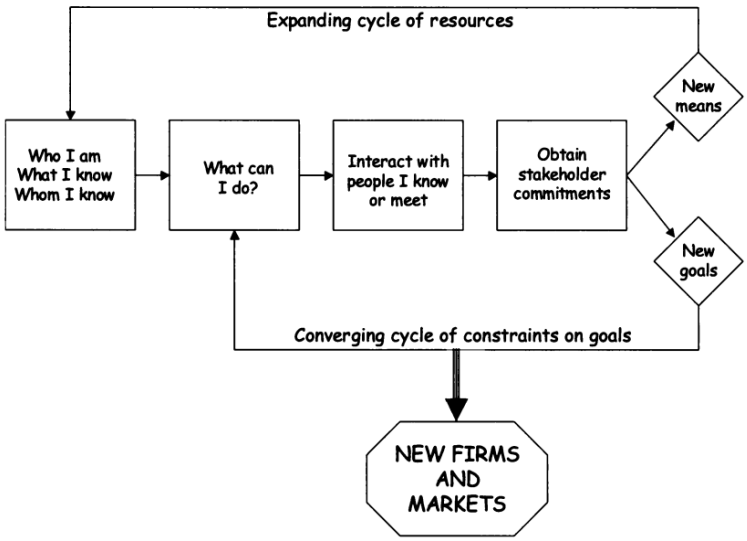


Fig.3 Effectuation Theory (source: Read and Sarasvathy, 2005, p. 53)

Effectuation complements macro- and meso-level theories by highlighting how entrepreneurs lead uncertainty and co-create opportunities. Though rooted in cognitive science, it offers valuable insights for practice, particularly in contexts such as digital entrepreneurship (Foss and Klein, 2010; Nambisan et al., 2019).

Governance

Governance theory has significantly evolved over recent decades, moving away from traditional hierarchical notions of government towards more distributed and dynamic forms of coordination. This shift has been instrumental in rethinking public action across multi-actor domains such as entrepreneurial ecosystems, innovation networks, and digital platforms (Peters and Pierre, 1998; Rhodes, 1996; Bianchi et al., 2021; Ansell and Gash, 2008; Emerson et al., 2012; Bryson et al., 2014).

Rhodes (1996) introduced a pivotal shift by defining governance as "self-organising, inter-organisational networks" that often operate independently from centralised state control. His empirical work in British public administration conceptualised governance as the dispersion of authority among state, market, and civil society actors. This marks a move from top-down models to horizontal interactions based on negotiation, interdependence, and mutual adjustment. Bevir and Rhodes (2006) later advanced this view with the idea of "decentred governance," stressing the interpretative role of individual agency and social practices in shaping governance processes.

In parallel, Peters and Pierre (1998) analysed the implications of fragmented authority, identifying the challenge this poses for legitimacy, accountability, and institutional coherence. Although they retained a state-centric lens, their work paved the way for understanding governance as a negotiated interface between enduring public institutions and emerging multi-level, networked arrangements. However, their framework falls short of addressing newer phenomena such as digital governance and platform-based coordination.

Ansell and Gash (2008) developed a more structured and operational model through their Collaborative Governance Framework (Fig. 4), which builds on institutional and deliberative theories. The model identifies key enabling conditions—such as resource asymmetries, leadership, and institutional design—and outlines a step-by-step process through which public and private actors co-create policy through trust-building and shared understanding. While influential, its linear approach may not fully capture the fluidity of innovation ecosystems.

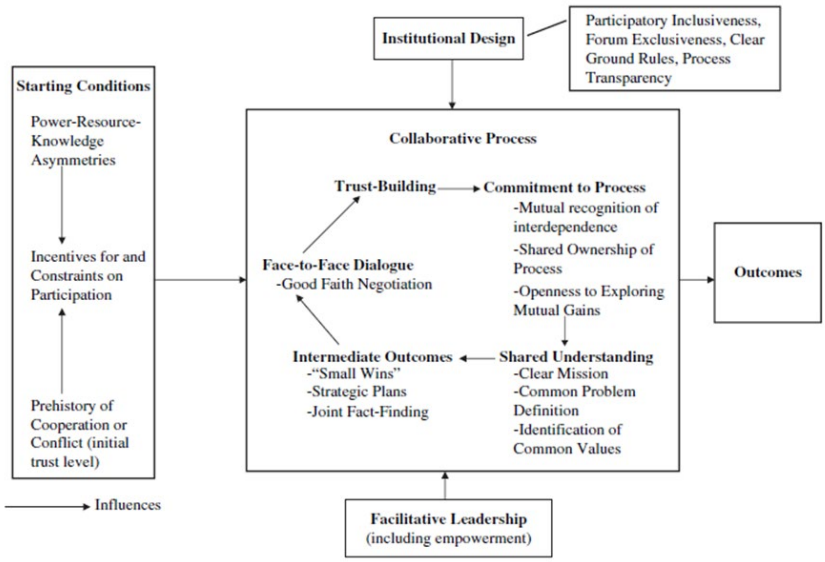


Fig.4 Model of Collaborative Governance (Source: Ansell and Gash, 2008, p. 550)

To address the need for a more recursive understanding, Emerson et al. (2012) introduced the Integrative Framework for Collaborative Governance. This model (Fig. 5) identifies three key dimensions—principled engagement, shared motivation, and capacity for joint action—as both antecedents and emergent properties of collaboration. By embedding these within a broader systemic context, the framework captures the non-linear, iterative nature of governance in complex policy environments. Their contribution is particularly relevant to innovation governance, where systems are subject to constant disruption (Emerson et al., 2012; Emerson and Nabatchi, 2015).

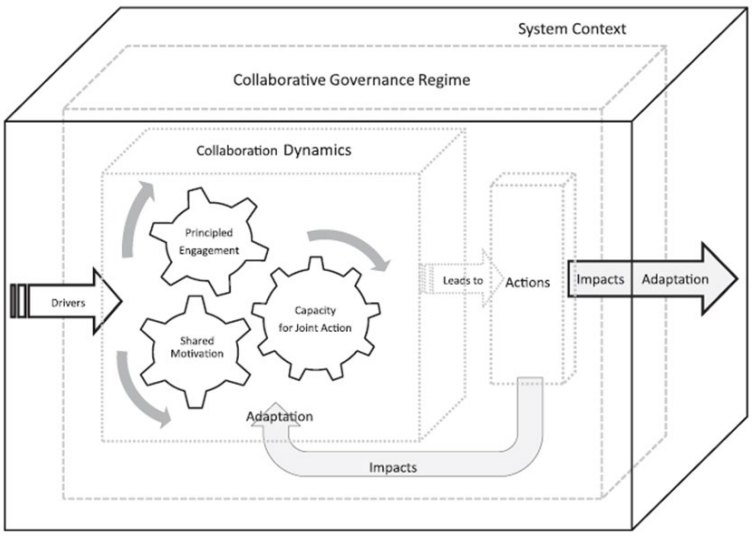


Fig.5 Integrative Framework for Collaborative Governance (Source: Emerson et al., 2012, p. 6)

Bianchi et al. (2021) further developed this field by exploring the implementation of collaborative governance. Their empirical work highlights the importance of managerial competencies, institutional adaptability, and contextual fit. They emphasise leadership and cross-sector coordination, particularly in settings characterised by institutional fragmentation. However, their analysis largely assumes a stable governance environment, which may not adequately reflect the dynamic and emergent nature of entrepreneurial and digital systems.

Taken collectively, these governance frameworks provide foundational insights for understanding coordination in innovation ecosystems. However, they tend to underplay the role of entrepreneurship and the rapid, often disruptive, nature of digital transformation. Most models centre on consensus and institutional legitimacy, which may be insufficient in contexts characterised by asymmetry, uncertainty, and systemic change. These limitations highlight the need for a new integrative framework, such as the Nested-Cyclical Model (NeCyM) for Entrepreneurial Innovation, capable of bridging governance, innovation, and entrepreneurship in a more adaptive and co-evolutionary manner.

Proposed conceptual framework

This study examines the interconnected roles of governance, innovation, and entrepreneurship in shaping dynamic and collaborative systems capable of addressing complex societal challenges (Fig. 6). It investigates how governance fosters trust, aligns stakeholders, and coordinates resources (Emerson et al., 2012); how innovation enhances adaptability, inclusivity, and problem-solving capacity (Schot and Steinmueller, 2018); and how entrepreneurship catalyses action through creativity and risk-taking (Wurth et al., 2022). These domains are not isolated; rather, they interact and reinforce one another, demonstrating the collective potential to transform collaboration, drive digital innovation, and support the development of entrepreneurial ecosystems (Baldwin

et al., 2024; Chaudhary et al., 2024). Viewed through this integrative lens, the study emphasises how their convergence fosters resilient, inclusive, and high-impact pathways for economic and social development.

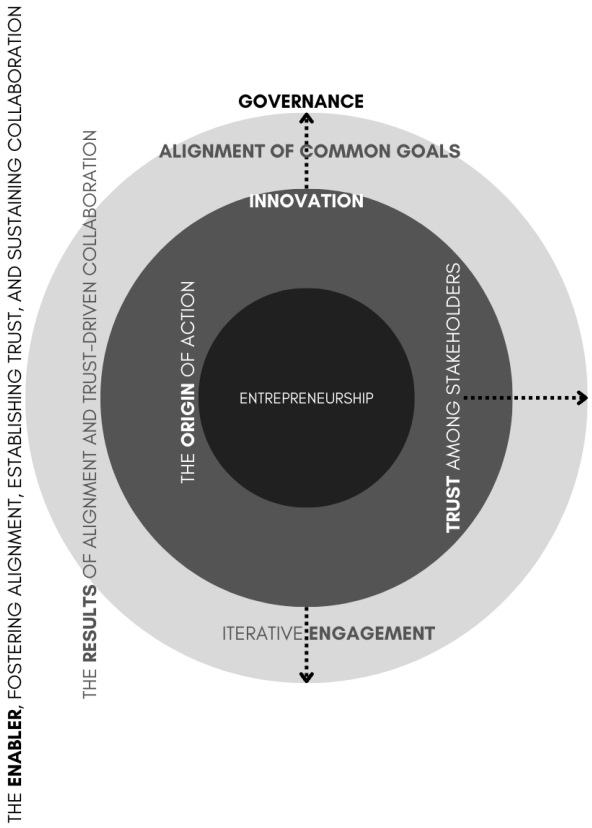


Fig.6 NeCyM for Entrepreneurial Innovation (Source: Author's own elaboration, 2025)

Grounded in this theoretical foundation, the following sections articulate and operationalise the NeCyM for Entrepreneurial Innovation. The model's three core dimensions—entrepreneurship, innovation, and governance—are systematically explored to clarify their individual contributions and interdependencies. Collectively, these dimensions form a coherent framework for cultivating ecosystems that are adaptive, collaborative, and oriented towards long-term sustainability.

Entrepreneurship: Catalysing Action and Adaptation

Within the NeCyM framework, entrepreneurship is defined as the agentic force that translates institutional and innovation dynamics into concrete, scalable outcomes. Entrepreneurs operate most effectively in environments characterised by trust, shared purpose, and institutional alignment, where resources can be mobilised, and uncertainty managed through collaboration (Wang and Chugh, 2014, Ferraris et al., 2020).

Entrepreneurial action is inherently iterative, marked by continuous experimentation, responsiveness to feedback, and the activation of innovation cycles (Hartley et al., 2013). Beyond driving new ventures, entrepreneurship contributes to the evolution of governance systems by embedding creativity, flexibility, and outcome orientation into decision-making processes (Eisenhardt and Schoonhoven, 1996; Reymen et al., 2015). Entrepreneurs excel at managing complexity and identifying opportunities under constraints, offering alternatives to static governance approaches through inclusive and co-creative practices (Holland, 2008; Muñoz and Cohen, 2018). Iterative methods—such as prototyping and real-time adaptation—promote institutional agility, while risk strategies based on the principle of "affordable loss" enable innovation without necessitating certainty (Matteucci et al., 2023).

Entrepreneurial activity also strengthens a collaborative culture within governance. Entrepreneurs align diverse actors around shared goals, reduce frictions, and enhance legitimacy through participatory engagement (Jiao et al., 2022). Their integration of technological and social innovations—including digital platforms, AI-enabled tools, and blockchain for accountability—enhances transparency, streamlines coordination, and broadens stakeholder participation (Nambisan et al., 2019; Gegenhuber and Mair, 2024); Audretsch et al., 2024). Entrepreneurship as such provides adaptable and replicable models to address complex societal challenges across sectors and regions (Chaves Avila et al., 2014), repositioning governance as a platform for long-term transformation.

Innovation: Transformative Problem-Solving

Innovation, in the NeCyM framework, is conceived as a systemic capacity for adaptive problem-solving enabled by collaborative interaction across diverse actors and knowledge domains. It thrives when shared objectives create coherence and when governance structures promote trust, openness, and mutual learning (Ansell and Gash, 2018). Iterative processes—such as experimentation and feedback loops—enable stakeholders to refine strategies in response to emerging challenges (Baregheh et al., 2009), while digital technologies such as AI and online platforms enhance the reach and responsiveness of these activities (Troise et al., 2023).

Innovation also exerts a transformative influence on governance systems. It introduces novel decision-making logics, powered by data analytics, predictive modelling, and real-time information flows (Koppenjan and Klijn, 2004; Gegenhuber et al., 2023). These tools allow institutions to make better-informed, more responsive policy choices. Digital co-design platforms and open-data initiatives democratise participation, improving transparency and legitimacy in governance processes (Christensen et al. 2006; Alizadeh et al., 2019; Caccamo et al., 2023).

The incorporation of innovation enables regulatory creativity and flexibility. Technologies such as blockchain and the Internet of Things (IoT) facilitate policy experimentation while ensuring accountability and oversight (Marsal-Llacuna, 2018; Thomas and Ritala, 2021). In this light, innovation redefines governance as a proactive and inclusive enabler of systemic transformation, rather than a reactive or restrictive force, thus contributing to institutional resilience and long-term adaptability (Bianchi et al., 2021).

Governance: enabling collaboration and structure

Governance, as conceptualised in the NeCyM model, provides the institutional infrastructure necessary for trust-building, resource coordination, and shared strategic

direction. It aligns heterogeneous actors around common goals through transparent decision-making and inclusive dialogue. These mechanisms ensure coherence within entrepreneurial ecosystems and innovation networks, enabling them to respond effectively to technological disruptions and evolving societal demands (Engels et al., 2019).

Crucially, governance is not static. Within NeCyM, it is defined as a dynamic force that co-evolves with innovation and entrepreneurship. It legitimises action, structures multi-stakeholder engagement, and cultivates environments conducive to experimentation and collaboration (Hartley et al., 2013). Shared objectives and institutional clarity foster alignment (Dentoni et al., 2018), while trust-building mechanisms ensure inclusive, participatory processes (Torfing et al., 2019; Engels et al., 2019).

Governance benefits from this interaction through accelerated policy learning, participatory feedback, and ecosystem-wide resilience. In turn, entrepreneurship injects agility and disruptive potential, while innovation drives the tools and processes for transformation (Nambisan et al., 2019). As such, governance under NeCyM is reframed as an adaptive infrastructure, embedded in a co-evolutionary system that supports innovative, inclusive development (Emerson and Nabatchi, 2015).

4 Discussion

The NeCyM for Entrepreneurial Innovation (Fig. 6) provides a nuanced and integrative framework for understanding how governance, innovation, and entrepreneurship interact in dynamic and collaborative ecosystems. By embedding feedback loops and iterative engagement as central mechanisms (Baregheh et al., 2009; Matteucci et al., 2023; Nambisan et al., 2019), the NeCyM advances existing theoretical models by reconceptualising these domains as mutually constitutive and continuously evolving. Unlike Schumpeter's model (1934), which positions entrepreneurs as macro-level disruptors driving economic transformation through discrete waves of innovation, the NeCyM highlights entrepreneurial agency as embedded in ongoing co-evolutionary cycles (Krueger et al., 2000). It integrates Schumpeterian innovation types into an adaptive process of transformation, framed by digitalisation and governance shifts (Brown and Mason 2017; Stam and van de Ven, 2021). In contrast to the NIS approach, which emphasises top-down innovation within nationally bounded institutional structures (Freeman, 1995; Sharif, 2006), the NeCyM introduces bottom-up entrepreneurial dynamics, informal networks, and digital platforms as key enablers of innovation. This captures the decentralised and fluid nature of contemporary ecosystems, where innovation emerges from heterogeneous actors engaging in collaborative experimentation (Baldwin et al., 2024; Chaudhary et al., 2024). While the EE perspective offers a valuable meso-level view of entrepreneurship as embedded within territorial and institutional networks (Brown and Mason, 2017; Stam and van de Ven, 2021; Wurth et al., 2022), the NeCyM extends this by integrating governance and innovation as co-evolving forces alongside entrepreneurship. Unlike EE models that emphasise structural enablers and spatial proximity, the NeCyM foregrounds processual mechanisms such as feedback loops and iterative learning. This allows for the analysis of both the configuration and transformation of ecosystem elements over time (Stam and van de Ven, 2021), particularly in response to digitalisation and sustainability goals. At the micro level, the NeCyM extends the effectuation theory (Read and Sarasvathy, 2005;

Sarasvathy, 2001) by moving beyond individual decision-making under uncertainty. While effectuation emphasises the entrepreneur's use of available means and stakeholder partnerships to navigate complexity, the NeCyM situates these behaviours within institutional and systemic structures. It bridges micro-level entrepreneurial logic with macro-level governance dynamics. In governance theory, Rhodes (1996) introduced a paradigm shift by framing governance as decentralised, horizontal coordination among networked actors. The NeCyM builds on this by explicitly integrating entrepreneurial agency and innovation cycles as internal drivers of governance evolution. It departs from Rhodes' largely public-sector focus by incorporating multi-actor and cross-sectoral dynamics, including civil society, private enterprise, and digital intermediaries. Similarly, while Peters and Pierre (1998) redefined governance as "governing without government", the NeCyM operationalises this concept by illustrating how governance becomes an enabling force through iterative adaptation, experimentation, and technological integration. It responds to critiques of abstractness in earlier governance frameworks by providing a process-driven and actionable structure suited to high-velocity environments.

Compared to the Collaborative Governance Framework (Ansell and Gash, 2008), which outlines a linear and consensus-oriented process, the NeCyM emphasises non-linear and emergent pathways to collaboration. It incorporates entrepreneurial experimentation and digital transformation as endogenous catalysts of institutional change, rather than treating them as external or contingent factors. By doing so, it better reflects the volatility and complexity of innovation ecosystems where traditional governance tools are insufficient. Moreover, the NeCyM complements Emerson and colleagues' (2012) Integrative Framework for Collaborative Governance by reinforcing the importance of principled engagement, shared motivation, and joint capacity. However, the NeCyM treats these elements as emergent outcomes of entrepreneurial and innovation activity, rather than as static preconditions. This shift offers a more flexible and adaptive logic that aligns with the fluid nature of digitally mediated and sustainability-driven systems. In relation to Bianchi et al. (2021), who highlight the managerial and institutional capacities necessary for implementing collaborative governance, the NeCyM pushes the discussion further. It reframes governance as not only implementational but transformational, shaped by the co-evolution of entrepreneurship, innovation, and contextual dynamics. The model accounts for the continuous restructuring of governance in response to systemic disruptions such as climate change, digitalisation, and socio-economic volatility.

By synthesising and extending these foundational contributions, the NeCyM emerges as a transformative framework that not only bridges but redefines the interplay between governance, innovation, and entrepreneurship. Its conceptual novelty lies in its ability to integrate these domains into a cyclical and adaptive system, challenging traditional governance paradigms that treat institutions as static or exogenous forces (Torfing et al., 2019). By positioning governance as an evolving, co-creative process shaped by entrepreneurial action and technological change, the NeCyM shifts the analytical focus from institutional stability to systemic adaptability. This reorientation is particularly relevant in environments characterised by high uncertainty and digital disruption, where conventional models often fall short. Furthermore, the model's emphasis on iterative feedback, shared ownership, and decentralised co-creation aligns with emerging demands for governance frameworks that are not only responsive but also inclusive and

future-oriented. Importantly, the NeCyM is designed with contextual adaptability in mind. Its nested structure accommodates application across varying territorial, institutional, and sectoral settings, from local innovation districts and smart city initiatives to cross-national digital policy networks. In doing so, it provides scholars and practitioners with a versatile tool to analyse, design, and evaluate entrepreneurial ecosystems capable of fostering inclusive, resilient, and innovation-driven transformations.

5 Implications

The NeCyM for Entrepreneurial Innovation contributes both practical and theoretical advancements to our understanding of how governance, innovation, and entrepreneurship co-evolve within dynamic ecosystems (Thomas and Ritala, 2021). This integrative framework is particularly salient in an era marked by digital disruption, institutional complexity, and the emergence of hybrid public-private governance arrangements (Mendez-Picazo et al., 2024).

Theoretical Implications

The NeCyM reframes governance not as a static or external constraint but as an evolving and embedded actor within entrepreneurial ecosystems. Building on foundational contributions in public administration and innovation theory (Gomes et al., 2018; Thomas and Ritala, 2021), it departs from linear and hierarchical models by introducing a cyclical and co-evolutionary logic that reflects volatility, uncertainty, complexity, and ambiguity (VUCA) in socio-technical systems (Troise et al., 2023).

By integrating entrepreneurial agency into the transformation of governance systems, the model contributes to the emerging literature on mission-oriented and collaborative governance (Bianchi et al., 2021; Mazzucato and Perez, 2015). It highlights the importance of feedback loops, shared ownership, and iterative learning as dynamic drivers of institutional change, especially relevant in the context of smart cities, digital platforms, and regional innovation strategies.

The model's nested architecture provides analytical flexibility, allowing scholars to examine multi-level institutional dynamics and their interaction with entrepreneurial behaviour. It invites longitudinal and comparative inquiry into how ecosystems adapt over time, supports the development of typologies of governance-innovation interactions, and bridges disciplinary silos across entrepreneurship, systems thinking, and digital transformation studies. In doing so, NeCyM enriches the theoretical toolkit available for analysing institutional adaptation in high-velocity environments (Jiao et al., 2022).

Practical Implications

From a policy and practice perspective, NeCyM serves as a diagnostic and design framework for shaping responsive, inclusive, and innovation-driven governance ecosystems. Its principles can inform institutional reforms, regulatory approaches, and participatory strategies in both mature urban ecosystems and underserved regions (Bianchi et al., 2021; Mendez-Picazo et al., 2024).

Real-world cases—such as Station F in Paris, the Smart City Living Lab in Amsterdam, and Emilia-Romagna's cooperative-led innovation systems—illustrate how public and private

Dimension	Operational Focus	Tools or Actions
Governance	Enable iterative and adaptive regulation through decentralised structures and stakeholder co-creation	Regulatory sandboxes; public–private innovation councils
Entrepreneurship	Embed entrepreneurial agency in decision-making; reduce asymmetries in resource access	Civic incubators; inclusive funding mechanisms (e.g., subgrants, innovation vouchers)
Innovation	Integrate technological experimentation and feedback into institutional processes	Participatory platforms (e.g., Decidim); AI-driven dashboards
Systemic Integration	Map co-evolutionary dynamics and feedback loops across ecosystem actors	Ecosystem mapping; scenario planning; systems design workshops

Table 1 NeCyM for Entrepreneurial Innovation Application (Source: Author's own elaboration, 2025)

actors can co-create adaptive governance mechanisms. These include participatory digital portals, modular regulation, and blockchain-based traceability tools (Das and Das, 2022; Ha, 2024; Kuziemski and Misuraca, 2020).

In rural or digitally marginalised contexts, NeCyM can support local authorities in designing digital inclusion strategies, combining targeted entrepreneurship programmes with decentralised governance tools. Examples like the Basque Country's public–private technology centres show how such approaches can foster equitable access to innovation and strengthen regional resilience (Koo and Eesley, 2021; Zhao and Weng, 2024).

Furthermore, the framework encourages participatory governance through instruments such as citizen assemblies, open data platforms, and living labs. These mechanisms support democratic innovation by embedding co-creation, transparency, and shared accountability into the governance of entrepreneurial ecosystems (Font-Cot et al., 2023; Kuzey et al., 2023).

Operational Implications and Guidance

To move from conceptual clarity to operational utility, the NeCyM offers an applied logic that can guide policymakers, ecosystem enablers, and civic institutions in diagnosing gaps, activating collaborative processes, and fostering adaptive capabilities. Table 1 provides an overview of operational foci, recommended tools, and illustrative actions.

To operationalise the governance dimension, stakeholders should prioritise experimental and participatory approaches over rigid regulatory models. Regulatory sandboxes can serve as controlled environments for testing new services, while multi-actor innovation councils can support continuous learning and policy adaptation through structured dialogue.

In terms of entrepreneurial engagement, the NeCyM encourages policymakers to recognise entrepreneurs as institutional actors. Municipalities, universities, and innovation hubs can promote modular funding schemes, support grassroots entrepreneurship through civic labs, and reduce systemic inequalities through inclusive resource allocation.

Activating the innovation dimension calls for organisations to invest in platforms and tools that enhance feedback, learning, and transparency. This includes mission-oriented

living labs, urban experimentation spaces, and open-data initiatives that democratise access to innovation processes.

Finally, the systemic integration dimension encourages ecosystem-wide coordination. Tools such as foresight processes, collaborative dashboards, and shared resilience indicators can help align stakeholders, visualise interdependencies, and steer ecosystems toward long-term sustainability and inclusive innovation outcomes.

6 Conclusions and direction for future research

The NeCyM for Entrepreneurial Innovation offers a robust and integrative framework for understanding how governance, innovation, and entrepreneurship co-evolve within complex and dynamic ecosystems. It advances a process-oriented and feedback-driven model of institutional transformation that departs from linear and hierarchical paradigms. By positioning governance as an embedded, adaptive, and co-creative actor, the NeCyM responds to the need for more flexible and participatory approaches to ecosystem development in the digital and long-term transitions.

This study was developed through a conceptual synthesis approach, integrating foundational and emerging perspectives across governance, innovation, and entrepreneurship. While this methodology offers theoretical coherence and cross-disciplinary insight, it also presents limitations in terms of empirical validation and contextual specificity. Future studies are therefore encouraged to test and refine the framework using comparative case research, scenario-based experimentation, and longitudinal mixed-method designs.

Among the key limitations of the model is its context dependency. The NeCyM assumes a baseline of institutional maturity, digital infrastructure, and stakeholder engagement capacity that may not be present in all regions or sectors. In under-resourced or politically unstable contexts, co-creative and decentralised governance logics may require significant adaptation (Chaves Avila et al., 2014; Font-Cot et al., 2023; Koo and Eesley, 2021). Similarly, sectors governed by rigid compliance frameworks—such as health or finance—may struggle to implement the model's iterative and experimental principles (Casady et al., 2020).

Temporal and technological challenges further underscore the need for real-time responsiveness. In high-frequency domains such as AI deployment or platform governance, the NeCyM's feedback loops must be complemented by predictive analytics, scenario planning, and adaptive policy cycles (Das and Das, 2022; Wang and Guo, 2024). Moreover, the model's emphasis on digital innovation risks marginalising analogue or community-led innovation pathways, particularly in contexts with limited ICT access or alternative epistemologies of development (Fung, 2015; Zaheer et al., 2022).

Power asymmetries present another critical concern. While the model assumes multi-stakeholder engagement, it must also account for real-world imbalances in access to resources, voice, and influence. Empirical application should therefore explore mechanisms, such as transparency mandates and participatory budgeting, to safeguard inclusivity and equity in collaborative governance processes (Dentoni et al., 2018; Kuziemski and Misuraca, 2020).

To support empirical uptake, future research should focus on applying the NeCyM within diverse ecosystem contexts, such as smart cities (e.g., Amsterdam, Helsinki), civic technologies (e.g., Barcelona's Decidim), and regional innovation systems (e.g., Emilia-

Romagna, the Basque Country). These settings offer fertile ground for piloting adaptive governance tools such as foresight workshops, living labs, and co-creation frameworks aligned with NeCyM principles.

The operationalisation potential of the model has also been outlined through actionable recommendations and an applied toolkit that guides policymakers, ecosystem enablers, and civic actors in implementing NeCyM-informed governance. Regulatory sandboxes, civic incubators, AI-supported platforms, and systemic mapping processes represent just a few of the mechanisms that can support inclusive, iterative, and context-sensitive innovation governance.

Ultimately, NeCyM is not only an analytical tool—it is a normative proposal for rethinking governance in an age of complexity and transition. As entrepreneurial ecosystems increasingly shape responses to global challenges, governance must evolve from a stabilising architecture to a generative force—capable of co-producing just, resilient, and future-oriented transformations. The NeCyM opens that possibility by embedding trust, adaptability, and shared purpose into the heart of institutional design.

References

Abatecola, G., Cristofaro, M., Giannetti, F., and Kask, J. (2022). How can biases affect entrepreneurial decision making? Toward a behavioral approach to unicorns. International Entrepreneurship and Management Journal, 18(2), 693–711. https://doi.org/10.1007/s11365-021-00772-4

Alghamdi, OmarA., and Agag, G. (2024). Competitive advantage: A longitudinal analysis of the roles of data-driven innovation capabilities, marketing agility, and market turbulence. Journal of Retailing and Consumer Services, 76, 103547. https://doi.org/10.1016/j.jretconser.2023.103547

Alizadeh, T., Sarkar, S., and Burgoyne, S. (2019). Capturing citizen voice online: Enabling smart participatory local government. Cities, 95. Scopus. https://doi.org/10.1016/j.cities.2019.102400

Amitrano, C. C., and Bifulco, F. (2024). The co-evolution of ecosystem and university's roles: A focus on the integration of technologies and cultural heritage. The Journal of Technology Transfer. https://doi.org/10.1007/s10961-024-10127-0

Ansell, C., and Gash, A. (2008). Collaborative Governance in Theory and Practice. Journal of Public Administration Research and Theory, 18(4), 543–571. https://doi.org/10.1093/jopart/mum032

Audretsch, D. B., Aronica, M., Belitski, M., and Piacentino, D. (2024). Natural selection or strategic adaptation? Entrepreneurial digital technologies and survival of the species. The Journal of Technology Transfer, 49(5), 1631–1659. https://doi.org/10.1007/s10961-024-10065-x

Baldwin, C. Y., Bogers, M. L. A. M., Kapoor, R., and West, J. (2024). Focusing the ecosystem lens on innovation studies. Research Policy, 53(3), 104949. https://doi.org/10.1016/j.respol.2023.104949

Baregheh, A., Rowley, J., and Sambrook, S. (2009). Towards a multidisciplinary definition of innovation. Management Decision, 47(8), 1323–1339. https://doi.org/10.1108/00251740910984578

Bevir, M., and Rhodes, R. A. W. (2006). Prime Ministers, Presidentialism and Westminster Smokescreens. Political Studies, 54(4), 671–690. https://doi.org/10.1111/j.1467-9248.2006.00632.x

Bianchi, C., Nasi, G., and Rivenbark, W. C. (2021). Implementing collaborative governance: models, experiences, and challenges. Public Management Review, 23(11), 1581–1589. https://doi.org/10.1080/14719037.2021.1878777

Brown, R., and Mason, C. (2017). Looking inside the spiky bits: a critical review and conceptualisation of entrepreneurial ecosystems. Small business economics, 49, 11–30. https://doi.org/10.1007/s11187-017-9865-7

Bryson, J. M., Crosby, B. C., and Bloomberg, L. (2014). Public Value Governance: Moving Beyond Traditional Public Administration and the New Public Management. Public Administration Review, 74(4), 445–456. https://doi.org/10.1111/puar.12238

Caccamo, M. , Pittino, D., and Tell, F. (2023). Boundary objects, knowledge integration, and innovation management: a systematic review of the literature. Technovation, 122, 102645. https://doi.org/10.1016/j.technovation.2022.102645

Carayannis, E.G. (Eds) (2013). Encyclopedia of Creativity, Invention, Innovation and Entrepreneurship. Springer, New York, NY. https://doi.org/10.1007/978-1-4614-3858-8

Casady, C. B., Eriksson, K., Levitt, R. E., and Scott, W. R. (2020). (Re)defining public-private partnerships (PPPs) in the new public governance (NPG) paradigm: An institutional maturity perspective. Public management review, 22(2), 161-183. https://doi.org/10.1080/14719037.2019.1577909

Chaudhary, S., Kaur, P., Ferraris, A., Bresciani, S., and Dhir, A. (2024). Connecting entrepreneurial ecosystem and innovation. Grasping at straws or hitting a home run? Technovation, 130, 102942. https://doi.org/10.1016/j.technovation.2023.102942

Chaves Avila, R. C., Bernal Jurado, E. B., Mozas Moral, A. M., and Puentes Poyatos, R. P. (2014). Improving e-economy by regional governments. Management Decision, 52(3), 559–572. https://doi.org/10.1108/MD-08-2012-0589

Christensen, C. M., Baumann, H., Ruggles, R., and Sadtler, T. M. (2006). Disruptive innovation for social change. Harvard Business Review, 84(12), 94–101, 163.

Das, A., and Das, S. S. (2022). E-Government and Entrepreneurship: Online Government Services and the Ease of Starting Business. Information Systems Frontiers, 24(3), 1027–1039. https://doi.org/10.1007/s10796-021-10121-z

Dentoni, D., Bitzer, V., and Schouten, G. (2018). Harnessing Wicked Problems in Multi-stakeholder Partnerships. Journal of Business Ethics, 150(2), 333–356. https://doi.org/10.1007/s10551-018-3858-6

Donaldson, C. (2021). Culture in the entrepreneurial ecosystem: A conceptual framing. International Entrepreneurship and Management Journal, 17(1), 289–319. https://doi.org/10.1007/s11365-020-00694-7

Eisenhardt, K. M., and Schoonhoven, C. B. (1996). Resource-Based View of Strategic Alliance Formation: Strategic and Social Effects in Entrepreneurial Firms. Organization Science, 7(2), 136–150. https://doi.org/10.1287/orsc.7.2.136

Emerson, K., and Nabatchi, T. (2015). Evaluating the Productivity of Collaborative Governance Regimes: A Performance Matrix. Public Performance and Management Review, 38(4), 717-747. https://doi.org/10.1080/15309576.2015.1031016

Emerson, K., Nabatchi, T., and Balogh, S. (2012). An Integrative Framework for Collaborative Governance. Journal of Public Administration Research and Theory, 22(1), 1–29. https://doi.org/10.1093/jopart/mur011

Engels, F., Wentland, A., and Pfotenhauer, S. M. (2019). Testing future societies? Developing a framework for test beds and living labs as instruments of innovation governance. Research Policy, 48(9), 103826. https://doi.org/10.1016/j.respol.2019.103826

Ferraris, A., Santoro, G., and Pellicelli, A. C. (2020). "Openness" of public governments in smart cities: Removing the barriers for innovation and entrepreneurship. International Entrepreneurship and Management Journal, 16(4), 1259–1280. https://doi.org/10.1007/s11365-020-00651-4

Font-Cot, F., Lara-Navarra, P., and Serradell-Lopez, E. (2023). Digital transformation policies to develop an effective startup ecosystem: The case of Barcelona. Transforming Government: People, Process and Policy, 17(3), 344–355. https://doi.org/10.1108/TG-01-2023-0006

Foss, N. J., and Klein, P. G. (2010). Entrepreneurial Alertness and Opportunity Discovery: Origins, Attributes, Critique. In Historical Foundations of Entrepreneurship Research. Edward Elgar Publishing. https://www.elgaronline.com/edcollchap/edcoll/9781847209191/9781847209191.00013.xml

Freeman, C., and Perez, C. (1988). Structural crises of adjustment, business cycles and investment behaviour. In G. Dosi, C. Freeman, R. R. Nelson, G. Silverberg, and L. L. G. Soete (Eds.), Technical change and economic theory (pp. 38–66). London and New York: Pinter.

Freeman, C. (1995). The 'National System of Innovation' in historical perspective. Cambridge Journal of economics, 19(1), 5–24. https://doi.org/10.1093/oxfordjournals.cje.a035309

Fung, A. (2015). Putting the Public Back into Governance: The Challenges of Citizen Participation and Its Future. Public Administration Review, 75(4), 513–522. https://doi.org/10.1111/puar.12361

Gegenhuber, T., and Mair, J. (2024). Open social innovation: taking stock and moving forward. Industry and Innovation, 31(1), 130-157. https://doi.org/10.1080/13662716.2023.2271863

Gegenhuber, T., Mair, J., Lührsen, R., and Thäter, L. (2023). Orchestrating distributed data governance in open social innovation. Information and Organization, 33(1), 100453. https://doi.org/10.1016/j.infoandorg.2023.100453

Geng, L., and Xue, Y. (2023). Promoting ICT adoption in rural entrepreneurship: More neighbourhood effect or more institutional incentives?—Empirical evidence from China. Journal of International Development, 35(6), 1530–1548. https://doi.org/10.1002/jid.3738

Gomes, L. A. D. V., Facin, A. L. F., Salerno, M. S., and Ikenami, R. K. (2018). Unpacking the innovation ecosystem construct: Evolution, gaps and trends. Technological Forecasting and Social Change, 136, 30–48. Scopus. https://doi.org/10.1016/j.techfore.2016.11.009

Guerrero, M., and Espinoza-Benavides, J. (2021). Does entrepreneurship ecosystem influence business re-entries after failure?. International Entrepreneurship and Management Journal, 17(1), 211–227. https://doi.org/10.1007/s11365-020-00694-7

Ha, L. T. (2024). Is e-Government a Driver to Enhance Entrepreneurship? An Empirical Investigation of European Countries. Entrepreneurship Research Journal, 14(3), 1311–1340. https://doi.org/10.1515/erj-2021-0487

Hartley, J., Sørensen, E., and Torfing, J. (2013). Collaborative Innovation: A Viable Alternative to Market Competition and Organizational Entrepreneurship. Public Administration Review, 73(6), 821–830. https://doi.org/10.1111/puar.12136

Holland, R. (2008). Will the real Smart City please stand up?. Intelligent, progressive or entrepreneurial? City, 12(3), 302–320. https://doi.org/10.1080/13604810802479126

Jiao, H., Wang, L., and Shi, Y. (2022). How does institutional environment in the digital context affect technology entrepreneurship? The moderating roles of government digitalization and gender. Journal of Organizational Change Management, 35(7), 1089–1112. https://doi.org/10.1108/JOCM-10-2021-0321

Koo, W. W., and Eesley, C. E. (2021). Platform governance and the rural–urban divide: Sellers' responses to design change. Strategic Management Journal, 42(5), 941–967. https://doi.org/10.1002/smj.3259

Koppenjan, J. F. M., and Klijn, E.-H. (2004). Managing Uncertainties in Networks: A Network Approach to Problem Solving and Decision Making. Psychology Press.

Krueger, N. F., Reilly, M. D., and Carsrud, A. L. (2000). Competing models of entrepreneurial intentions. Journal of Business Venturing, 15(5), 411–432. https://doi.org/10.1016/S0883-9026(98)00033-0

Kuzey, C., Al-Shaer, H., Karaman, A. S., and Uyar, A. (2023). Public governance, corporate governance and excessive ESG. Corporate Governance: The International Journal of Business in Society, 23(7), 1748–1777. https://doi.org/10.1108/CG-01-2023-0028

Kuziemski, M., and Misuraca, G. (2020). AI governance in the public sector: Three tales from the frontiers of automated decision-making in democratic settings. Telecommunications Policy, 44(6), 101976. https://doi.org/10.1016/j.telpol.2020.101976

Liyanaarachchi, G., Viglia, G., and Kurtaliqi, F. (2024). Addressing challenges of digital transformation with modified blockchain. Technological Forecasting and Social Change, 201, 123254. https://doi.org/10.1016/j.techfore.2024.123254.

Marsal-Llacuna, M.-L. (2018). Future living framework: Is blockchain the next enabling network? Technological Forecasting and Social Change, 128, 226–234. https://doi.org/10.1016/j.techfore.2017.12.005

Matteucci, N., Santolini, R., and Di Fabio, S. (2023). ICT diffusion in public administrations and business dynamics: Evidence from Italian municipalities. Annals of Public and Cooperative Economics, 94(4), 1233–1271. https://doi.org/10.1111/apce.12400

Mazzucato, M. and Perez C. (2015). Innovation as growth policy. In J. Fagerberg, S. Laestadius and B. R. Martin (Eds.), The Triple Challenge for Europe: Economic Development, Climate Change, and Governance. Oxford University Press: Oxford, UK, pp. 229–264

Mendez-Picazo, M.-T., Galindo-Martin, M.-A., and Perez-Pujol, R.-S. (2024). Direct and indirect effects of digital transformation on sustainable development in pre- and post-pandemic periods. Technological Forecasting and Social Change, 200, 123139. https://doi.org/10.1016/j.techfore.2023.123139

Muñoz, P., and Cohen, B. (2018). Sustainable Entrepreneurship Research: Taking Stock and looking ahead. Business Strategy and the Environment, 27(3), 300–322. https://doi.org/10.1002/bse.2000

Nambisan, S., Wright, M., and Feldman, M. (2019). The digital transformation of innovation and entrepreneurship: Progress, challenges and key themes. Research Policy, 48(8), 103773. https://doi.org/10.1016/j.respol.2019.03.018

Owen, R., Vedanthachari, L. N., and Hussain, J. (2024). The role of the university entrepreneurial ecosystem in entrepreneurial finance: Case studies of UK innovation knowledge centres. Venture Capital, 26(3), 351–375. https://doi.org/10.1080/13691066.2023.2205606

Perez, C. (1983). Structural change and assimilation of new technologies in the economic and social systems. Futures, 15(5), 357–375. https://doi.org/10.1016/0016-3287(83)90050-2

Perez, C. (2004). Technological Revolutions, Paradigm Shifts and Socio-institutional Change. In Reinert, E.S. (Eds.). Globalization, Economic Development and Inequality. Cheltenham, UK: Edward Elgar Publishing. https://doi.org/10.4337/9781845421625.00016

Peters, B. G., and Pierre, J. (1998). Governance Without Government? Rethinking Public Administration. Journal of Public Administration Research and Theory, 8(2), 223–243. https://doi.org/10.1093/oxfordjournals.jpart.a024379

Read, S., and Sarasvathy, S. D. (2005). Knowing What to Do and Doing What You Know: Effectuation as a Form of Entrepreneurial Expertise. The Journal of Private Equity, 9(1), 45–62.

Reuber, A. R., Fischer, E., and Coviello, N. (2016). Deepening the Dialogue: New Directions for the Evolution of Effectuation Theory. The Academy of Management Review, 41(3), 536–540.

Reymen, I. M. M. J., Andries, P., Berends, H., Mauer, R., Stephan, U., and van Burg, E. (2015). Understanding Dynamics of Strategic Decision Making in Venture Creation: A Process Study of Effectuation and Causation. Strategic Entrepreneurship Journal, 9(4), 351–379. https://doi.org/10.1002/sej.1201

Rhodes, R. A. W. (1990). Policy Networks: A British Perspective. Journal of Theoretical Politics, 2(3), 293–317. https://doi.org/10.1177/0951692890002003003

Rhodes, R. A. W. (1991). Theory and Methods in British Public Administration: The View from Political Science. Political Studies, 39(3), 533–554. https://doi.org/10.1111/j.1467-9248.1991.tb01627.x

Rhodes, R. A. W. (1996). The New Governance: Governing without Government Political studies, 44(4), 652–667. https://doi.org/10.1111/j.1467-9248.1996.tb01747.x

Sarasvathy, S. D. (2001). Causation and Effectuation: Toward a Theoretical Shift from Economic Inevitability to Entrepreneurial Contingency. Academy of Management Review, 26(2), 243–263. https://doi.org/10.5465/amr.2001.4378020

Sarasvathy, S. D. (2008). Effectuation. Cheltenham, UK: Edward Elgar Publishing. https://www.elgaronline.com/monobook/9781843766803.xml

Schiavone, F., Leone, D., Caporuscio, A., and Lan, S. (2022). Digital servitization and new sustainable configurations of manufacturing systems. Technological Forecasting and Social Change, 176, 121441. https://doi.org/10.1016/j.techfore.2021.121441

Schot, J., and Steinmueller, W. E. (2018). Three frames for innovation policy: RandD, systems of innovation and transformative change. Research Policy, 47(9), 1554–1567. https://doi.org/10.1016/j.respol.2018.08.011

Schumpeter, J. (1934). The Theory of Economic Development. An inquiry into profits, capital, credit, interest, and the business cycle (Vol. 55), Harvard University Press, Boston.

Shams, R., Vrontis, D., Belyaeva, Z., Ferraris, A., and Czinkota, M. R. (2021). Strategic agility in international business: A conceptual framework for "agile" multinationals. Journal of International Management, 27(1), 100737. https://doi.org/10.1016/j.intman.2020.100737

Sharif, N. (2006). Emergence and development of the National Innovation Systems concept. Research policy, 35(5), 745–766. https://doi.org/10.1016/j.respol.2006.04.001

Soete, L., and Freeman, C. (2012). The Economics of Industrial Innovation. Routledge. https://doi.org/10.4324/9780203357637

Stam, E., and van de Ven, A. (2021). Entrepreneurial ecosystem elements. Small Business Economics, 56(2), 809–832. https://doi.org/10.1007/s11187-019-00270-6

Thomas, L. D. W., and Ritala, P. (2021). Ecosystem Legitimacy Emergence: A Collective Action View. Journal of Management, 48(3), 515–541. https://doi.org/10.1177/0149206320986617

Torfing, J., Sørensen, E., and Røiseland, A. (2019). Transforming the Public Sector Into an Arena for Co-Creation: Barriers, Drivers, Benefits, and Ways Forward. Administration and Society, 51(5), 795–825. https://doi.org/10.1177/0095399716680057

Troise, C., Jones, P., Candelo, E., and Sorrentino, M. (2023). The role of entrepreneurial alertness, digital platform capability, organisational agility and business model innovation on young innovative companies' performance. Technology Analysis and Strategic Management, 0(0), 1–14. https://doi.org/10.1080/09537325.2023.2209223

Wang, C. L., and Chugh, H. (2014). Entrepreneurial Learning: Past Research and Future Challenges. International Journal of Management Reviews, 16(1), 24–61. https://doi.org/10.1111/ijmr.12007

Wang, H., and Guo, J. (2024). New way out of efficiency-equity dilemma: Digital technology empowerment for local government environmental governance. Technological Forecasting and Social Change, 200, 123184. https://doi.org/10.1016/j.techfore.2023.123184

Wurth, B., Stam, E., and Spigel, B. (2022). Toward an Entrepreneurial Ecosystem Research Program. Entrepreneurship Theory and Practice, 46(3), 729–778. https://doi.org/10.1177/1042258721998948

Zhao, X., and Weng, Z. (2024). Digital dividend or divide: The digital economy and urban entrepreneurial activity. Socio-Economic Planning Sciences, 93, 101857. https://doi.org/10.1016/j.seps.2024.101857

Appendix 3 - Research paper 3

Esposito, G., De Bernardi, P., Bertello, A., & Vrontis, D. (2025)
Value tensions and actionable knowledge in grassroots innovation: a study of invitational ambiguity and implementation challenges
Journal of Knowledge Management, 29(2), 372-392

1. Introduction

In recent years, there has been a growing recognition among both practitioners and researchers that addressing contemporary societal challenges requires innovative organizational forms that foster collective action (Ferraro et al., 2015; Thomas. et al, 2024). The fundamental premise is that complex societal issues necessitate collaborative efforts across multiple stakeholders (Del Giudice et al., 2017; Dentoni et al., 2018). Innovation policies have predominantly focused on top-down, conventional research and development approaches, often overlooking the potential of alternative, grassroots initiatives that could enhance plurality and reflexivity (Smith et al., 2014). Within this scenario, grassroots innovation movements have emerged as significant actors in promoting more inclusive innovation processes and engaging local communities in knowledge creation, decision-making, and outcomes (Smith et al., 2014). Despite their promise, these movements have historically faced challenges such as limited access to financing (Middlemiss and Parrish, 2010) and difficulties in forging broader community connections (Seyfang and Smith, 2007). Recent policy changes have begun to address these challenges by emphasizing the empowerment of local communities and marginal stakeholders to promote entrepreneurial solutions tailored to specific community needs (Hossain, 2016). This change has led to the development of new policy models that aim to create social impact by involving a range of different actors, including governments, universities, private companies, citizens and marginal stakeholders (Bertello et al., 2022; Papaioannou et al., 2024), giving life to complex and nested multi-stakeholder collaborative initiatives (Dentoni et al., 2018; Foray et al., 2012; Mazzucato, 2018). Nonetheless, the intricate processes of knowledge creation and mobilization, particularly in complex domains such as climate change, social inequality, and urban regeneration, warrant further investigation. Research on disruptive innovation highlights how grassroots innovations can challenge established practices and shift societal norms (Christensen et al., 2018; Christensen and Bower, 1996; Hill and Lineback, 2011), while other work examines how evidence from grassroots initiatives can inform policy decisions and practical applications (Cartwright and Hardie, 2012; Cowen and Cartwright, 2022; Joyce and Cartwright, 2022). However, there remains a gap in understanding how collective knowledge can be effectively mobilized and implemented through policies that provide financial and institutional support for grassroots innovation projects while maintaining their connection to specific community issues. This research addresses this gap by analyzing the New European Bauhaus (NEB) initiative, which, inspired by the European Green Deal, aims to reimagine sustainable living in Europe. The NEB initiative seeks to recognize and support projects that improve living spaces in Europe, centred on three core values: sustainability, aesthetics, and inclusion. The rhetorical strategy implemented by the NEB provides an empirical context to analyze how storytelling and narratives create inter-organizational spaces for ambiguity that allow for multiple interpretations and bottom-up, participatory approaches (Boje, 2014; Henderson and

Boje, 2015; Larsen et al., 2020). Utilizing the concept of invitational ambiguity—where appealing to common values invites participation in specific actions (Sillince J. and Jarzabkowski P., 2011),—this study poses the following research questions: RQ1 "How do broadly defined invitational values, such as sustainability, inclusion, and aesthetics, affect the implementation and operationalization of grassroots initiatives in practice?" and RQ2 "What are the challenges encountered when translating invitational ambiguity into actionable frameworks for grassroots projects, and how can these challenges be addressed to better support grassroots innovation? To explore these questions, we conducted an embedded case study collecting data through online self-assessment surveys, secondary data analysis, and semi-structured interviews. Our findings reveal two primary sources of tension in transforming mobilized knowledge into actionable outcomes: difficulty in harmonizing NEB core values and misalignment of role expectations between NEB representatives and grassroots projects. This paper contributes to understanding the effects of ambiguity on knowledge mobilization and implementation in multi-stakeholder collaborations aimed at addressing social and environmental challenges (Ferraro et al., 2015). It also offers insights into the dynamic interplay between top-down and bottom-up forces in innovation policies (Njøs and Fosse, 2019; Ostrom, 1990).

2. Theoretical background

Over the past 15 years, grassroots innovation has gained considerable scholarly attention for its transformative potential in addressing complex societal challenges (Fait et al., 2022; Hossain, 2016; Martin and Upham, 2015; Middlemiss and Parrish, 2010, 2010; Seyfang and Smith, 2007; Smith et al., 2014). Despite this growing interest, the research field is still struggling with the need for a unified framework and deeper integration of grassroots perspectives within mainstream management and innovation discourses. Grassroots innovation emphasizes community-driven solutions rather than profit motivations, contributing uniquely to sustainability, social equity, and resilience. This approach underscores the importance of shared knowledge and participatory practices in promoting sustainable development and tackling pressing environmental and social issues.

Grassroots innovation represents a shift from traditional innovation models by prioritizing community values and addressing local needs (Fait et al., 2022; Seyfang and Smith, 2007). It emerges as a response to social injustices and environmental challenges, operating outside formal institutions and emphasizing community empowerment and participation (Seyfang and Haxeltine, 2012). Nevertheless, grassroots initiatives face many challenges, including organizational vulnerability and limited funding (Gupta, 2012; Roysen et al., 2024). Overcoming these barriers requires a nuanced understanding of the factors that drive and hinder grassroots innovation dynamics. On the other hand, participatory approaches are critical in promoting innovation within grassroots contexts, facilitating knowledge sharing, skills development, and community empowerment (Hossain, 2018). The Grassroots Innovation Movements (GIMs) framework, developed by Smith et al., (2014), offers a foundational understanding of how community-led initiatives function outside conventional market and institutional structures. This framework emphasizes the role of local knowledge, participatory governance, and social networks in driving innovation, elucidating how grassroots movements can influence

broader socio-technical transitions, particularly in the context of sustainable development. Complementing this, the Socio-Technical Transitions and Multi-Level Perspective (MLP) framework (Geels, 2019), offers insight into how technological innovations emerge and stabilize through interactions at different societal levels. This framework helps to understand the scaling and mainstreaming of grassroots innovations by examining the interplay between niche innovations, mainstream practices (regimes), and broader socio-cultural trends (landscapes) (Geels, 2002; Smith and Raven, 2012). Another relevant framework to understand grassroots innovation is the Inclusive Innovation Framework (Foster and Heeks, 2013; Heeks et al., 2013). This framework explores how innovation processes can be made more inclusive, particularly for marginalized groups, and it is relevant for understanding how grassroots projects can foster broader participation in innovation processes, thereby addressing social inequalities and promoting sustainable development. Finally, Ostrom's model of collective action in the commons explores how communities can collectively manage shared resources sustainably (Ostrom, 1990; Poteete et al., 2010). This framework is particularly relevant for understanding grassroots efforts in managing urban commons and promoting stewardship, considering the resource limitations that are endemic to such projects and that require institutional arrangements between different actors at the societal level.

3. Research Context - The New European Bauhaus

The NEB initiative aims to translate the European Green Deal into tangible, positive experiences that encourage collaborative action to address pressing societal challenges (EU NEB Website, 2024). It is a creative and interdisciplinary initiative that links the European Green Deal to living spaces through three core values: sustainability, aesthetics, and inclusiveness (EU NEB Website, 2024). By fostering innovative and entrepreneurial endeavours through multi-level, multidisciplinary, and participatory approaches, the NEB Awards, which is one of the main initiatives launched by the NEB, celebrate exemplary projects and concepts that reflect these values. Established as an annual competition, the awards highlight local efforts to create more sustainable and aesthetically pleasing communities, places, products, and processes. In the last three editions—2021, 2022, and 2023—the awards have recognized 52 winners out of over 4,500 applications, showcasing promising talent across various European countries. The finalists include 7 projects from Spain, 5 from Italy, 4 from Greece, and 3 each from Denmark and Belgium, with additional projects from Austria, France, Germany, Lithuania, Poland, Bulgaria, Czech Republic, Finland, Hungary, Ireland, Luxembourg, Montenegro, Portugal, and Romania.

The NEB Compass, developed by the NEB Unit representatives, serves as a guiding framework (Figure 1) for practitioners and scholars to integrate and evaluate NEB values in their projects (EU NEB Compass, 2023). It outlines essential pathways and principles for projects to authentically embody NEB's ethos. The NEB Compass provides multivocal definitions of the three core values: aesthetics, sustainability, and inclusion. Aesthetics pertains to the visual and emotional appeal that enriches a space or environment. Sustainability addresses climate goals, circular practices, and biodiversity preservation, ensuring efficient resource use and ecosystem protection. Inclusion spans social

diversity, accessibility, and affordability, aiming to provide equal opportunities and access to resources.

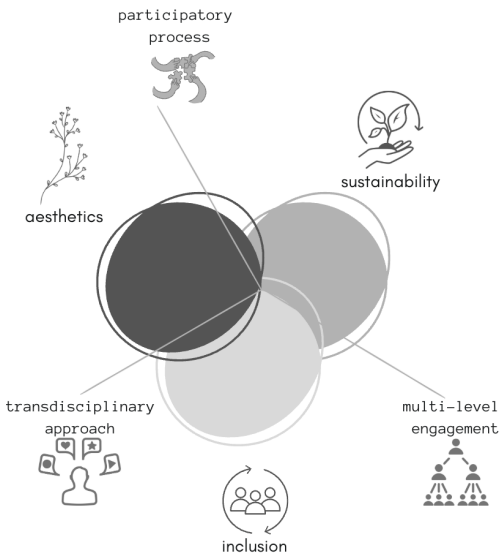


Figure 1 - NEB framework (Source: NEB Compass, 2023)

The NEB initiative was initiated in September 2020 (EU Commission, 2021) and launched by Ursula von der Leyen. It seeks to make climate-neutral cities more livable and redefine the Bauhaus movement's scope in the context of contemporary environmental challenges (EU Commission, 2021). The NEB's core values were established by the NEB High-Level Round Table in 2018 (EU Commission, 2023), which included experts from diverse fields such as architecture, venture capital, urban planning, biology, ecology, innovation, activism, and the arts. This round table employed participatory methods through collaborative workshops to formulate these values, reflecting a holistic approach that integrates human, community, and planetary scales (EU Commission, 2021). The broad definitions of these values have elevated the NEB's visibility, leading to 624,000 visitors and 1,881,400 page views. The official social media channels have 24,700 followers and 37,900 interactions in the past year (EU Commission, 2023). With 600 official partner organizations ranging from EU-wide networks to local initiatives, the NEB engages millions of citizens. Although the broad nature of these values has effectively mobilized a wide range of projects and stakeholders, the inherent ambiguity can pose challenges during implementation.

4. Methodology

To address the research questions - RQ1 "How do broadly defined invitational values, such as sustainability, inclusion, and aesthetics, affect the implementation and operationalization of grassroots initiatives in practice?" and RQ2 "What are the challenges encountered when translating invitational ambiguity into actionable frameworks for grassroots projects, and how can these challenges be addressed to better

support grassroots innovation?" - this study employs an exploratory qualitative research design to provide new insights into grassroots innovation. (Eisenhardt, 1989). Given the limited existing research on this topic, we have chosen an embedded case study (Bertello et al., 2022b) focusing on the NEB awards initiative and the projects awarded by the NEB. This methodology is particularly suited to the study's objectives because it allows for an in-depth exploration of the nuanced and multifaceted processes involved in grassroots initiatives (Maine et al., 2015). By examining NEB as the primary unit of analysis and the prize-winning projects as sub-units, the embedded case study method provides a comprehensive understanding of how broad, abstract invitational values are operationalized in real-world settings with diverse stakeholder interactions and varying levels of institutional support. This approach captures the nuanced dynamics and contextual factors that influence how these values are translated into practical actions, which is crucial for addressing the specific challenges and misalignments identified in our research. The in-depth, multi-layered analysis facilitated by the research design is essential for uncovering the intricacies of how invitational values are applied in practice. It also offers valuable insights into the difficulties faced by both the NEB Unit representative (top-down perspective) and the grassroots projects (bottom-up perspective) in aligning their roles and expectations.

4.1 Data collection and analysis

Data collection for this study involved triangulating multiple data sources (Yin, 2009) to ensure a comprehensive understanding of the NEB dynamics (Figure 2). The process began in September 2023 with the distribution of an online self-assessment form to all finalist NEB prize projects. This form, created using Google Forms, contained 20 questions in Likert scale or multiple-choice formats. It was designed to be completed within 20 minutes and was structured into sections: an initial segment for background information, followed by a primary section exploring NEB adherence, coherence of values, and operational principles. This online self-assessment form assessed how well the projects aligned with NEB's identity, as outlined in the NEB Compass Framework, including the ambition levels for each value.

Figure 2 - Data collection plan (Author's own elaboration)

Table I - NEB Projects Secondary Data reports the self-assessment results in terms of adherence coherence to NEB values based on NEB project owner perspectives. This table displays the interviewee, the code we assigned to them, and the project name, along with their responses to how each of the following core values—"aesthetics,"

"sustainability," and "inclusion"—represents the identity of their project. Each column (Table I and Table II) explains how those values are melded into the project's overall identity according to the interviewees' perspectives. After collecting responses from the online self-assessment (Table I - NEB Projects Secondary Data), we further examined project descriptions and statuses by reviewing secondary data available online, including social media and project websites, in addition to the NEB website project fiches. The combination of these online data sources and the self-assessment responses provided a foundational understanding of the extent to which each claims to align with NEB values and principles.

Nr	Project Name	To what extent is NEB's aesthetic value in line with the identity of your project?	To what extent is NEB's sustainability value in line with the identity of your project?	To what extent is NEB's inclusion value in line with the identity of your project?
1	Esseri Urbani (Italy, Puglia) 2021 Finalist	High	Medium/High	High
2	Genius Loci (Lithuania, Kaunas) 2022 Winner	High	Medium/High	High
3	Noi Ortadini (Italy, Basilicata) 2023 Finalist	Medium	Medium/High	High
4	Klimaatspeelplaats (Belgium, Flanders) 2023 Finalist	Medium/High	Medium/High	High
5	Sacromonte Caves Museum (Spain, Andalusia) 2023 Finalist	High	High	Medium/High
6	Roofscapes (Paris, France) 2023 Finalist	Medium/High	High	Medium/High
7	INCLUD (Milan, Italy) 2022 Finalist	Medium	Medium	High
8	Odyssea Academy (Rendis, Greece) 2022 Finalist	Medium/High	High	High
9	Symbiotic Spaces Collective (Germany, Berlin) 2022 Winner	High	High	Medium

Table I - NEB Projects Secondary Data (Author's own elaboration)

This preliminary understanding was deepened through semi-structured interviews with nine NEB project owners (from December 2023 until March 2024). This qualitative method was selected to gain richer insights into the experiences and perspectives of project participants (Rowley, 2012). Project selection for interviews was based on criteria including (1) diversity across NEB prize categories (i.e. Mobilisation of Culture, Arts & Communities; Regaining a Sense of Belonging; Buildings Renovated in a Spirit of Circularity; Prioritising the Places and People That Need It the Most; and Reconnecting with Nature) and (2) geographic diversity to capture a range of socio-economic and cultural contexts. Table II (Table II - Research Sample - NEB Projects and Interviewee) lists the projects illustrating their innovative ideas. This table presents a detailed overview of the research sample, including the names of NEB projects, brief descriptions of each project, and the roles of individuals who were interviewed. The semi-structured interview questions explore various aspects related to the interviewee's project status, implementations and future perspectives.

Nr	Project Name	Short Description	Interviewee
1	Esseri Urbani (Italy, Puglia) 2021 Finalist	The project aims to transform urban spaces through interactive art, fostering cultural accessibility, sustainable tourism, and employment. Through open-air exhibitions and APP-guided circuits, it revitalises heritage, engages diverse audiences, and promotes multicultural exchange for sustainable growth.	Co-founder
2	Genius Loci (Lithuania, Kaunas) 2022 Winner	The project aims to empower citizens to create interactive maps safeguarding Šančiai against top-down decisions. It preserves cultural heritage, landscapes, and environment, fostering a sustainable vision through community engagement and data-driven insights.	Founder and Co-Founder
3	Noi Ortadini (Italy, Basilicata) 2023 Finalist	The project aims to transform an abandoned patch of land into a thriving community garden in Matera, Italy. Through agriculture, education, and events, it promotes sustainability, socialisation, and environmental awareness among citizens.	Project Owner
4	Klimaatspeelplaats (Belgium, Flanders) 2023 Finalist	The project aims to transform the concrete playground at Sint-Paulus Primary School in Kortrijk, Belgium, into a green oasis, fostering biodiversity, and sustainability, and enhancing students' learning experience through hands-on interaction with nature.	Project Owner
5	Sacromonte Caves Museum (Spain, Andalusia) 2023 Finalist	The project, led by the residents' organisation "Vaivén-Paraíso," aims to restore natural, cultural, and social heritage in Granada's Darro River valley, preserving ethnic minority history and biodiversity through collaborative rehabilitation efforts.	Founder and Co-founder
6	Roofscapes (Paris, France) 2023 Finalist	Roofscapes convert unused pitched rooftops into green havens, combating urban heat, fostering biodiversity, managing stormwater, and creating urban oases in European cities. Utilizing prefabricated timber modules, it facilitates sustainable urban adaptation.	Co-Founder
7	INCLUD (Milan, Italy) 2022 Finalist	INCLUD, a digital platform, that evaluates buildings based on Universal Design principles using objective indicators. It aids designers in creating inclusive spaces for diverse abilities, tested in Italy, for both new constructions and renovations.	Research Team Lead

Nr	Project Name	Short Description	Interviewee
8	Odyssea Academy (Rendis, Greece) 2022 Finalist	Odyssea Academy fosters job integration for marginalised groups in Athens' Metropolitan area. Once an abandoned warehouse, it's transformed into a nurturing space through inclusive renovation, involving locals and reclaimed materials.	Founder
9	Symbiotic Spaces Collective (Germany, Berlin) 2022 Winner	Symbiotic Spaces Collective employs open-source 3D printing and local clay to craft diverse habitats for urban wildlife. Inspired by nature's architecture, these structures aim to bolster biodiversity, emphasizing humanity's interconnectedness with ecosystem guardians.	Founder
10	Not Applicable	New European Bauhaus Unit at Joint Research Centre at the European Commission	Head of Unit
11	Not Applicable	New European Bauhaus Unit at Joint Research Centre at the European Commission	Policy Officer

Table II - Research Sample - NEB Projects and Interviewee (Author's own elaboration)

The interviews conducted online via the Webex platform with durations ranging from 30 to 50 minutes were initiated after obtaining informed consent from the participants. The objective of the interview was to explore several key aspects: (RQ1) the projects' alignment with NEB values and their consistency with these values and (RQ2) the mutual engagement between the projects and the Joint Research Centre (JRC) team. Interviews aimed to uncover various aspects of each project, including its origin, alignment with NEB values, and ongoing consistency with these values. Each interview began by exploring the project's inspiration, determining whether the NEB values were intrinsic to the project's conception or integrated later. The discussion then focused on how the NEB values manifested in the project's implementation. Further, the interviews investigated the project's long-term alignment with NEB values and principles, including reflections on how adherence has evolved. Interviewees were asked to identify areas for improvement and suggest measures for better adherence to NEB values in the future. Finally, the interviews evaluated the role of the JRC, i.e., the NEB Unit representatives, in supporting the project post-award and during the NEB Award Event, and highlighting any positive or impactful interactions. The detailed findings from this analysis will be presented in Section 5 of the paper. Interviews continued until data saturation was reached, meaning no new significant insights emerged, ensuring that the sample was representative.

To complement the insights from the NEB project interviews, we conducted two additional interviews with members of the JRC Research Team (see Table II - Research Sample - NEB Projects and Interviewee). These interviews provided top-down perspectives on how NEB values were interpreted and disseminated across different

levels of the program, contributing to a more nuanced and comprehensive understanding of the NEB community's dynamics.

The data analysis for this study employed a rigorous coding approach, treating transcribed interviews and collected documents as primary units of analysis (Eisenhardt, 1989). The study followed the Gioia methodology, which is known for its systematic approach to concept development and grounded theory, aiming to bring qualitative rigour to inductive research (Gioia et al., 2012).

5. Findings and Discussion

Our analysis revealed two primary sources of tension in the process of translating invitational ambiguity into actionable knowledge. First, the NEB's core values—sustainability, aesthetics, and inclusion—though defined with a sense of harmony by the NEB, have proven challenging to implement simultaneously. Projects often encountered difficulties in integrating these aspirational values, highlighting an inherent incompatibility between them when put into practice. Second, we observed significant misalignments in role expectations. NEB representatives utilized invitational ambiguity to engage and mobilize grassroots innovation projects, but their involvement was largely limited to providing support without assuming direct control. In contrast, the projects anticipated a more hands-on approach, expecting closer guidance to align with an actionable framework based on NEB's core values.

These issues are addressed in Section 5.1, titled "Translating Aspirational Values into Actionable Knowledge," which explores how broadly defined values impact the implementation and operationalization of grassroots initiatives (RQ1). Section 5.2, "Misalignments in Role Expectations: NEB vs. Project Expectations," deepens the specific challenges and misalignments encountered when translating invitational ambiguity into actionable frameworks and offers ways to address these issues to better support grassroots innovation (RQ2).

5.1 Translating aspirational values into actionable knowledge

Our study has uncovered the challenges faced by different projects selected as finalists for the NEB Prize during project implementation, as they strive to reconcile the coexistence of the three NEB core values: sustainability, inclusion, and aesthetics. The semantic ambiguity employed by the NEB in defining these values has contributed to the development of a conflict-free framework. However, our case studies have revealed how these conflicts emerge once these projects attempt to put these values into practice.

Nr	Project Name	Paradoxical Value – the value contains seemingly contradictory or self-defeating elements	How the conflict with the Value Identity emerges
1	Esseri Urbani (Italy, Puglia) 2021 Finalist	**Sustainability**: In the implementation of the "**Esseri Urbani**" project, a significant conflict emerges between the project's ambitious sustainability values and its practical limitations. While the project is committed to promoting sustainability through localized, smaller-scale actions and internal practices, it faces difficulties in addressing broader, large-scale environmental challenges. This discrepancy creates a tension between the project's value identity, which aspires to have a substantial impact on environmental sustainability, and its operational capacity, which is confined to incremental changes. Consequently, the project's efforts to uphold sustainability values are often at odds with its ability to effect systemic environmental improvements, revealing an inherent conflict between its idealistic goals and practical realities.	The **Esseri Urbani** project faces a challenge in aligning its sustainability goals with its limited capacity to address large-scale environmental issues. This tension between promoting sustainability through smaller-scale actions and achieving broader environmental impacts can be understood through **the Commons** and **Collective Action Framework** by Elinor Ostrom. This framework highlights the importance of collective management of shared resources and adapting strategies to local contexts. By leveraging this approach, Esseri Urbani can integrate community-driven solutions and adaptive strategies, thus aligning its sustainability efforts with broader environmental goals while ensuring effective, collaborative resource management.
2	Genius Loci (Lithuania, Kaunas) 2022 Winner	Integrated Values (Sustainability, Inclusion, Beauty)	
3	Noi Ortadini (Italy, Basilicata) 2023 Finalist	**Inclusion**: Conflicts arise in the implementation of the inclusion value within the **'Noi Ortadini'** project, particularly when reconciling diverse perspectives among community garden users. The clash centers on differing views regarding the aesthetics of the space and its intended community purpose. Without clear policies to guide these varied opinions, achieving a cohesive vision of inclusion proves challenging. This lack of alignment underscores the	The Noi Ortadini project grapples with "**inclusion**" as divergent user perspectives create tensions over the community garden's aesthetics and purpose. This challenge reflects the broader issue of managing diverse community interests. Applying the **Collective Action Framework** by Elinor Ostrom, Noi Ortadini can enhance its approach by involving all stakeholders in decision-making processes, thus fostering a more

Nr	Project Name	Paradoxical Value – the value contains seemingly contradictory or self-defeating elements	How the conflict with the Value Identity emerges
		inherent tension between the ideal of inclusive participation and the practicalities of managing conflicting individual preferences, revealing a fundamental struggle between upholding inclusive values and effectively overseeing diverse stakeholder expectations.	inclusive environment that harmonizes different viewpoints and improves collective stewardship of the community garden. This alignment with the framework not only enhances the project's inclusivity but also advances its goals of sustainable development and social cohesion.
4	Klimaatspeelplaats (Belgium, Flanders) 2023 Finalist	Integrated Values (Sustainability, Inclusion, Beauty)	
5	Sacromonte Caves Museum (Spain, Andalusia) 2023 Finalist	**Inclusion**: The "**Sacromonte**" project faces a conflict in implementing NEB's inclusion value due to landscape constraints, hindering full accessibility while preserving natural beauty and environmental integrity. Despite efforts to ensure access, limitations exist, underscoring the tension between inclusivity goals and environmental conservation.	The **Sacromonte** project struggles with "inclusion" due to landscape constraints that limit accessibility while preserving environmental integrity. This conflict underscores the challenge of integrating diverse community needs with ecological preservation. The **Commons and Collective Action Framework** by Elinor Ostrom provides valuable insights for addressing this issue. It emphasizes how communities can collaboratively manage resources and balance competing needs. Applying this framework to Sacromonte can facilitate a participatory approach, enabling stakeholders to develop inclusive solutions that respect both accessibility and environmental values, ultimately promoting equitable resource management and community engagement.
6	Roofscapes (Paris, France) 2023 Finalist	Integrated Values (Sustainability, Inclusion, Beauty)	

Nr	Project Name	Paradoxical Value – the value contains seemingly contradictory or self-defeating elements	How the conflict with the Value Identity emerges
7	INCLUD (Milan, Italy) 2022 Finalist	**Beauty**: The "**Includ**" project encounters a conflict in implementing the NEB value of "beauty" due to its subjective nature. While striving for inclusivity in architectural design, the project focuses on developing a framework for accessibility, prioritizing functionality over aesthetic appeal. This highlights the challenge of reconciling abstract concepts of beauty with practical needs in creating inclusive spaces.	The **Includ** project faces challenges in implementing the NEB value of "beauty" due to its subjective nature, prioritizing accessibility and functionality over aesthetic appeal. This highlights the difficulty of reconciling abstract notions of beauty with practical design needs. The **Commons and Collective Action Framework** by Elinor Ostrom is relevant here as it explores how communities manage shared resources sustainably. By applying Ostrom's principles, the project can address this tension by incorporating collective decision-making processes. This framework aids in balancing the subjective value of beauty with practical considerations, ensuring that inclusive design meets both functional needs and communal values.
8	Odyssea Academy (Rendis, Greece) 2022 Finalist	Integrated Values (Sustainability, Inclusion, Beauty)	
9	Symbiotic Spaces Collective (Germany, Berlin) 2022 Winner	Inclusion: The Symbiotic Spaces Collective project is struggling with a conflict in implementing the NEB value of 'inclusion' as it seeks to extend inclusion beyond human participants to include the diverse ecosystem it aims to protect. This reveals a tension between traditional notions of inclusion, which focus primarily on human involvement, and the broader perspective of inclusivity that recognises the importance of non-human entities in environmental initiatives.	The **Symbiotic Spaces** project faces challenges in "inclusion" by extending its focus beyond human participants to encompass the surrounding ecosystem. This broadens the traditional concept of inclusion to include non-human elements in environmental initiatives. The **Commons and Collective Action Framework** by Elinor Ostrom is pertinent here, as it highlights how communities manage shared resources through collective action. Applying this

Nr	Project Name	Paradoxical Value – the value contains seemingly contradictory or self-defeating elements	How the conflict with the Value Identity emerges
			framework, Symbiotic Spaces can leverage community involvement to balance human and ecological needs, ensuring that both people and the environment benefit from inclusive, sustainable practices, thus integrating diverse perspectives into resource management.

Table III - Translating aspirational values into actionable knowledge (Author's own elaboration)

For instance, Sacromonte (project nr5 in Table III), faced challenges balancing sustainability and inclusion. While prioritizing the preservation of a unique landscape, the project's efforts to maintain environmental integrity often conflicted with the need to ensure accessibility for people with disabilities. The project owner noted:

"Our mission mainly focuses on the conservation and promotion of caves, which act as bioclimatic homes. It is important to note that these caves have preserved their environmental integrity for centuries. We have made a conscious effort to minimise our environmental footprint by not altering the land or landscape. Furthermore, sustainable tourism is a key objective for us. We strive to educate visitors about the importance of conservation while ensuring that our activities are not harmful to the environment. From the recycling of water to the use of second-hand furniture, sustainability is woven into every aspect of our project."

However, they also express concerns about the evidence that efforts to protect a unique landscape and geographic context often result in struggles to accommodate people with disabilities and ensure access for those with mobility issues, as this would require the installation of structures that might deface the surrounding environment, highlighting the challenge of simultaneously upholding sustainability and inclusion.
Similarly, Noi Ortadini Project Owner (project nr3 in Table III) encountered issues balancing aesthetics with sustainability and inclusion. While the community garden project aimed to foster inclusiveness through its design and community engagement, disagreements among participants about the garden's aesthetic and maintenance led to conflicts. By introducing elements such as wooden garden arbours and botanical species in the process of extinction, Noi Ortadini aims to cultivate a communal garden, rediscovering the art of simplicity. Inclusiveness is at the heart of the project, which seeks to create a unique community space that encourages the sharing of ideas and collaboration between residents and visitors. Participation goes beyond young people, involving all members of the local community to enrich the authenticity of the project.

Sustainability, on the other hand, is at the core of its philosophy, primarily focusing on social and environmental sustainability. Weekly meetings serve to further understand these issues, empowering participants to effect meaningful change. However, despite the efforts to strengthen the community bonds, the biodiversity and aesthetics of the garden were not unanimously appreciated by all participants in the community project. One member expressed a different perception and conception of aesthetics from that of the group, preferring daily pruning of the garden, which was not feasible. Consequently, this individual decided to appropriate part of the garden for personal use, so the Noi Ortadini committee invited the "disabler" to try to autonomously manage and follow and align with the rules imposed by the municipality. One participant's differing view on garden maintenance exemplified this tension:

"He has taken over a significant piece, putting up a fence always in line with." The "disabler" remarks "If you don't have consistency with mowing and everything, I'll adopt it and do it myself."

This case illustrates the complexities of aligning various viewpoints within community projects and the inherent paradoxes of inclusion.
Esseri Urbani (project nr1 in Table III) faced difficulties in integrating sustainability with its broader aesthetic goals. The project, focused on urban regeneration, acknowledged its limitations in addressing large-scale environmental issues. The Esseri Urbani Co-Founder expresses conflict during the implementation of the sustainability dimension:

"Regarding sustainability, we recognize that it is not the project that acts on the big environmental issues. I think of pollution: the massive dumping of waste into the seas and all the big environmental issues. Of course, we do have measures that led us to see how we could help, through the use of technology, to limit as much as possible, for example, paper advertising material, and where it is used, we always try to use recycled materials anyway. But it is clear that our project is not the kind of initiative that can take massive action on major environmental issues."

5.2 Misalignments in Role Expectations: NEB vs. Project Expectations

The NEB initiative aimed since the beginning to integrate bottom-up innovation and experimentation with top-down policymaking. providing a supportive framework and EU funding for projects that respond to the ideas of aesthetic, sustainability, and inclusion. However, there were notable misalignments in role expectations between the NEB Unit representative and project teams.

Nr	Project Name	The misalignment surfaced in the roles and expectations	How can these challenges be addressed to better support grassroots innovation
1	Esseri Urbani (Italy, Puglia) 2021 Finalist	Tensions refer to the need for greater attention, support, and flexibility from the NEB entity, particularly in addressing the specific challenges faced by projects in southern Italy. They emphasize the importance of consistent engagement and a more inclusive approach to ensure that the NEB entity's initiatives have a meaningful impact on peripheral territories	To better support grassroots innovation in peripheral regions like southern Italy, the NEB entity should apply Elinor Ostrom's Commons and Collective Action Framework. This involves strengthening local governance by empowering community-led decision-making, enhancing stakeholder engagement through continuous and inclusive dialogues, and adapting support mechanisms to address specific regional challenges. Facilitating resource sharing and collaboration among stakeholders will leverage local knowledge effectively. Additionally, implementing adaptive management practices allows for flexible adjustments based on feedback and changing conditions. These strategies ensure that NEB initiatives are responsive and impactful, aligning with local needs and promoting sustainable grassroots innovation.
2	Genius Loci (Lithuania, Kaunas) 2022 Winner	Role expectations were aligned	
3	Noi Ortadini (Italy, Basilicata) 2023 Finalist	Role expectations were aligned	
4	Klimaatspeelplaats (Belgium, Flanders) 2023 Finalist	Tensions revolve around the scale-up process of the Klimaatspeelplaats project and the level of assistance the NEB provides or expects to provide during this phase. The project may feel that they need more guidance, resources, funding or other forms of assistance to successfully tackle this critical phase of expansion. This could include help with strategic planning, securing additional funding or partnerships, navigating regulatory requirements or accessing relevant networks	To address the challenges faced by the Klimaatspeelplaats project during its scale-up phase, the NEB entity can draw on Elinor Ostrom's Commons and Collective Action Framework. First, it should enhance local governance by fostering collaborative decision-making among project stakeholders and community members to better align support with the project's needs. The NEB can provide targeted assistance in strategic planning and securing funding by facilitating access to networks and resources, and offering guidance on regulatory navigation. Additionally, establishing clear channels for ongoing communication and feedback will allow for adaptive management, ensuring that

Nr	Project Name	The misalignment surfaced in the roles and expectations	How can these challenges be addressed to better support grassroots innovation
		or resources.	support is responsive and tailored to the evolving needs of the project during its expansion.
5	Sacromonte Caves Museum (Spain, Andalusia) 2023 Finalist	While Sacromonte recognises the potential benefits of engaging with the NEB, it is however unable to fully participate or contribute due to a lack of adequate funding. Without sufficient resources, it is unable to take advantage of the international venues or networking opportunities offered by the NEB.	To address the funding challenges faced by the Sacromonte project, the NEB entity can apply Elinor Ostrom's Commons and Collective Action Framework by focusing on several key strategies. First, it should facilitate the creation of a local governance structure that allows Sacromonte to effectively participate in decision-making processes and leverage collective resources. By providing targeted financial support or facilitating access to additional funding sources, the NEB can help overcome resource constraints. Additionally, fostering partnerships and networks within the NEB framework can enhance Sacromonte's access to international venues and opportunities, ensuring that the project can fully engage with the broader innovation ecosystem and contribute meaningfully.
6	Roofscapes (Paris, France) 2023 Finalist	The tension between Roofscapes and the NEB entity arises from Roofscapes' stable position in the French market but a lack of understanding regarding the NEB's role and minimal follow-up in community engagement activities. Clarity and proactive communication are needed to bridge this gap and fully utilize potential collaboration opportunities.	To address the challenges faced by Roofscapes in its relationship with the NEB entity, the Commons and Collective Action Framework by Elinor Ostrom provides valuable insights. First, establishing clear and transparent communication channels can help bridge the gap in understanding the NEB's role and expectations. Regular, proactive interactions and feedback loops should be implemented to ensure both parties are aligned and can effectively collaborate. Second, integrating Roofscapes into the NEB's community engagement activities through targeted initiatives can enhance its involvement and leverage its market position. This approach aligns with Ostrom's emphasis

Nr	Project Name	The misalignment surfaced in the roles and expectations	How can these challenges be addressed to better support grassroots innovation
			on collective decision-making and shared resources, thereby facilitating a more cohesive and productive partnership.
7	INCLUD (Milan, Italy) 2022 Finalist	The tension between Includ and the NEB entity stems from the project's dependency on research departmental funds, with minimal support from the NEB other than visibility at the NEB festival. Includ may feel neglected and seeks more substantial engagement and support from the NEB to align with the project's needs and expectations.	To better support grassroots innovation like the Includ project, challenges identified by the Commons and Collective Action Framework can be addressed through targeted strategies. Firstly, enhancing reciprocal relationships by increasing the NEB's engagement and resource support can align with Includ's needs, moving beyond mere visibility to substantial backing. Additionally, improving communication and feedback mechanisms will facilitate better understanding and responsiveness from the NEB, aligning with Ostrom's emphasis on transparent dialogue and continuous mutual support for effective collective action.
8	Odyssea Academy (Rendis, Greece) 2022 Finalist	Role expectations were aligned	
9	Symbiotic Spaces Collective (Germany, Berlin) 2022 Winner	The tension between the 'Symbiotic Spaces Collective' and the 'NEB entity' stems from the fact that Symbiotic Spaces has received adequate visibility through the NEB festival, but has not had consistent follow-up and engagement from the NEB team. They desire more proactive involvement and support to pursue its initiatives beyond the initial exposure.	To support the Symbiotic Spaces Collective effectively, the NEB should focus on enhancing ongoing engagement by establishing regular communication and follow-ups, moving beyond initial visibility provided at the festival. This approach aligns with Ostrom's principle of sustained interaction in resource management. The NEB should also adopt reciprocal feedback mechanisms to align support with the Collective's evolving needs, ensuring that resources and guidance are relevant and timely. Additionally, the NEB must offer targeted support and mentorship, facilitating strategic planning and access to essential networks. These steps, rooted in the Commons and Collective Action Framework, will foster deeper collaboration and sustained innovation.

Table IV - Misalignments in Role Expectations: NEB vs. Project Expectation
(Author's own elaboration)

The NEB's strategy focused on fostering innovation by providing institutional support while allowing significant freedom in project implementation. This approach was intended to promote a diverse range of solutions and encourage experimentation. As the Head of the NEB Unit representative expressed (interview nr10 in Table II):

"We welcome feedback and comments as part of this continuous dialogue, particularly as we strive to further interpret and refine our values. The bottom-up approach is integral to our methodology, ensuring that the voices and perspectives of diverse stakeholders are heard and incorporated into our initiatives."

However, projects often expect more systematic support and guidance throughout the implementation phase. The lack of tailored, ongoing support led to perceptions of insufficiency and standardization. For example, the Essere Urbani project owner (project nr1 in Table IV), revealed the challenge of extending their network of collaboration in the Southern regions of Italy:

"We need more focus on the Southern regions. It feels like everything related to Europe stops at Rome and doesn't reach further south. Some local projects have been abandoned due to limited "top-down" interactions. NEB needs to be a constant presence, not just a yearly event."

Conversely, Kammersplatz's project owner (project nr4 in Table IV) reflected on how NEB's support sometimes failed to address specific project needs:

"I believe NEB should have dedicated contacts or groups responsible for specific activities, like networking or sharing resources. Grassroots projects like ours need readily accessible support, even if we don't require financial assistance. NEB could play a crucial role in facilitating partnerships and collaborations. We're scaling up our initiatives, and it would be beneficial to have NEB's practical support in highlighting opportunities and facilitating discussions on project strategies. We need more than just putting information on a platform and hoping for the best."

Additionally, the Esseri Urbani co-founder highlighted issues with NEB's rigid support procedures. The project owner has highlighted how, despite providing funding opportunities and visibility, the NEB award ceremony 'forces' projects to be submitted by a specific deadline, without taking into account the timeline of the projects. In this case, the support is seen as constraining rather than empowering, contradicting both NEB and the projects' ambitions.
Finally, the INCLUD Research Team Lead (project nr7 in Table IV) expressed a desire for more active involvement within the NEB community:

"We'd like to have a more active role within the NEB community. After the selection process, we haven't had any communication and we're eager to participate in other activities. Are these follow-up evaluation activities being created by the EU Commission for this purpose?"

These findings underscore the need for clearer role definitions and more tailored support to bridge the gap between NEB's strategic goals and the practical needs of grassroots projects.

5.3 Discussion

The cases investigated in this research paper, illustrate the difficulties NEB projects encounter when translating abstract values into practical actions, highlighting the importance of adaptability and the need for ongoing negotiation and adjustment in collective action settings (Gehman, J. et al., 2022). Sacromonte founders faced a conflict between environmental conservation and accessibility, which suggests that managing common resources involves addressing trade-offs and balancing different uses. Noi Ortadini experienced internal conflicts within the community, reflecting that collective action can be hampered by divergent perceptions and expectations (Ferraro et al., 2015; Ostrom, 1990). Similarly, Esseri Urbani struggled to balance sustainability with aesthetic goals echoing the challenge of aligning diverse stakeholder interests in the management of shared resources.

The findings highlight the difficulty projects face when trying to integrate the three core NEB values—sustainability, aesthetics, and inclusion. This struggle (5.1 paragraph) reflects a broader challenge often discussed in collective action settings (Poteete et al., 2010), where individuals or groups must balance multiple, sometimes conflicting, objectives within shared resources or community settings. For instance, Ostrom's work emphasizes the complexity of managing common-pool resources (Cole and McGinnis, 2017) and the need for mechanisms that help reconcile diverse interests and values among stakeholders. Related to the misalignment in role expectations (paragraph 5.2 Misalignments in Role Expectations: NEB vs. Project Expectations) - our research shows a tension between the NEB's role in providing support and the expectations of the projects for more direct involvement and guidance. This builds on Ostrom's observations (Ostrom, 2000) about the need for clear role definitions and agreements among stakeholders in collective action scenarios. Moreover, the NEB's strategy to support projects through the ambiguous definition of invitational values triggered projects' expectations for more systematic guidance, including the establishment of clear boundaries, agreed-upon roles, and mechanisms for conflict resolution. These insights suggest that successful collective action depends on the presence of effective and supportive institutions that can provide both guidance and flexibility, addressing the disconnect between the NEB's support and the projects' needs. In conclusion, our research identifies a need for adaptive mechanisms to better support grassroots initiatives.

6. Conclusions

This research explores how grassroots innovation initiatives address the challenges of translating broad and inviting values - such as sustainability, aesthetics, and inclusion - into practical and actionable knowledge, focusing on the NEB initiative and its award-winning projects. Our research, grounded in qualitative methods such as self-assessment surveys and interviews, reveals that while these projects are deeply committed to NEB values, they often grapple with practical constraints that necessitate trade-offs. These

findings underscore the challenges inherent in balancing competing ideals when facing limited resources and divergent stakeholder priorities. The implications of this research offer strategic guidance for practitioners, policymakers, and scholars, highlighting the need for adaptive frameworks, enhanced support structures, and comprehensive monitoring systems. However, limitations such as sampling bias and the subjectivity of qualitative analysis suggest that future research should expand participant diversity and incorporate longitudinal and mixed-method approaches. By addressing these gaps and exploring new research directions we can further enhance our understanding of how grassroots projects can effectively lead and integrate NEB values.

6.1 Implications

Understanding the practical impact of our findings is critical to effectively addressing industry challenges and opportunities. This section explores the key implications (See Table V) of our research for managers and practitioners in the field, offering insights and strategic recommendations. By translating theoretical insights into practical guidance, we aim to help those in leadership and operational roles leverage our findings to improve their practices and achieve positive results in their projects. These implications are intended to bridge the gap between research and practice, ensuring that the insights gained contribute to more informed and effective decision-making.

Practitioners	Policy Makers	Scholars
Drive value integration	Establishing decentralized hubs	Research on value integration and trade-offs
Enhanced support structures	Balancing aspirational values and practical goals	Investigating institutional support dynamic
Implementing monitoring metrics	Developing a comprehensive monitoring system	Integration of invitational ambiguity into collective action frameworks

Table V - Implications (Author's own elaboration)

Implications for Practitioners

Drive value integration: Practitioners should be prepared to address the complex trade-offs between different values such as sustainability, aesthetics, and inclusion. The research's findings underscore that while aligning with NEB values was crucial for the projects, practical constraints often require prioritizing certain values over others. Managers should develop strategies that enable projects to balance these values more effectively without losing their own project identity. This could involve creating adaptive frameworks that offer practical guidance for reconciling conflicting values and creating

tools to assess the impact of these values across different contexts. For instance, as seen with Sacromonte's struggle between environmental preservation and accessibility, practitioners should be equipped with strategies to make informed decisions about which values to prioritize in specific scenarios.

Enhanced support structures: The research's findings suggest that projects expect not only initial funding but also ongoing support throughout the project lifecycle. Managers and practitioners should support and seek additional resources beyond initial funding. This could include the creation or involvement of bridging organizations that provide closer and more personalized support to projects, facilitating better alignment with NEB values. For example, creating networks of mentors or technical advisors could help projects overcome the complexity of integrating NEB values into concrete steps.

Implementing monitoring metrics: To address the challenge of tracking progress and performance, practitioners should focus on developing and implementing clear metrics that assess the degree to which a project is aligned with NEB values. Metrics should be designed to capture both the intended and unintended impacts of integrating these values. Practitioners should work with stakeholders to define these metrics and ensure that they reflect the various dimensions of sustainability, aesthetics, inclusiveness, and experimentation of project outcomes and impact. This will help projects continually evaluate and adapt their strategies to better achieve their goals.

Implications for Policymakers

The insights from this study offer significant implications for policymakers, who played a crucial role in shaping the environment in which NEB projects operate. This section outlines how research findings can inform policy development and implementation, providing a basis for creating strategies that address the challenges identified. By understanding the implications of our research, policymakers can better align regulations and incentives with the needs of grassroots initiatives, ensuring that policies promote innovation, inclusiveness, and sustainability. The goal is to guide policy decisions in ways that create enabling environments and improve the effectiveness of initiatives at various levels.

Establishing Decentralized hubs: Policymakers should consider establishing decentralized hubs to provide localized support for NEB projects. These hubs would serve as points of contact and offer tailored guidance and resources to projects based on their specific needs and contexts. This approach addresses the gap identified in the study regarding the need for more hands-on support and helps bridge the divide between institutional expectations and practical project requirements. Decentralized hubs could also facilitate better communication and feedback loops between NEB and grassroots projects.

Balancing aspirational values and practical goals: Policymakers should recognize the paradoxical nature of values like sustainability, aesthetics, and inclusion, and design policies that accommodate the complexities of balancing these values. Policies should be flexible enough to allow projects to navigate trade-offs and adapt their approaches as needed. This might involve creating guidelines that offer a range of acceptable practices rather than rigid standards, allowing projects to make context-specific decisions while still aligning with overarching NEB goals.

Developing comprehensive monitoring systems: To effectively track the impact of NEB projects, policymakers should develop comprehensive monitoring systems that evaluate

both short-term and long-term societal impacts. These systems should include metrics that capture the multifaceted nature of NEB values and provide insights into how well projects are meeting their goals. Policymakers should work with researchers and practitioners to develop these metrics and ensure they are integrated into funding and support structures.

Implications for Scholars

The results of this study offer valuable insights for scholars engaged in management and innovation research. By exploring the intersections of value dynamics and knowledge mobilization within grassroots initiatives, this research contributes to a deeper understanding of how these elements influence project success and stakeholder engagement. This section highlights how our research findings can advance theoretical frameworks and empirical investigations in these domains. The goal is to encourage further scholarly inquiry into the nuanced roles of collaborative practices and value integration in promoting innovative outcomes and sustainable practices in various organizational and social contexts.

Research on value integration and trade-offs: Scholars should further explore the complexities of integrating aspirational values within grassroots innovation projects (Ameels et al., 2002; Beauregard, 2015; Breuer and Lüdeke-Freund, 2017; Contu and Girei, 2013; Kenzer, 2006; Martin and Upham, 2015). Research should focus on developing theoretical frameworks that address the practical challenges of reconciling values such as sustainability, aesthetics, and inclusion. This includes studying case examples to identify best practices and strategies for managing conflicting values. The findings from this study, such as the challenges faced by Sacromonte and Noi Ortadini, provide valuable insights for developing more nuanced theoretical models.

Investigating institutional support dynamics: The study highlights a gap in understanding how institutional support impacts grassroots projects (Lewis et al., 2020; Ostrom, 1990; Sassen, 2018; Sewell, 1992). Scholars should investigate the dynamics of institutional support with projects' expectations and needs. Research could focus on how different types of support (e.g., financial, technical, advisory) influence project outcomes and identify ways to improve alignment between institutional support and project needs. This could involve examining successful support models and proposing new approaches for enhancing institutional support.

Integration of invitational ambiguity into collective action frameworks: Most of the projects examined in this study were organized around the management of common resources, making them examples of commons (Ostrom, 1990). Our research highlighted how the use of ambiguously defined value systems can help mobilize resources and knowledge, even in grassroots innovation contexts where resources are limited. However, this approach also led to friction and organizational challenges in the medium to long term, as divergences emerged during the implementation of the knowledge generated.

6.2 Research limitations

This study has made a substantial contribution by analyzing empirically how grassroots designs align with the NEB values of sustainability, aesthetics, and inclusiveness. However, several limitations must be considered to fully understand the scope and implications of our findings. A notable limitation is the representativeness of our sample.

Although we surveyed a diverse range of projects, the selection of participants in the semistructured interviews may not represent the full spectrum of grassroots initiatives. This potential sampling bias could affect the generalizability of our results. To address this limitation, future research should seek to include a larger and more representative sample of projects and stakeholders. While engaging key stakeholders, our research would benefit from broadening the range of perspectives included. In future studies, incorporating feedback from a broader range of voices, such as local community members, end users, and external evaluators, could provide a more holistic view of how NEB values are implemented and perceived. Engaging a diverse set of stakeholders could bring out additional insights into the effectiveness and challenges of grassroots projects in integrating sustainability, aesthetics, and inclusiveness. In terms of methodological limitations, although we endeavoured to mitigate confirmation bias by triangulating data from interviews, secondary sources, and document analysis (Yin, 2009), the inherent subjectivity of qualitative research remains an issue. Our research team has engaged in multiple discussions and iterations to reconcile different interpretations, but qualitative data are still susceptible to researcher biases. Future studies could improve the robustness of results by incorporating mixed-method approaches. The combination of qualitative insights and quantitative data could provide a more comprehensive understanding of the challenges and successes associated with integrating NEB values into grassroots projects. Another major limitation concerns the scope of data collection. Our study relied primarily on interviews and document analysis, which, while useful, offer a rather limited perspective on the real-time dynamics of project implementation. To better understand how projects adapt and respond to challenges, future research should include participant observations. For example, observation of project steering committee meetings or workshops could provide a richer and more nuanced view of the day-to-day processes and decision-making practices within these projects.

6.3 Future research

Building on the insights of this study, several avenues for future research emerge, each offering the potential to deepen our understanding of grassroots innovation and collective resource management. One promising research direction is to conduct comparative studies on the use of invitational ambiguity across different contexts and sectors. Invitational ambiguity, which allows for flexible interpretation and construction of meanings (Sillince J. and Jarzabkowski P., 2011), has shown both potential benefits and challenges in grassroots innovation settings. Future research should investigate how this concept plays out in various environments—from community-driven projects to corporate sustainability initiatives—and assess its impact on collective action. By examining different case studies, researchers can determine whether invitational ambiguity facilitates more innovative and inclusive solutions or if it leads to confusion and misalignment. This comparative approach will help clarify the conditions under which invitational ambiguity enhances or hinders the effectiveness of collective resource management and provide guidance for its optimal application. Another critical area for future inquiry is the development of adaptive governance models that integrate collective action principles with the contemporary challenges faced by grassroots initiatives. As the complexities of modern resource management evolve, there is a need for governance frameworks that are both flexible and robust (Ferraro et al., 2015). Future

research could focus on designing and testing governance models that address the dynamic and often unpredictable nature of grassroots projects. These models could incorporate Ostrom's principles, such as clear boundaries and collective decision-making (Ostrom, 2000, 1990), while also adapting to new challenges such as digital transformation and global interconnectedness. By developing adaptive frameworks, researchers can offer practical solutions that enhance the resilience and effectiveness of grassroots governance. Lastly, future research should explore mechanisms for resolving value conflicts within grassroots projects. The tension between competing values—such as sustainability, aesthetics, and inclusion—can significantly impact project outcomes and stakeholder satisfaction. Research could focus on creating and testing tools or strategies designed to manage and reconcile these conflicting objectives. This might involve developing frameworks for prioritizing values, facilitating stakeholder negotiations, or implementing adaptive management practices that can adjust to changing circumstances. By providing practical mechanisms for addressing value conflicts, researchers can support grassroots initiatives in achieving their goals while maintaining a balanced approach to multiple, often competing, priorities.

By addressing these limitations and pursuing the future research avenues outlined, scholars can build on our findings to gain a deeper and more comprehensive understanding of the complexities (and potentialities) involved in grassroots projects.

References

Ameels, A., Bruggeman, W., Scheipers, G., 2002. Value-based management control processes to create value through integration: a literature review. 18.

Beauregard, R.A., 2015. Planning Matter: Acting with Things. University of Chicago Press.

Bertello, A., Battisti, E., De Bernardi, P., Bresciani, S., 2022a. An integrative framework of knowledge-intensive and sustainable entrepreneurship in entrepreneurial ecosystems. J. Bus. Res. 142, 683–693. https://doi.org/10.1016/j.jbusres.2021.12.054

Bertello, A., Bogers, M.L.A.M., De Bernardi, P., 2022b. Open innovation in the face of the COVID-19 grand challenge: insights from the Pan-European hackathon 'EUvsVirus.' RD Manag. 52, 178–192. https://doi.org/10.1111/radm.12456

Boje, D.M., 2014. Storytelling Organizational Practices: Managing in the quantum age. Routledge, London. https://doi.org/10.4324/9780203597767

Breuer, H., Lüdeke-Freund, F., 2017. Values-Based Innovation Management: Innovating by What We Care About. Bloomsbury Publishing.

Cartwright, N., Hardie, J., 2012. Evidence-Based Policy: A Practical Guide to Doing It Better. Oxford University Press.

Christensen, C.M., Bower, J.L., 1996. Customer Power, Strategic Investment, and the Failure of Leading Firms. Strateg. Manag. J. 17, 197–218. https://doi.org/10.1002/(SICI)1097-0266(199603)17:3<197::AID-SMJ804>3.0.CO;2-U

Christensen, C.M., McDonald, R., Altman, E.J., Palmer, J.E., 2018. Disruptive Innovation: An Intellectual History and Directions for Future Research. J. Manag. Stud. 55, 1043–1078. https://doi.org/10.1111/joms.12349

Cole, D.H., McGinnis, M.D., 2017. Elinor Ostrom and the Bloomington School of Political Economy: A Framework for Policy Analysis. Lexington Books.

Contu, A., Girei, E., 2013. NGOs management and the value of 'partnerships' for equality in international development: What's in a name? - Human Relations. Hum. Relat. 67. https://doi.org/10.1177/00187267134899

Cowen, N., Cartwright, N., 2022. Disagreement about Evidence-Based Policy.

Del Giudice, M., Carayannis, E.G., Maggioni, V., 2017. Global knowledge intensive enterprises and international technology transfer: emerging perspectives from a quadruple helix environment. J. Technol. Transf. 42, 229–235. https://doi.org/10.1007/s10961-016-9496-1

Dennis A. Gioia, Kevin G. Corley, Aimee L. Hamilton, 2012. Seeking Qualitative Rigor in Inductive Research: Notes on the Gioia Methodology - Dennis A. Gioia, Kevin G. Corley, Aimee L. Hamilton, 2013 16. https://doi.org/10.1177/1094428112452151

Dentoni, D., Bitzer, V., Schouten, G., 2018. Harnessing Wicked Problems in Multi-stakeholder Partnerships. J. Bus. Ethics 150, 333–356. https://doi.org/10.1007/s10551-018-3858-6

Eisenhardt, K.M., 1989. Building Theories from Case Study Research | Academy of Management Review. Acad. Manage. Rev. 14. https://doi.org/10.5465/amr.1989.4308385

EU Commission, 2023. NEB Progress Report.

EU Commission, 2021. EU NEB Position Paper.

EU NEB Compass, 2023. NEB Compass - European Union [WWW Document]. Compass Framew. URL https://new-european-bauhaus.europa.eu/get-involved/use-compass_en (accessed 3.28.24).

EU NEB Website, 2024. New European Bauhaus: beautiful, sustainable, together. - European Union [WWW Document]. URL https://new-european-bauhaus.europa.eu/index_en (accessed 3.28.24).

Fait, M., Magni, D., Perano, M., Farina Briamonte, M., Sasso, P., 2022. Grassroot processes of knowledge sharing to build social innovation capabilities. J. Knowl. Manag. 27, 1390–1408. https://doi.org/10.1108/JKM-04-2022-0338

Ferraro, F., Etzion, D., Gehman, J., 2015. Tackling Grand Challenges Pragmatically: Robust Action Revisited. Organ. Stud. 36, 363–390. https://doi.org/10.1177/0170840614563742

Foray, D., Mowery, D.C., Nelson, R.R., 2012. Public R&D and social challenges: What lessons from mission R&D programs? Res. Policy, The need for a new generation of policy instruments to respond to the Grand Challenges 41, 1697–1702. https://doi.org/10.1016/j.respol.2012.07.011

Foster, C., Heeks, R., 2013. Conceptualising Inclusive Innovation: Modifying Systems of Innovation Frameworks to Understand Diffusion of New Technology to Low-Income Consumers. Eur. J. Dev. Res. 25, 333–355. https://doi.org/10.1057/ejdr.2013.7

Geels, F.W., 2019. Socio-technical transitions to sustainability: a review of criticisms and elaborations of the Multi-Level Perspective. Curr. Opin. Environ. Sustain., Open Issue 2019 39, 187–201. https://doi.org/10.1016/j.cosust.2019.06.009

Geels, F.W., 2002. Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. Res. Policy, NELSON + WINTER + 20 31, 1257–1274. https://doi.org/10.1016/S0048-7333(02)00062-8

Gehman, J., Etzion, D., Ferraro, F., 2022. Robust action: Advancing a distinctive approach to grand challenges. Emerald Publishing Limited.

Gupta, A.K., 2012. Innovations for the poor by the poor. Int. J. Technol. Learn. Innov. Dev. 5, 28–39. https://doi.org/10.1504/IJTLID.2012.044875

Heeks, R., Amalia, M., Kintu, R., Shah, N., 2013. Inclusive Innovation: Definition, Conceptualisation and Future Research Priorities. https://doi.org/10.2139/ssrn.3438439

Henderson, T., Boje, D.M., 2015. Organizational Development and Change Theory: Managing Fractal Organizing Processes. Routledge, New York. https://doi.org/10.4324/9781315755090

Hill, L.A., Lineback, K., 2011. Being the Boss: The 3 Imperatives for Becoming a Great Leader. Harvard Business Press.

Hossain, M., 2018. Frugal innovation: A review and research agenda. J. Clean. Prod. 182, 926–936. https://doi.org/10.1016/j.jclepro.2018.02.091

Hossain, M., 2016. Grassroots innovation: A systematic review of two decades of research. J. Clean. Prod. 137, 973–981. https://doi.org/10.1016/j.jclepro.2016.07.140

Joyce, K.E., Cartwright, N., 2022. How Should Evidence Inform Education Policy?, in: Handbook of Philosophy of Education. Routledge.

Kenzer, M.S., 2006. Review of Spaces of Global Capitalism: Towards a Theory of Uneven Geographical Development. symplokē 14, 363–365.

Larsen, J., Boje, D.M., Bruun, L., 2020. True Storytelling: Seven Principles For An Ethical and Sustainable Change-Management Strategy. Routledge, London. https://doi.org/10.4324/9780367425739

Lewis, D., Kanji, N., Themudo, N.S., 2020. Non-Governmental Organizations and Development, 2nd ed. Routledge, London. https://doi.org/10.4324/9780429434518

Maine, E., Soh, P.-H., Dos Santos, N., 2015. The role of entrepreneurial decision-making in opportunity creation and recognition. Technovation, Opportunity Recognition and Creation 39–40, 53–72. https://doi.org/10.1016/j.technovation.2014.02.007

Martin, C.J., Upham, C.J., 2015. Grassroots social innovation and the mobilisation of values in collaborative consumption: a conceptual model - Journal of Cleaner Production. J. Clean. Prod. Volume 134, Page A.

Mazzucato, M., 2018. Mission-oriented innovation policies: challenges and opportunities. Ind. Corp. Change 27, 803–815. https://doi.org/10.1093/icc/dty034

Middlemiss, L., Parrish, B.D., 2010. Building capacity for low-carbon communities: The role of grassroots initiatives. Energy Policy, Special Section: Carbon Reduction at Community Scale 38, 7559–7566. https://doi.org/10.1016/j.enpol.2009.07.003

Njøs, R., Fosse, J.K., 2019. Linking the bottom-up and top-down evolution of regional innovation systems to policy: organizations, support structures and learning processes. Ind. Innov. 26, 419–438. https://doi.org/10.1080/13662716.2018.1438248

Ostrom, E., 2000. Collective Action and the Evolution of Social Norms. J. Econ. Perspect. 14, 137–158. https://doi.org/10.1257/jep.14.3.137

Ostrom, E., 1990. Governing the Commons: The Evolution of Institutions for Collective Action. Camb. Camb. Univ. Press, Cambridge: Cambridge University Press.

Papaioannou, A., Dimitropoulos, P., Koronios, K., Marinakos, K., 2024. Perceived financial performance in sport services firms: the role of HRM practices and innovation. Evid.-Based HRM Glob. Forum Empir. Scholarsh. 12, 1–22. https://doi.org/10.1108/EBHRM-10-2022-0250

Poteete, A., Janssen, M.A., Ostrom, E., 2010. Working Together: Collective Action, the Commons, and Multiple Methods in Practice. Princeton University Press. https://doi.org/10.1515/9781400835157

Rowley, J., 2012. Conducting research interviews. Manag. Res. Rev. 35, 260–271. https://doi.org/10.1108/01409171211210154

Roysen, R., Bruehwiler, N., Kos, L., Boyer, R., Koehrsen, J., 2024. Rethinking the diffusion of grassroots innovations: An embedding framework. Technol. Forecast. Soc. Change 200, 123156. https://doi.org/10.1016/j.techfore.2023.123156

Sassen, S., 2018. Cities in a World Economy. SAGE Publications.

Sewell, William H., 1992. A Theory of Structure: Duality, Agency, and Transformation. Am. J. Sociol. 98, 1–29. https://doi.org/10.1086/229967

Seyfang, G., Haxeltine, A., 2012. Growing Grassroots Innovations: Exploring the Role of Community-Based Initiatives in Governing Sustainable Energy Transitions. Environ. Plan. C Gov. Policy 30, 381–400. https://doi.org/10.1068/c10222

Seyfang, G., Smith, A., 2007. Grassroots innovations for sustainable development: Towards a new research and policy agenda. Environ. Polit. 16, 584–603. https://doi.org/10.1080/09644010701419121

Sillince J., Jarzabkowski P., S.D., 2011. Shaping Strategic Action Through the Rhetorical Construction and Exploitation of Ambiguity (2011). https://doi.org/10.1287/orsc.1110.0670

Smith, A., Fressoli, M., Thomas, H., 2014. Grassroots innovation movements: challenges and contributions. J. Clean. Prod., Special Volume: Sustainable Production, Consumption and

Livelihoods: Global and Regional Research Perspectives 63, 114–124. https://doi.org/10.1016/j.jclepro.2012.12.025

Smith, A., Raven, R., 2012. What is protective space? Reconsidering niches in transitions to sustainability. Res. Policy, Special Section on Sustainability Transitions 41, 1025–1036. https://doi.org/10.1016/j.respol.2011.12.012

Thomas J. Fewer Gerard George, Lazzarini, S., n.d. Partnering for Grand Challenges: A Review of Organizational Design Considerations in Public–Private Collaborations, 2024 [WWW Document]. URL https://journals.sagepub.com/doi/full/10.1177/01492063221148992 (accessed 3.28.24).

Yin, R.K., 2009. Case Study Research: Design and Methods. SAGE.

Appendix 4 - Conference Proceedings

Beyond the three peer-reviewed journal articles that constitute the foundation of this cumulative doctoral dissertation, several additional research outputs were developed and presented at international academic conferences. While these conference papers are not formally included within the core structure of the thesis, they represent a significant component of the research trajectory. Produced in parallel with the main studies, they offer applied and exploratory perspectives that enrich the theoretical, conceptual, and methodological contributions of the published articles.

These proceedings played a pivotal role in the early dissemination of findings, the validation of research directions, and the engagement with academic debates in the fields of sustainability transitions, participatory governance, and innovation studies. Crucially, they also functioned as experimental spaces for testing and refining the conceptual frameworks proposed in this thesis—particularly in relation to real-world initiatives such as the New European Bauhaus (NEB). As such, they contribute empirical substantiation and enhance the practical relevance of the dissertation's core arguments.

This section presents three selected conference contributions, each of which engages with the thesis from a distinct but interconnected angle. Each paper is analysed with reference to its alignment with the overarching research questions, its empirical or conceptual extension of the core articles, and its role in supporting or challenging key theoretical insights. Collectively, these contributions demonstrate how the propositions developed in this dissertation resonate with—and are applicable to—contemporary policy agendas and grassroots innovation practices.

Each sub-section provides a concise synthesis of the respective conference paper, followed by an explanation of how it contributes to or expands upon the central research pillars of this doctoral work: (1) boundary objects and collaboration in people-centred cities (Paper 1 – *How do boundary objects influence people-centred cities? A systematic literature review*), (2) governance pathways and entrepreneurial ecosystems (Paper 2 – *Governance Pathways for Digital Entrepreneurial Ecosystems: A Nested-Cyclical Framework*), and (3) value tensions in grassroots innovation (Paper 3 – *Value tensions and actionable knowledge in grassroots innovation: a study of invitational ambiguity and implementation challenges*).

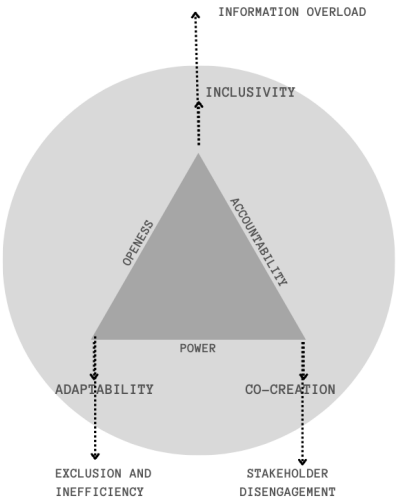
Appendix 4.1 - Conference (I) - R&D Management 2025

Conference Paper I Esposito, G., Mora, L., Amitrano, C., & Bresciani, S. (2025) Enabling Co-Creation, Inclusivity, and Adaptability through Open Social Innovation In R&D Management Conference: Open Social Innovation for a Next Generation of Public Governance

The conference paper titled "Enabling Co-Creation, Inclusivity, and Adaptability through Open Social Innovation" contributes significantly to the broader thesis by deepening our understanding of how digital tools and participatory platforms mediate collaborative

governance processes within the *EU Mission for Climate-Neutral Cities*. Focusing on the dimensions of openness, accountability, and power, the study identifies both the enabling conditions and systemic risks of distributed data governance in *Open Social Innovation (OSI) ecosystems*. Through qualitative interviews with city-level experts and grounded in Collaborative Governance theory, the paper reveals that digital infrastructures—while essential for transparency and participation—can exacerbate asymmetries in power and access if not mediated through inclusive, ethical frameworks. Public institutions emerge as pivotal orchestrators, responsible for embedding openness into decision-making, safeguarding accountability, and ensuring power is equitably distributed.

The paper introduces the **Governance Triangle of OSI** as a conceptual tool that links governance mechanisms (openness, accountability, power) to desired system-level outcomes: co-creation, inclusivity, and adaptability. This framework serves as both a diagnostic and strategic guide for designing participatory, resilient, and ethically grounded governance systems in digitally mediated urban environments.



By operationalising key governance levers and highlighting their relational dynamics, the paper offers actionable insights for policymakers and urban innovation practitioners, while also contributing to theoretical advancement in digitally enabled collaborative governance. It serves as a practical and conceptual bridge across the themes explored in the three core thesis papers.

Connection to Paper 1 – *Boundary Objects in People-Centred Cities*

The R&D Management 2025 paper operationalises several of the key concepts explored in Paper 1, particularly the role of collaborative artefacts—such as digital platforms, participatory protocols, and data-sharing tools—as boundary objects (BOs). These artefacts mediate cross-sector engagement, enabling translation and coordination across heterogeneous actors in climate-neutral governance ecosystems. Much like the boundary objects reviewed in Paper 1, the tools discussed in this study help bridge epistemic, institutional, and sectoral divides.

Furthermore, the conceptualisation of the "Governance Triangle of OSI" (openness, accountability, and power) builds on the notion that BOs must be both technically functional and normatively adaptable. This resonates with Paper 1's emphasis on the design tensions and performative role of BOs in shaping smart urban innovation. The empirical focus on digital infrastructures in the OSI ecosystem offers new examples of how BOs are applied in practice and how they influence people-centred governance.

Connection to Paper 2 – *Governance Pathways for Digital Entrepreneurial Ecosystems*

This conference paper strongly aligns with and extends the NeCyM framework presented in Paper 2. Both works theorise governance as a nested and cyclical system, characterised by dynamic feedback loops, distributed agency, and co-evolutionary processes. The R&D paper empirically explores how these dynamics play out in the EU Mission for Climate-Neutral Cities through multi-stakeholder orchestration, adaptive governance mechanisms, and layered policy-infrastructure configurations. The concept of *"public institutions as orchestrators"* aligns directly with the NeCyM framework's focus on enabling actors and institutional adaptation. Additionally, the emphasis on system-level outcomes (*co-creation, inclusivity, adaptability*) reinforces Paper 2's normative orientation toward sustainability and digital transition. The triangulation of openness, accountability, and power as mediators of ecosystem dynamics parallels NeCyM's dimensions of governance, innovation, and entrepreneurship. The R&D paper can thus be seen as a theoretical testing ground for NeCyM in a real-world policy setting, affirming the model's relevance in digitally mediated, mission-driven urban ecosystems.

Connection to Paper 3 – *Value Tensions and Actionable Knowledge in Grassroots Innovation*

From the perspective of Paper 3, the R&D Management 2025 paper explores how normative and structural tensions play out in grassroots and institutional settings. While Paper 3 focuses on the translation of aspirational values (sustainability, inclusion, aesthetics) and the challenges posed by invitational ambiguity, this paper tackles *normative tensions within digitally enabled, multi-stakeholder OSI processe*s. The governance dimensions of openness, accountability, and power map well onto the types of ambiguity and role misalignments discussed in Paper 3. In both cases, there is a central concern for how actors navigate asymmetries, build shared legitimacy, and interpret loosely defined policy visions. Additionally, both papers address the risks of exclusion, overload, and strategic ambiguity in governance. The R&D paper thus reinforces and extends Paper 3's theoretical contribution by examining value operationalisation in technologically mediated environments and proposing a more structured model *(the Governance Triangle)* for analysing *how normative aspirations translate into collaborative outcomes.*

Appendix 4.1 - Conference Paper II – Reference

Aidi, Ahmadi, Ilya Avianti, Poppy Sofia Koeswayo, Sugiono Poulus, and Siti Mariam. 2024. 'The Effect of an Inclusive Approach to Collaborative Governance and Its Impact on Digitizing the Quality of Public Services'. Cogent Business & Management 11 (1): 2392324. https://doi.org/10.1080/23311975.2024.2392324.

Ansell, Chris, and Alison Gash. 2008. 'Collaborative Governance in Theory and Practice'. Journal of Public Administration Research and Theory 18 (4): 543–71. https://doi.org/10.1093/jopart/mum032.

Antoncic, M. 2020. 'A Paradigm Shift in the Board Room: Incorporating Sustainability into Corporate Governance and Strategic Decision-Making Using Big Data and Artificial Intelligence'. Journal of Risk Management in Financial Institutions 13 (4): 290–94.

Bagheri, Samaneh, and Vanessa Dirksen. 2024. 'Public Value-Driven Assessment of Trustworthy AI in the Public Sector: A Review'. In Disruptive Innovation in a Digitally Connected

Healthy World, edited by Rogier van de Wetering, Remko Helms, Ben Roelens, Samaneh Bagheri, Yogesh K. Dwivedi, Ilias O. Pappas, and Matti Mäntymäki, 3–13. Cham: Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-72234-9_1.

Bertot, John C., Paul T. Jaeger, and Justin M. Grimes. 2010. 'Using ICTs to Create a Culture of Transparency: E-Government and Social Media as Openness and Anti-Corruption Tools for Societies'. Government Information Quarterly 27 (3): 264–71. https://doi.org/10.1016/j.giq.2010.03.001.

Bianchi, Carmine, and Greta Nasi. 2021. 'Implementing Collaborative Governance: Models, Experiences, and Challenges', November.

Birchall, S. Jeff, and Sarah Kehler. 2023. 'Denial and Discretion as a Governance Process: How Actor Perceptions of Risk and Responsibility Hinder Adaptation to Climate Change'. Environmental Science & Policy 147 (September):1–10. https://doi.org/10.1016/j.envsci.2023.05.017.

Bowman, M., and S. Minas. 2019. 'Resilience through Interlinkage: The Green Climate Fund and Climate Finance Governance'. Climate Policy 19 (3): 342–53. https://doi.org/10.1080/14693062.2018.1513358.

Camilleri, Mark Anthony, Ciro Troise, Serena Strazzullo, and Stefano Bresciani. 2023. 'Creating Shared Value through Open Innovation Approaches: Opportunities and Challenges for Corporate Sustainability', Business Strategy and the Environment, . https://doi.org/10.1002/bse.3377.

Climate KIC, Holding BV. 2023. 'Net Zero Cities'. https://netzerocities.eu.

Colovic, Ana, Annalisa Caloffi, Federica Rossi, and Margherita Russo. 2025. 'Institutionalising the Digital Transition: The Role of Digital Innovation Intermediaries'. Research Policy 54 (1): 105146. https://doi.org/10.1016/j.respol.2024.105146.

Craft, Jonathan, Michael Howlett, Mark Crawford, and Kathleen McNutt. 2013. 'Assessing Policy Capacity for Climate Change Adaptation: Governance Arrangements, Resource Deployments, and Analytical Skills in Canadian Infrastructure Policy Making'. Review of Policy Research 30 (1): 42–65. https://doi.org/10.1111/ropr.12002.

Creswell, John W. 2009. Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. 3. ed., [Nachdr.]. Los Angeles: SAGE Publ.

Davidson, E., L. Wessel, J.S. Winter, and S. Winter. 2023. 'Future Directions for Scholarship on Data Governance, Digital Innovation, and Grand Challenges'. Information and Organization 33 (1). https://doi.org/10.1016/j.infoandorg.2023.100454.

Dessy, E., J. Mair, and V. Xhauflair. 2024. 'Organizational Diversity of Social-Mission Platforms: Advancing a Configurational Research Agenda'. Information and Organization 34 (3). https://doi.org/10.1016/j.infoandorg.2024.100514.

Dolmans, Sharon A. M., Wouter P. L. Van Galen, Bob Walrave, Elke Den Ouden, Rianne Valkenburg, and A. Georges L. Romme. 2023. 'A Dynamic Perspective on Collaborative Innovation for Smart City Development: The Role of Uncertainty, Governance, and Institutional Logics'. Organization Studies 44 (10): 1577–1601. https://doi.org/10.1177/01708406231169422.

Emerson, Kirk, and Tina Nabatchi. 2015. 'Evaluating the Productivity of Collaborative Governance Regimes: A Performance Matrix', October.

Emerson, Kirk, Tina Nabatchi, and Stephen Balogh. 2012. 'An Integrative Framework for Collaborative Governance'. Journal of Public Administration Research and Theory 22 (1): 1–29. https://doi.org/10.1093/jopart/mur011.

Esposito, Gabriella, Alberto Bertello, Luca Mora, and David Tucek. 2025. 'How Do Boundary Objects Influence People-Centered Smart Cities? A Systematic Literature Review'. Review of Managerial Science, January. https://doi.org/10.1007/s11846-025-00835-8.

European Commission. 2023. 'A European Green Deal Striving to Be the First Climate-Neutral Continent'. Commission Europa. 2023. https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en European Union. 2019. 'The European Green Deal – Delivering the EU's 2030 Climate Targets'.

https://commission.europa.eu/publications/delivering-european-green-deal_en.

Foster, Christopher, and Richard Heeks. 2013. 'Conceptualising Inclusive Innovation: Modifying Systems of Innovation Frameworks to Understand Diffusion of New Technology to Low-Income Consumers'. The European Journal of Development Research 25 (3): 333–55. https://doi.org/10.1057/ejdr.2013.7.

Geels, Frank W. 2002. 'Technological Transitions as Evolutionary Reconfiguration Processes: A Multi-Level Perspective and a Case-Study'. Research Policy, NELSON + WINTER + 20, 31 (8): 1257–74. https://doi.org/10.1016/S0048-7333(02)00062-8.

Gegenhuber, Thomas, and Johanna Mair. 2023. 'Open Social Innovation: Taking Stock and Moving Forward', November, 130–57.

Gegenhuber, Thomas, Johanna Mair, René Lührsen, and Laura Thäter. 2023a. 'Orchestrating Distributed Data Governance in Open Social Innovation'. Information and Organization 33 (1): 100453

Getha-Taylor, Heather, Misty J. Grayer, Robin J. Kempf, and Rosemary O'Leary. 2019. 'Collaborating in the Absence of Trust? What Collaborative Governance Theory and Practice Can Learn From the Literatures of Conflict Resolution, Psychology, and Law'. The American Review of Public Administration 49 (1): 51–64. https://doi.org/10.1177/0275074018773089.

Gioia, Dennis A, Kevin G. Corley, and Aimee L. Hamilton. 2013. 'Seeking Qualitative Rigor in Inductive Research: Notes on the Gioia Methodology' 16 (1). https://doi.org/10.1177/1094428112452151.

Gregory, Robert Wayne, Ola Henfridsson, Evgeny Kaganer, and Harris Kyriakou. 2021. 'The Role of Artificial Intelligence and Data Network Effects for Creating User Value'. Academy of Management Review 46 (3): 534–51. https://doi.org/10.5465/amr.2019.0178.

Haesevoets, Tessa, Arne Roets, Kristof Steyvers, Bram Verschuere, and Bram Wauters. 2024. 'Towards a Multifaceted Measure of Perceived Legitimacy of Participatory Governance'. Governance 37 (3): 711–28. https://doi.org/10.1111/gove.12800.

Heeks, Richard, Mirta Amalia, Robert Kintu, and Nishant Shah. 2013. 'Inclusive Innovation: Definition, Conceptualisation and Future Research Priorities'. SSRN Scholarly Paper. Rochester, NY. https://doi.org/10.2139/ssrn.3438439.

Kuziemski, Maciej, and Gianluca Misuraca. 2020. 'AI Governance in the Public Sector: Three Tales from the Frontiers of Automated Decision-Making in Democratic Settings'. Telecommunications Policy, Artificial intelligence, economy and society, 44 (6): 101976. https://doi.org/10.1016/j.telpol.2020.101976.

Lee, Taedong, and Chris Koski. 2015. 'Multilevel Governance and Urban Climate Change Mitigation'. Environment and Planning C: Government and Policy 33 (6): 1501–17. https://doi.org/10.1177/0263774X15614700.

Linde, Lina, David Sjödin, Vinit Parida, and Joakim Wincent. 2021. 'Dynamic Capabilities for Ecosystem Orchestration A Capability-Based Framework for Smart City Innovation Initiatives'. Technological Forecasting and Social Change 166:120614.

Liu, Yixin. 2024. 'Public Trust and Collaborative Governance: An Instrumental Variable Approach'. Public Management Review 26 (2): 421–42. https://doi.org/10.1080/14719037.2022.2095003.

Moon, M. Jae. 2020. 'Fighting COVID-19 with Agility, Transparency, and Participation: Wicked Policy Problems and New Governance Challenges'. Public Administration Review 80 (4): 651–56. https://doi.org/10.1111/puar.13214.

Mora, L., P. Gerli, L. Ardito, and A. Messeni Petruzzelli. 2023. 'Smart City Governance from an Innovation Management Perspective: Theoretical Framing, Review of Current Practices, and Future Research Agenda'. Technovation 123. https://doi.org/10.1016/j.technovation.2023.102717.

Newig, Jens, Edward Challies, Nicolas W. Jager, Elisa Kochskaemper, and Ana Adzersen. 2018. 'The Environmental Performance of Participatory and Collaborative Governance: A Framework of Causal Mechanisms'. Policy Studies Journal 46 (2): 269–97.

https://doi.org/10.1111/psj.12209.

Nielsen, Brita Fladvad, Daniela Baer, and Carmel Lindkvist. 2019. 'Identifying and Supporting Exploratory and Exploitative Models of Innovation in Municipal Urban Planning; Key Challenges from Seven Norwegian Energy Ambitious Neighborhood Pilots'. Technological Forecasting and Social Change, Understanding Smart Cities: Innovation ecosystems, technological advancements, and societal challenges, 142 (May):142–53. https://doi.org/10.1016/j.techfore.2018.11.007.

Raj, Guilherme, Giuseppe Feola, Maarten Hajer, and Hens Runhaar. 2022. 'Power and Empowerment of Grassroots Innovations for Sustainability Transitions: A Review'. Environmental Innovation and Societal Transitions 43 (June):375–92. https://doi.org/10.1016/j.eist.2022.04.009.

Shtjefni, D., G. Ulpiani, N. Vetters, G. Koukoufikis, and P. Bertoldi. 2024. 'Governing Climate Neutrality Transitions at the Urban Level: A European Perspective'. Cities 148 (May):104883. https://doi.org/10.1016/j.cities.2024.104883.

Sørensen, Eva, and Jacob Torfing. 2022. 'Co-Creating Ambitious Climate Change Mitigation Goals: The Copenhagen Experience'. Regulation & Governance 16 (2): 572–87. https://doi.org/10.1111/rego.12374.

Strauss, Anselm L., and Juliet M. Corbin. 1998. Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory. 2nd ed. Thousand Oaks: Sage Publications.

Appendix 4.2 - Conference (II) - IFKAD 2025

Conference Paper II Esposito, G., Bresciani, S., Troise, C., & Alfiero, S. (2025) Governance for Transition: Regulatory Incentives and Stakeholder Engagement in the New European Bauhaus
In Knowledge Futures: AI, Technology, and the New Business Paradigm (pp. 997-1002). IKAM–Institute of Knowledge Assets Management

The IFKAD 2025 paper, *"Regulatory Incentives and Stakeholder Engagement in Scaling Grassroots Innovation: The Case of the New European Bauhaus,"* offers a significant contribution to the overarching research agenda of this thesis. It serves both as a practical application of key conceptual frameworks and as a platform for theoretical validation and advancement. Positioned at the nexus of transition studies, participatory governance, and innovation policy, the paper strengthens and extends the dissertation's inquiry into how collaborative mechanisms and governance structures enable inclusive, adaptive, and context-sensitive innovation within complex urban ecosystems.

Connection to Paper 1 – *Boundary Objects in People-Centred Cities*

Paper 1 conceptualises boundary objects (BOs) as mediating artefacts that facilitate engagement, translation, and co-creation among heterogeneous urban stakeholders. The IFKAD paper empirically extends this conceptual framing by illustrating how regulatory instruments, such as funding calls, evaluation frameworks, and participatory protocols, can themselves function as institutional BOs. These instruments are shown to simultaneously standardise and adapt across scales (EU–local), actor groups (public–private–civic), and epistemic communities (policy, design, grassroots). Participatory devices such as self-assessment templates and the NEB Compass are used as proxies for boundary-spanning tools in the empirical analysis. As such, the IFKAD paper provides real-world evidence that substantiates Paper 1's theoretical argument regarding the role

of BOs in translating shared values, such as sustainability, inclusion, and aesthetics, into actionable design and governance practices.

Connection to Paper 2 – *Governance Pathways for Digital Entrepreneurial Ecosystems*

Paper 2 introduces the Nested-Cyclical Model (NeCyM) to theorise the co-evolution of governance, innovation, and entrepreneurship in digitally mediated ecosystems. The IFKAD paper serves as a testing ground for NeCyM's core propositions. By analysing NEB initiatives situated within a multi-level governance environment, from EU-level programming to municipal implementation and grassroots agency, it empirically maps the cyclical feedback loops, institutional tensions, and adaptive strategies conceptualised in the NeCyM framework. Key findings related to uneven stakeholder access, iterative policy alignment, and embedded co-creation mechanisms reinforce the model's processual and recursive assumptions. Furthermore, the analysis of how niche innovations scale toward institutionalised regime practices reflects the dynamic nesting logic at the heart of NeCyM's architecture.

Connection to Paper 3 – *Value Tensions and Actionable Knowledge in Grassroots Innovation*

The IFKAD study is most directly aligned with Paper 3, which examines how normative policy values are translated and contested in grassroots innovation initiatives within the NEB framework. Both studies share methodological similarities, including embedded case studies, semi-structured interviews, and triangulated data sources, and draw on the same empirical setting of NEB award-winning projects. While Paper 3 focuses on invitational ambiguity and misaligned role expectations, the IFKAD paper extends the analysis by exploring how regulatory frameworks and financial incentives influence these dynamics. It adds an institutional perspective to the study of value tensions, highlighting how top-down policy instruments shape the conditions for bottom-up experimentation. Issues such as resource asymmetries, bureaucratic burdens, and conditional participation provide a more granular understanding of the challenges faced by grassroots actors. This reinforces the thesis's central argument that successful participatory innovation requires not only rhetorical inclusion but also robust, reflexive, and enabling governance architectures.

Appendix 4.2 - Conference Paper II - Reference

Alizadeh, T., Sarkar, S., Burgoyne, S., 2019. Capturing citizen voice online: Enabling smart participatory local government. Cities 95. https://doi.org/10.1016/j.cities.2019.102400

Ambrose, G., Siddiki, S., 2024. Assessing drivers of sustained engagement in collaborative governance arrangements. J Public Adm Res Theory 34, 498–514. https://doi.org/10.1093/jopart/muae005

Anderson, N., Potočnik, K., Zhou, J., 2014. Innovation and Creativity in Organizations: A State-of-the-Science Review, Prospective Commentary, and Guiding Framework. Journal of Management 40, 1297–1333. https://doi.org/10.1177/0149206314527128

Ansell, C., Gash, A., 2008. Collaborative Governance in Theory and Practice. Journal of Public Administration Research and Theory 18, 543–571. https://doi.org/10.1093/jopart/mum032

Baldwin, C.Y., Bogers, M.L.A.M., Kapoor, R., West, J., 2024. Focusing the ecosystem lens on innovation studies. Research Policy 53, 104949. https://doi.org/10.1016/j.respol.2023.104949

Bianchi, C., Nasi, G., 2021. Implementing collaborative governance: models, experiences, and challenges.

Bryson, J.M., Crosby, B.C., Stone, M.M., 2006. The Design and Implementation of Cross-Sector Collaborations: Propositions from the Literature. Public Administration Review 66, 44–55. https://doi.org/10.1111/j.1540-6210.2006.00665.x

Creswell, J.W., 2009. Research design: qualitative, quantitative, and mixed methods approaches, 3. ed., [Nachdr.]. ed. SAGE Publ, Los Angeles.

Dentoni, D., Bitzer, V., Schouten, G., 2018. Harnessing Wicked Problems in Multi-stakeholder Partnerships. J Bus Ethics 150, 333–356. https://doi.org/10.1007/s10551-018-3858-6

Emerson, K., Nabatchi, T., Balogh, S., 2012. An Integrative Framework for Collaborative Governance. Journal of Public Administration Research and Theory 22, 1–29. https://doi.org/10.1093/jopart/mur011

Escolar, S., Villanueva, F.J., Santofimia, M.J., Villa, D., Toro, X. del, López, J.C., 2019. A Multiple-Attribute Decision Making-based approach for smart city rankings design. Technological Forecasting and Social Change, Understanding Smart Cities: Innovation ecosystems, technological advancements, and societal challenges 142, 42–55. https://doi.org/10.1016/j.techfore.2018.07.024

Esposito, G., Bernardi, P.D., Bertello, A., Vrontis, D., 2024. Value tensions and actionable knowledge in grassroots innovation: a study of invitational ambiguity and implementation challenges. Journal of Knowledge Management 29, 372–392. https://doi.org/10.1108/JKM-04-2024-0385

EU NEB Compass, 2023. NEB Compass - European Union [WWW Document]. Compass Framework. URL https://new-european-bauhaus.europa.eu/get-involved/use-compass_en (accessed 3.28.24).

EU NEB Website, 2024. New European Bauhaus: beautiful, sustainable, together. - European Union [WWW Document]. URL https://new-european-bauhaus.europa.eu/index_en (accessed 3.28.24).

European Union, G.C.P., 2023. ORIENTATION PAPER of the URBAN AGENDA FOR THE EU GREENING CITIES PARTNERSHIP.

Freeman, R.E., David, L.R., 1983. Stockholders and Stakeholders: A New Perspective on Corporate Governance. California Management Review 25, 88–106. https://doi.org/10.2307/41165018

Geels, F.W., 2002. Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. Research Policy, NELSON + WINTER + 20 31, 1257–1274. https://doi.org/10.1016/S0048-7333(02)00062-8

Gerlak, A.K., Guido, Z., Owen, G., McGoffin, M.S.R., Louder, E., Davies, J., Smith, K.J., Zimmer, A., Murveit, A.M., Meadow, A., Shrestha, P., Joshi, N., 2023. Stakeholder engagement in the co-production of knowledge for environmental decision-making. World Development 170, 106336. https://doi.org/10.1016/j.worlddev.2023.106336

Haesevoets, T., Roets, A., Steyvers, K., Verschuere, B., Wauters, B., 2024. Towards a multifaceted measure of perceived legitimacy of participatory governance. Governance 37, 711–728. https://doi.org/10.1111/gove.12800

Heinelt, H., Niederhafner, S., 2008. Cities and Organized Interest Intermediation in the EU Multi-Level System. European Urban and Regional Studies 15, 173–187. https://doi.org/10.1177/0969776408090023

Hospers, G.-J., 2014. Policy Responses to Urban Shrinkage: From Growth Thinking to Civic Engagement. European Planning Studies 22, 1507–1523. https://doi.org/10.1080/09654313.2013.793655

Kemp, R., Schot, J., Hoogma, R., 1998. Regime shifts to sustainability through processes of niche formation: The approach of strategic niche management. Technology Analysis & Strategic Management 10, 175–198. https://doi.org/10.1080/09537329808524310

Kuenkel, P., 2019. Stewarding Sustainability Transformations in Multi-stakeholder Collaboration, in: Kuenkel, P. (Ed.), Stewarding Sustainability Transformations: An Emerging Theory and Practice of SDG Implementation. Springer International Publishing, Cham, pp. 141–205. https://doi.org/10.1007/978-3-030-03691-1_6

Lee, T., Koski, C., 2015. Multilevel governance and urban climate change mitigation. Environ Plann C Gov Policy 33, 1501–1517. https://doi.org/10.1177/0263774X15614700

Leiringer, R., 2006. Technological innovation in PPPs: incentives, opportunities and actions. Construction Management and Economics 24, 301–308. https://doi.org/10.1080/01446190500435028

Maher, R., Buhmann, K., 2019. Meaningful stakeholder engagement: Bottom-up initiatives within global governance frameworks. Geoforum 107, 231–234. https://doi.org/10.1016/j.geoforum.2019.06.013

Mills, K.A., 2019. Big Data for Qualitative Research. Taylor & Francis Group.

Njøs, R., Fosse, J.K., 2019. Linking the bottom-up and top-down evolution of regional innovation systems to policy: organizations, support structures and learning processes. Industry and Innovation 26, 419–438. https://doi.org/10.1080/13662716.2018.1438248

Pee, L.G., Pan, S.L., 2022. Climate-intelligent cities and resilient urbanisation: Challenges and opportunities for information research. International Journal of Information Management 63. https://doi.org/10.1016/j.ijinfomgt.2021.102446

Raj, G., Feola, G., Hajer, M., Runhaar, H., 2022. Power and empowerment of grassroots innovations for sustainability transitions: A review. Environmental Innovation and Societal Transitions 43, 375–392. https://doi.org/10.1016/j.eist.2022.04.009

Schot, J., Geels, F.W., 2011. Strategic niche management and sustainable innovation journeys: theory, findings, research agenda, and policy, in: The Dynamics of Sustainable Innovation Journeys. Routledge.

Seyfang, G., Haxeltine, A., 2012. Growing Grassroots Innovations: Exploring the Role of Community-Based Initiatives in Governing Sustainable Energy Transitions. Environ Plann C Gov Policy 30, 381–400. https://doi.org/10.1068/c10222

Seyfang, G., Smith, A., 2007. Grassroots innovations for sustainable development: Towards a new research and policy agenda. Environmental Politics 16, 584–603. https://doi.org/10.1080/09644010701419121

Tranfield, D., Denyer, D., Smart, P., 2003. Towards a Methodology for Developing Evidence-Informed Management Knowledge by Means of Systematic Review. British J of Management 14, 207–222. https://doi.org/10.1111/1467-8551.00375

Yin, R.K., 2009. Case study research: Design and methods.

Appendix 4.3 - Conference (III) AIDEA 2023

Conference Paper III Esposito, G., Paola, D. B., & Forliano, C. (2023)
Unveiling the Role of Stakeholders' Involvement in City Climate Neutrality: A Salience Theory Perspective
In *Abstract Conference Proceeding Convegno Nazionale AIDEA 2023" L'aziendalismo crea valore!"* (pp. 12–24) AIDEA

The AIDEA 2023 conference paper, *"Unveiling the Role of Stakeholders' Involvement in City Climate Neutrality: a Salience Theory Perspective"*, serves as a significant complementary component of this doctoral research. It provides an applied and empirically grounded environment through which the theoretical contributions of the

three core papers are critically reflected upon. Anchored in a qualitative, exploratory design, the study adopts the stakeholder salience framework to examine how diverse urban actors, including institutional authorities, corporate entities, grassroots associations, and citizens, are involved in the governance of climate neutrality initiatives. Focusing on the participatory governance process underpinning the Climate City Contract in Turin, the paper offers a rich empirical context in which mobilisation, engagement, and negotiation processes can be observed. These processes directly align with this thesis's broader concerns around collaborative governance and adaptive responses to sustainability transitions.

Connection to Paper 1 – *Boundary Objects in People-Centred Cities*

From the perspective of Paper 1, which explores the function of BOs in facilitating engagement and knowledge translation in people-centred cities, the AIDEA study provides a concrete application. The use of participatory instruments, such as consultation platforms, public assemblies, and co-designed governance tools, illustrates how BOs mediate relationships among heterogeneous stakeholders, enable translation across institutional boundaries, and anchor inclusive innovation processes. These empirical observations substantiate the design tensions identified in the systematic literature review, such as balancing openness with clarity, and integration with simplicity. The study thus reinforces the operational validity of BOs in shaping collaborative urban governance.

Connection to Paper 2 – *Governance Pathways for Digital Entrepreneurial Ecosystems*

In relation to Paper 2, which introduces the NeCyM to conceptualise the co-evolution of governance, innovation, and entrepreneurship in digitalised ecosystems, the AIDEA paper provides both substantive and procedural alignment. The empirical exploration of stakeholder dynamics within the Turin Climate City Contract exemplifies the recursive nature of governance arrangements and stakeholder salience. It highlights key principles embedded in the NeCyM framework, such as adaptive orchestration, iterative engagement, and decentralised legitimacy. By documenting the transition from top-down authority to multi-actor governance, and the use of feedback loops to recalibrate stakeholder roles and influence, the paper offers tangible empirical validation of the NeCyM's core tenets.

Connection to Paper 3 – *Value Tensions and Actionable Knowledge in Grassroots Innovation*

Finally, in connection with Paper 3, which investigates how broad normative values and role expectations are operationalised in grassroots innovation, the AIDEA paper provides valuable insight into the dynamics of legitimacy, urgency, and institutional recognition, particularly for civil society actors. The identification of previously marginal actors emerging as central figures through participatory governance aligns with the thesis's exploration of invitational ambiguity, value translation, and contested stakeholder roles. These findings further support the claim that grassroots actors function not merely as implementers but as agenda-setters and co-designers in complex governance systems.

The observed misalignments and subsequent recalibrations within the Climate City Contract mirror the value tensions explored in the NEB case, demonstrating the broader applicability of the theoretical constructs developed in this thesis.

Appendix 4.3 - Conference Paper III - Reference

Acuto, M., Rayner, S., 2016. City networks: Breaking gridlocks or forging (new) lock-ins? Int. Aff. 92, 1147–1166. https://doi.org/10.1111/1468-2346.12700

Appio, F.P., Lima, M., Paroutis, S., 2019. Understanding Smart Cities: Innovation ecosystems, technological advancements, and societal challenges. Technol. Forecast. Soc. Change 142, 1–14. https://doi.org/10.1016/j.techfore.2018.12.018

Argyris, C., Putnam, R., McLain Smith, D., 1985. Action Science: Concepts, Methods and Skills for Research and Intervention. Jossey-Bass Inc Pub, San Francisco, California. Audretsch, D.B., Belitski, M., 2017. Entrepreneurial ecosystems in cities: establishing the framework conditions. J. Technol. Transf. 42, 1030–1051. https://doi.org/10.1007/s10961- 016-9473-8

Beck, D., Storopoli, J., 2021. Cities through the lens of Stakeholder Theory: A literature review. Cities 118, 103377. https://doi.org/10.1016/j.cities.2021.103377

Bernard, W.T., 2000. Participatory research as emancipatory method: Challenges and opportunities. Res. Train. Soc. Sci. 167–185. Bettencourt, L.M.A., Lobo, J., Helbing, D., Kühnert, C., West, G.B., 2007. Growth, innovation, scaling, and the pace of life in cities. Proc. Natl. Acad. Sci. U. S. A. 104, 7301–7306. https://doi.org/10.1073/pnas.0610172104

Brescia, R., Marshall, J.T., 2016. How Cities Will Save the World: Urban Innovation in the Face of Population Flows, Climate Change and Economic Inequality, How Cities Will save the World: Urban Innovation in the Face of Population Flows, Climate Change and Economic Inequality. Routledge. https://doi.org/10.4324/9781315587158

Bryman, A., Bell, E., 2015. Business Research Methods. Oxford University Press

Cappa, F., Franco, S., Rosso, F., 2022. Citizens and cities: Leveraging citizen science and big data for sustainable urban development. Bus. Strateg. Environ. 31, 648–667. https://doi.org/10.1002/bse.2942

Chambers, R., 1997. Prelims - Whose Reality Counts?, Whose Reality Counts? London: Intermediate technology publications. https://doi.org/10.3362/9781780440453.000

Cornwall, A., Jewkes, R., 1995. What is participatory research? Soc. Sci. Med. 41, 1667–1676. Damsø, T., Kjær, T., Christensen, T.B., 2017. Implementation of local climate action plans: Copenhagen – Towards a carbon-neutral capital. J. Clean. Prod. 167, 406–415. https://doi.org/10.1016/J.JCLEPRO.2017.08.156

Dhanaraj, C., Parkhe, A., 2006. Orchestrating innovation networks. Acad. Manag. Rev. 31, 659–669. https://doi.org/10.5465/amr.2006.21318923

Dutt, N., Hawn, O., Vidal, E., Chatterji, A., McGAHAN, A., Mitchell, W., 2016. How open system intermediaries address institutional failures: The case of business incubators in emerging-market countries. Acad. Manag. J. 59, 818–840. https://doi.org/10.5465/amj.2012.0463

Eden, C., Huxham, C., 1996. Action research for management research. Br. J. Manag. 7, 75–86. https://doi.org/10.1111/j.1467-8551.1996.tb00107.x

Elmqvist, T., Andersson, E., Frantzeskaki, N., McPhearson, T., Olsson, P., Gaffney, O., Takeuchi, K., Folke, C., 2019. Sustainability and resilience for transformation in the urban century. Nat. Sustain. 2, 267–273. https://doi.org/10.1038/s41893-019-0250-1

European Commission, 2021. Net Zero City Mission. European Commission, 2020a. Developments and Forecasts on Continuing Urbanisation. European Commission, 2020b. 100 climate-neutral cities by 2030 - by and for the citizens: report of the mission board for climate-neutral and smart cities. Publications Office, Brussels. https://doi.org/doi/10.2777/46063

Ferraris, A., Santoro, G., Pellicelli, A.C., 2020. "Openness" of public governments in smart cities: removing the barriers for innovation and entrepreneurship. Int. Entrep. Manag. J. 16, 1259– 1280. https://doi.org/10.1007/s11365-020-00651-4

Ferraro, F., Etzion, D., Gehman, J., 2015. Tackling Grand Challenges Pragmatically: Robust Action Revisited. Organ. Stud. 36, 363–390. https://doi.org/10.1177/0170840614563742

George, G., Howard-Grenville, J., Joshi, A., Tihanyi, L., 2016. Understanding and tackling societal grand challenges through management research. Acad. Manag. J. 59, 1880–1895. https://doi.org/10.5465/amj.2016.4007

Gioia, D.A., Price, K.N., Hamilton, A.L., Thomas, J.B., 2010. Forging an identity: An insideroutsider study of processes involved in the formation of organizational identity. Adm. Sci. Q. 55, 1–46. https://doi.org/10.2189/asqu.2010.55.1.1

Giudici, A., Reinmoeller, P., Ravasi, D., 2018. Open-system orchestration as a relational source of sensing capabilities: Evidence from a venture association. Acad. Manag. J. 61, 1369–1402. https://doi.org/10.5465/amj.2015.0573

Gupta, A., Panagiotopoulos, P., Bowen, F., 2020. An orchestration approach to smart city data ecosystems. Technol. Forecast. Soc. Change 153, 119929. https://doi.org/10.1016/j.techfore.2020.119929

Hemment, J., 2007. Public anthropology and the paradoxes of participation: Participatory action research and critical ethnography in provincial Russia. Hum. Organ. 66, 301–314. https://doi.org/10.17730/humo.66.3.p153144353wx7008

Huovila, A., Siikavirta, H., Antuña Rozado, C., Rökman, J., Tuominen, P., Paiho, S., Hedman, Å., Ylén, P., 2022. Carbon-neutral cities: Critical review of theory and practice. J. Clean. Prod. 341, 130912. https://doi.org/10.1016/J.JCLEPRO.2022.130912

Jetoo, S., 2019. Stakeholder engagement for inclusive climate governance: The case of the City of Turku. Sustain. 11, 6080. https://doi.org/10.3390/su11216080

Joosse, S., Powell, S., Bergeå, H., Böhm, S., Calderón, C., Caselunghe, E., Fischer, A., Grubbström, A., Hallgren, L., Holmgren, S., 2020. Critical, engaged and change-oriented scholarship in environmental communication. Six methodological dilemmas to think with. Environ. Commun. 14, 758–771. K.Yin, R., 2017. Case study research and applications: Design and methods, Journal of Hospitality & Tourism Research. Sage Publications.

Kabisch, N., Frantzeskaki, N., Pauleit, S., Naumann, S., Davis, M., Artmann, M., Haase, D., Knapp, S., Korn, H., Stadler, J., Zaunberger, K., Bonn, A., 2016. Nature-based solutions to climate change mitigation and adaptation in urban areas: Perspectives on indicators, knowledge gaps, barriers, and opportunities for action. Ecol. Soc. 21. https://doi.org/10.5751/ES-08373-210239

Levin, K., Cashore, B., Bernstein, S., Auld, G., 2012. Overcoming the tragedy of super wicked problems: Constraining our future selves to ameliorate global climate change. Policy Sci. 45, 123–152. https://doi.org/10.1007/s11077-012-9151-0

MacDonald, C., 2012. Understanding Participatory Action Research: a Qualitative Research Methodology Option. Can. J. Action Res. 13, 34–50. https://doi.org/10.33524/cjar.v13i2.37

Martina, R., Wakkee, I., Divito De Paauw, L., 2022. Resource Orchestration and Opportunity Beliefs in Multi-Stakeholder Initiatives for Sustainability, in: Academy of Management Proceedings. Academy of Management Briarcliff Manor, NY 10510, p. 16260.

McGrath, J.E., Martin, J., Kulka, R.A., 1982. Judgment calls in research, (No Title). Sage Publications.

Mitchell, R.K., Agle, B.R., Wood, D.J., 1997. Toward a theory of stakeholder identification and salience: Defining the principle of who and what really counts. Acad. Manag. Rev. 22, 853– 886. https://doi.org/10.5465/AMR.1997.9711022105

Mora, L., Deakin, M., Reid, A., 2019. Strategic principles for smart city development: A multiple case study analysis of European best practices. Technol. Forecast. Soc. Change 142, 70–97. https://doi.org/10.1016/j.techfore.2018.07.035

Nambisan, S., Sawhney, M., 2011. Orchestration processes in network-centric innovation: Evidence from the field. Acad. Manag. Perspect. 25, 40–57. https://doi.org/10.5465/AMP.2011.63886529

Narayanan, V.K., Nath, R., 1993. Organization Theory: A Strategic Approach. Richard d Irwin, Homewood, Illinois. Nolas, S.-M., 2009. Between the Ideal and the Real: Using Ethnography as a Way of Extending Our Language of Change. Qual. Res. Psychol. 6, 105–128. https://doi.org/10.1080/14780880902901133

Rassiah, P., Mohd Nasir, N., Khan, G., Munir, S., 2022. Stakeholder salience and environmental stewardship among hotels in Malaysia. Sustain. Accounting, Manag. Policy J. 13, 1201–1228. https://doi.org/10.1108/SAMPJ-06-2021-0221

Reason, P., Bradbury, H., 2001. Handbook of action research: Participative inquiry and practice. SAGE Publications Inc. Ribeiro, P.J.G., Gonçalves, L.A.P.J., 2019. Urban resilience: A conceptual framework. Sustain. Cities Soc. 50, 101625. Rittel, H.W.J., Webber, M.M., 1973. Dilemmas in a general theory of planning. Policy Sci. 4, 155–169. https://doi.org/10.1007/BF01405730

Salvia, M., Pietrapertosa, F., D'Alonzo, V., Clerici Maestosi, P., Simoes, S.G., Reckien, D., 2023. Key dimensions of cities' engagement in the transition to climate neutrality. J. Environ. Manage. 344, 118519. https://doi.org/10.1016/J.JENVMAN.2023.118519

Santini, C., Marinelli, E., Boden, M., Cavicchi, A., Haegeman, K., 2016. Reducing the distance between thinkers and doers in the entrepreneurial discovery process: An exploratory study. J. Bus. Res. 69, 1840–1844. Schiller, M., Awad, I., Buijse, N., Chantre, M., Huang, Y.C., Jonitz, E., van den Brink, L., van Dordrecht, L., 2023. Brokerage in urban networks on diversity and inclusion: The case of Rotterdam. Cities 135, 104219. https://doi.org/10.1016/j.cities.2023.104219

Shabb, K., McCormick, K., Mujkic, S., Anderberg, S., Palm, J., Carlsson, A., 2022. Launching the Mission for 100 Climate Neutral Cities in Europe: Characteristics, Critiques, and Challenges. Front. Sustain. Cities 3, 817804. Sharifi, A., 2020. Urban resilience assessment: Mapping knowledge structure and trends. Sustain. 12, 5918. https://doi.org/10.3390/SU12155918

Susman, G.I., Evered, R.D., 1978. An Assessment of the Scientific Merits of Action Research. Adm. Sci. Q. 23, 582. https://doi.org/10.2307/2392581

Tanima, F.A., Brown, J., Hopper, T., 2023. Doing critical dialogic accounting and accountability research: an analytical framework and case illustration. Accounting, Audit. Account. J. United Nations, 2022.

Handbook of Statistics 2022. Geneva, Switzerland. van der Heijden, J., Luckmann, O., Cherkasheva, A., 2020. Urban climate governance in Russia: Insights from Moscow and St. Petersburg. J. Urban Aff. 42, 1047–1062. https://doi.org/10.1080/07352166.2019.1617036

Weick, K.E., 1995. What Theory is Not, Theorizing Is. Adm. Sci. Q. 40, 385. https://doi.org/10.2307/2393789 Welch, C., Piekkari, R., Plakoyiannaki, E., Paavilainen-Mäntymäki, E., 2011. Theorising from case studies: Towards a pluralist future for international business research. J. Int. Bus. Stud. 42, 740–762. https://doi.org/10.1057/jibs.2010.55

Wolfram, M., 2016. Conceptualizing urban transformative capacity: A framework for research and policy. Cities 51, 121–130. https://doi.org/10.1016/j.cities.2015.11.011

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