

Transdisciplinarity
for **affordable**
and **sustainable**
housing

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RE-DWELL.

Transdisciplinarity for affordable and sustainable housing

Table of contents

Foreword <i>by Ashraf Salama</i>	9
Preface	15
Acknowledgements	17
Introduction <i>by Leandro Madrazo</i>	19

1 Setting the stage: A cross-disciplinary view of contemporary challenges in affordable and sustainable housing	
1.1 Reduce, Space, Share <i>by Marta Peris and José Toral</i>	31
1.2 The co-production turn in community participation in housing <i>by Darinka Czischke and Sara Brysch</i>	45
1.3 Housing policy and finance: Balancing affordability, sustainability, and social need <i>by Kath Scanlon</i>	59
— Reflections	71
2 Transdisciplinary innovation in housing research and academic development	
2.1 Rethinking dwelling: Affordability, sustainability, and transdisciplinary knowledge <i>by Leandro Madrazo</i>	77
2.2 Transdisciplinary education in practice: The RE-DWELL learning and research environment <i>by Leandro Madrazo</i>	121
— Reflections	167

3	Developing a shared framework: Disciplinary insights and collaborative knowledge building	
3.1	Exploring housing challenges from diverse disciplinary perspectives	
	ESR research projects	177
3.2	Collaborative knowledge building	243
	Vocabulary	245
	— Reflections	267
	Case library	271
	— Reflections	337
	Challenges	341
	— Reflections	375
4	Exploring affordability and sustainability in housing: Policy, people, and learning	
4.1	A review of social housing sustainability in England <i>by Mahmoud Alsaeed, Karim Hadjri and Krzysztof Nawratek</i>	381
4.2	Resident engagement in sustainable housing retrofit: Applying the technical democracy model <i>by Saskia Furman and Adriana Diaconu</i>	403
4.3	Advancing architectural education through experiential learning: Preparing future professionals to create sustainable urban dwelling <i>by Annette Davis, Effrosyni Roussou and Núria Martí Audí</i>	419
	— Reflections	435

5	Integrating research domains with community engagement and co-creation	
5.1	Interlinking domains: Research insights and emerging directions in affordable and sustainable housing <i>by Nadia Charalambous, Adrienne Csizmady and Gojko Bežovan</i>	441
5.2	Beyond housing provision: Community engagement as a driver of affordable and sustainable dwelling <i>by Carla Sentieri, Nadia Charalambous and Alexandra Paio</i>	459
5.3	Co-creating housing solutions: A participatory toolbox for transdisciplinary research <i>by Alexandra Paio, Androniki Pappa and Marja Elsinga</i>	473
	— Reflections	491
6	Integration of academia and practice in transdisciplinary research	
6.1	Exploring the value of secondments in housing research: A reflective review <i>by Mahmoud Alsaeed and Leonardo Ricaurte</i>	497
6.2	Bridging academia and practice in transdisciplinary housing research	515
	— Reflections	529
	Afterword <i>by Roderick Lawrence</i>	533
	Epilogue	539
	Appendix	541
	Round table: Transdisciplinary research for affordable and sustainable housing	541
	— Reflections	555
	Contributors	561
	Consortium	569

Foreword

Ashraf M. Salama

Extending the epistemic foundations of housing knowledge

Housing has become one of the most consequential and contested territories of contemporary societal transformation. Across geographic, cultural, and political contexts, the provision of adequate housing is increasingly shaped through intersecting demands associated with escalating costs, environmental degradation, demographic change, and deepening social inequality. These demands have situated housing as a critical space where social justice, economic systems, environmental responsibility, and spatial quality meet. Within this milieu, housing as a field of study, raises fundamental questions for architecture and urbanism, understood both as professional practices and as fields of knowledge whose conventional assumptions, methods of inquiry, and boundaries are under increasing scrutiny.

This volume is structured around three closely interdependent focus areas—housing, affordability, and sustainability—with transdisciplinarity offering a shared space for inquiry. The three areas do not operate in isolation. Housing conditions are shaped through affordability structures that influence access, tenure, and security, while sustainability considerations inform how housing is produced, maintained, and adapted over time. Each dimension

acquires meaning through its relation to the others, which together define a contemporary housing condition that calls for integrative approaches to research, education, and practice.

Across the contributions to this volume, housing is approached as a lived and evolving socio-spatial condition. Attention extends beyond physical environments and technical solutions to encompass everyday routines, social relations, cultural practices, and forms of wellbeing that develop within housing environments. Housing, at the same time, is situated within institutional, economic, and political systems that shape who gains access to secure and dignified living conditions and under what circumstances. Land ownership systems, financial markets, planning frameworks, and welfare policies exert significant influence over housing outcomes, shaping possibilities for architectural and urban interventions. The distance that can emerge between design and planning intentions and lived realities emphasises the limits of object-centred and discipline-bound approaches to housing research and knowledge production.

Conceiving housing within these terms calls for understanding it as a socio-spatial process that evolves over

time. Patterns of use, management, adaptation, and negotiation come into sight and emphasise that housing quality is not determined at the time of design and construction. Instead, quality emerges through occupancy and everyday socio-spatial practices. This perspective echoes the long-standing arguments that housing research benefits from engagement with lived experience, behavioural patterns, and socio-cultural contexts rather than exclusive reliance on prescriptive standards or formal classifications.

Earlier efforts to reconceptualise affordable housing research have already interrogated approaches that equated affordability with cost alone. Lifestyle-based frameworks demonstrated that affordability is closely connected to household social norms, cultural expectations, and modes of living and working, highlighting the necessity of understanding how people inhabit and appropriate space within specific socio-economic contexts (Lawrence, 2025; Salama & Alshuwaikhat, 2006). Such perspectives framed affordability as a relational condition shaped through income, household structure, social norms, and spatial organisation. These insights retain great relevance as housing systems in many contexts are becoming increasingly removed from the lived realities they are intended to support.

Affordability has since emerged as a defining concern within contemporary housing discourse, encompassing diverse income groups and geographic regions. Despite this prominence, affordability is commonly framed through narrow economic indicators such as price-to-income

ratios, construction costs, unit size, or adjustments for household composition. Typically, limited attention is given to longer-term accessibility, security, and quality of life. Housing that appears affordable at the point of entry may become increasingly difficult to sustain over time due to energy costs, maintenance demands, or insecure tenure provisions. Housing that meets environmental performance criteria may also remain inaccessible when initial costs exceed the reach of those most in need.

What do the preceding conditions tell us? They point toward affordability as an organisational and operational issue shaped through broader economic and institutional dynamics. Commercialisation, speculative investment, and market-driven development have repositioned housing as a commodity, with significant implications for access and use. In practice, architectural and urban responses that do not engage with these dynamics risk addressing surface conditions without sufficiently interrogating underlying structures. Consequently, consideration of housing affordability benefits from analytical frameworks that connect architectural and urban design with policy instruments, economic measures, and social practices.

Sustainability introduces critical layers of complexity. Housing contributes substantially to environmental pressures through energy consumption, material demand, land occupation, and carbon emissions. This has brought sustainability to the forefront of housing-related research and practice, stimulating advances in building technologies, energy systems, and

performance standards. In parallel, sustainability in housing goes beyond technical performance. Housing environments that demonstrate environmental efficiency while remaining socially exclusionary or economically inaccessible raise important ethical questions regarding the scope and meaning of sustainability.

More comprehensive approaches to sustainability recognise the interrelation of environmental responsibility, social equity, and economic durability, addressing these three pillars of sustainability and the interdependencies within them. Housing that supports long-term wellbeing depends on affordability in construction, operation, maintenance, and adaptability to changing household profiles and demographic patterns. These considerations necessitate integrative frameworks that engage sustainability, affordability, and housing quality as interrelated conditions evolving across scales and over time.

The convergence of housing, affordability, and sustainability underscores the limitations of disciplinary approaches that operate in relative isolation. Design and planning expertise alone are not sufficient to address issues rooted in political economy or governance, while policy and financial mechanisms that overlook spatial quality and lived experience shape housing environments in consequential ways. Such conditions have prompted sustained reflection on related research paradigms and on the need for more inclusive and integrative modes of knowledge production.

Transdisciplinarity has emerged as an important response within the

landscape of housing affordability and sustainability. Departing from approaches that accumulate disciplinary perspectives or integrate methods across academic fields, transdisciplinarity embraces action-oriented knowledge production through interaction among diverse actors. Complex affordable and sustainable housing challenges take shape through the actions of multiple stakeholders and institutional measures, while calling for forms of inquiry that extend beyond single disciplinary domains.

Within architectural and urban research, transdisciplinarity has been articulated as a way of addressing fragmentation while strengthening social relevance (Salama, 2011). The integration of architectural thinking with insights from social sciences, environmental studies, policy analysis, and stakeholder knowledge invigorates comprehensive understandings of housing as a socio-spatial system. Processes of co-production and mutual learning receive particular emphasis, allowing knowledge to emerge through shared investigation.

Residents and communities appear within this framework as active contributors to understanding housing conditions. Lived experiences, everyday practices, and aspirations inform how housing functions in use and how it adapts over time. Policy frameworks and financial instruments are examined as expressions of values and power relations that shape spatial outcomes. Design takes on a mediating role, supporting the translation of diverse forms of knowledge into spatial propositions that can be explored, discussed, and refined. This way, housing is viewed as a shared field

of knowledge in which residents, institutions, and design practices contribute jointly to the continuous shaping of housing outcomes.

This epistemic orientation carries implications for architectural research more broadly. Established models of inquiry have often focused on speculative design, formal exploration, or typological analysis, often with limited engagement with empirical evidence and social impact. While such approaches have generated important insights, engagement with housing affordability and sustainability benefits from an expanded organisational repertoire. Transdisciplinary research enables qualitative and quantitative methods to interact with design inquiry while preserving the capacity for synthesis and spatial imagination.

Architectural and urban design education plays a significant role within this changing landscape. Housing-related challenges call for graduates capable of working across disciplinary, institutional, and cultural boundaries. Pedagogical models centred on individual authorship and the formal resolution and manipulation of forms continue to offer value, but they encounter powerful limits when addressing complex housing conditions. Research-led learning environments that integrate research, education, and practice support the development of methodological mastery, ethical awareness, and collaborative competence. Engagement with real housing contexts allows students to encounter complexity as a lived condition shaped through social, economic, and environmental forces.

Likewise, professional practice is evolving in response to these conditions. Architects increasingly operate within regulatory frameworks, funding structures, and multi-actor processes that shape housing outcomes. Professional agency develops through the capacity to collaborate, interpret research findings, and engage with diverse forms of expertise. Transdisciplinary practice positions architects as participants within the broader ecosystem of housing provision, contributing spatial knowledge alongside other epistemologies.

The contributions of this volume are situated within this wider reorientation of architectural thinking. They engage with housing as a multifaceted societal challenge in which trade-offs between affordability and sustainability are continuously negotiated. Through varied perspectives, methodological approaches, and empirical contexts, the chapters illustrate how transdisciplinary inquiry can elucidate structural conditions, interrogate established conceptions and misconceptions, and identify pathways toward more equitable and resilient housing environments.

The volume focuses on situated knowledge, showing how housing challenges vary across cultural, institutional, and geographic settings, while remaining connected through shared dynamics. This orientation supports adaptive and reflective approaches to housing research and practice that remain attentive to difference while engaging with broader systemic insights.

In the spirit of this inquiry, the questions addressed in this volume extend beyond housing as a sector. The intersection of affordability and sustainability positions housing at the convergence of social justice, environmental responsibility, and collective wellbeing. How societies choose to house their populations reflects and reinforces these commitments. The relevance of architecture within this context is predicated on its ability to engage complexity, enable collaboration, and critically reflect on its own role within intersecting social and institutional frameworks. Transdisciplinarity provides a foundation for this ongoing evolution. Engagement with housing as it is lived, governed, and contested

positions architectural knowledge as an effective participant in shaping just, affordable, and sustainable futures.

This publication contributes to this ambition through sustained dialogue among housing, affordability, and sustainability within a transdisciplinary framework. It offers a lens through which architectural research, education, and practice can be conceived in light of contemporary housing conditions. At a time when the housing question has acquired renewed urgency, the reflections and inquiries gathered here assert the importance of architectural knowledge that remains socially engaged, methodologically open, and ethically intentional.

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Preface

Ensuring access to adequate housing has become a global issue—one that has intensified over decades—driven by the interplay of social, economic, environmental, and technological forces shaping the provision of affordable and sustainable homes for urban populations. Social and demographic pressures—including urbanisation, population growth, inequality, and public health concerns—intensify housing needs, necessitating homes of diverse types, qualities, and locations to support varied lifestyles and incomes. Economic constraints, such as financial crises, market instability, and limited public funding, further complicate housing access. Environmental factors—ranging from climate change and resource scarcity to the need for resilient housing—intersect with technological and design innovations, including advanced construction methods, circular building practices, and smart systems for energy efficiency and automation.

Housing is a societal issue that demands collaboration across multiple disciplines and stakeholders. Addressing its complex nature requires professionals who can integrate knowledge across environmental, social, and technological domains while balancing often competing priorities. Architects, planners, engineers, economists, sociologists, lawyers, and other professionals must work alongside policymakers, financial

institutions, industry partners, and communities to develop solutions for persistent housing needs.

Over the past two decades, a series of EU-funded initiatives—[Housing@21.eu](#) (2003–06), [OIKODOMOS](#) (2007–11), [OIKONET](#) (2013–16), and [RE-DWELL](#) (2020–24)—have advanced the integration of research, education, and community engagement in the study of housing. The projects evolved from interinstitutional collaboration in [Housing@21.eu](#) to the interdisciplinary framework of [OIKODOMOS](#), progressed through the inter- and transdisciplinary work of [OIKONET](#), and culminated in [RE-DWELL](#), where transdisciplinarity shapes both research and learning.

Participation in these projects expanded steadily: from five universities in [Housing@21.eu](#), to twelve partners in [OIKODOMOS](#), thirty-four organisations in [OIKONET](#)—including universities, research institutes, civic groups, and international agencies—and twenty-two in [RE-DWELL](#). Student involvement grew not only in quantity but also in academic level, spanning from undergraduates contributing to early projects to doctoral candidates engaging in advanced research and collaborative initiatives within [RE-DWELL](#). Altogether, approximately 75 institutions, 1,400 students, and 180 faculty members across Europe and beyond have participated, fostering innovation in teaching and learning, exchanging expertise across subjects

and disciplines, and generating new insights into contemporary housing.

Building on this legacy, RE-DWELL consolidates previous projects and advances the integration of cross- and transdisciplinary knowledge to address the complex challenges of contemporary housing.

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- Stephen Gage,
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Marta Peris and José Toral, Darinka Czischke and Sara Brysch, and Kath Scanlon kindly accepted the invitation to address key themes within

the tripartite RE-DWELL research framework and to provide an up-to-date foundation for the project’s collaborative research, drawing on both academic and professional perspectives.

I am sincerely grateful to Ashraf Salama and Roderick Lawrence for generously contributing the Foreword and Afterword. Their reflections, grounded in long-standing experience and recognised expertise, situate the RE-DWELL research on transdisciplinarity for affordable and sustainable housing within the broader housing debate and highlight key challenges in bridging the knowledge–practice divide.

My thanks also go to the staff of La Salle Campus for their support during the preparation of this book. Regina González, librarian, assisted in identifying and locating relevant publications. Lisa Kinnear carried out a rigorous review and proofreading and offered helpful guidance on linguistic matters across the individual contributions.

Special recognition is due to Matthias Ramsch, graphic designer, for his professionalism and sustained commitment during the development of this publication. With patience and care, he helped give visual form and structure to an initial idea as it evolved over time. His attentive design work has been instrumental in ensuring the

readability and overall coherence of the book.

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Introduction

Leandro Madrazo

RE-DWELL is a Marie Skłodowska-Curie Innovative Training Network (MSCA-ITN) project conducted from October 2020 to September 2024. According to the Horizon 2020 programme guidelines¹, MSCA-ITNs aim to:

- Train a new generation of creative, entrepreneurial and innovative early-stage researchers to face current and future challenges and to convert knowledge and ideas into products and services for economic and social benefit.
- Raise excellence and structure research and doctoral training, extending the traditional academic research training setting, incorporating the elements of Open Science and equipping researchers with the right combination of research-related and transferable competences.
- Provide enhanced career perspectives in both the academic and non-academic sectors through international, interdisciplinary and inter-sectoral mobility combined with an innovation-oriented mind-set.

The specific objective of RE-DWELL is to train a new generation of professionals equipped with the skills to tackle the urgent challenge of affordable and sustainable housing in a transdisciplinary manner—a critical issue for European societies.

THE AFFORDABLE AND SUSTAINABLE HOUSING CHALLENGE IN EUROPE

Today's shortage of affordable housing in Europe reflects the cumulative outcome of long-standing structural, economic, and policy dynamics. Access to adequate homes has become increasingly constrained, particularly in metropolitan areas where employment opportunities and essential services are concentrated.

The 2019 Housing Europe report *The State of Housing in Europe*² highlighted rising housing costs, insufficient social housing, persistent energy poverty, and inequalities affecting vulnerable groups, emphasising the need for coordinated policies, investment, and social inclusion. In the 2025 report³, the situation had worsened: demand far exceeds supply, waiting lists for social housing are swelling, and residential construction has fallen to a ten-year low. Rising costs and limited financing further constrain new builds and energy-efficient renovations. Public, cooperative, and social housing providers remain critical, but without stable financing, coherent regulation, and stronger EU-level support, affordability pressures and social exclusion are set to increase.

¹ H2020 Programme Guide for Applicants. Marie Skłodowska-Curie Actions - Innovative Training Networks (ITN). Version 5.1 - 2020 9 November 2019

² <https://www.housingeurope.eu/the-state-of-housing-in-the-eu-2019/>

³ <https://www.housingeurope.eu/state-of-housing-in-europe-2025-trends-in-a-nutshell/>

The housing shortage increasingly affects not only low-income groups, but also middle-income households. Across the EU, housing costs account for roughly a quarter of household expenditure, with nearly one in ten Europeans spending more than 40% of their income on housing, according to Eurostat 2023⁴. Rising rent arrears, mortgage defaults, and evictions exacerbate socio-economic divides and territorial inequalities. Economically, salaries for the lower half of the population have stagnated, while real estate prices have climbed.

The European Pillar of Social Rights⁵ recognises housing as one of its twenty fundamental principles, affirming that “everyone has the right to a good-quality, affordable place to live.” Proclaimed at the 2017 Gothenburg Summit, the pillars ensure that homeless and vulnerable individuals have the right to access quality social housing and assistance, protection from forced eviction, and adequate shelter with supportive services to promote social inclusion. These objectives are reinforced in the European Commission’s current Social Rights Action Plan⁶, responding to growing concerns across Europe about affordable housing, homelessness, and energy poverty. The recent appointment of the first-ever European Commissioner responsible for housing further underscores the political significance of the crisis, signalling recognition that housing has become a transnational issue

requiring coordinated EU-level action. As one of its first major initiatives, the Commission presented the first European Affordable Housing Plan⁷ in December 2025, following an Affordable Housing Dialogue to gather input from stakeholders across Member States.

Housing is central to Europe’s climate and environmental goals. The Nice Declaration⁸, adopted at an informal meeting of EU housing ministers in 2022, sets out a shared commitment to ensure affordable, sustainable, decent, and resilient housing for all, with particular attention to vulnerable groups and those experiencing homelessness. It urges Member States to strengthen tenant and owner protections, enhance market transparency, and integrate housing strategies into broader urban development planning. The Declaration highlights sustainable construction, energy-efficient renovation, and climate-conscious policies, while promoting public and EU-level investment in social, cooperative, and affordable housing. It also encourages the sharing of good practices across countries, addressing challenges from short-term rentals, and institutionalising regular cooperation among housing ministers and national focal points. Overall, it provides a framework for coordinated EU-level action to make housing more accessible, inclusive, and environmentally sustainable, aligning with the New European Bauhaus⁹ strategy, which connects aesthetic,

social, and environmental dimensions to foster inclusive and sustainable urban development.

Addressing the need for affordable and sustainable housing requires holistic, transdisciplinary approaches that bring together architecture, urban planning, economics, social sciences, governance, industry, and communities. Policies should promote integrated solutions across the entire housing life cycle—from design and construction to operation, maintenance, and eventual demolition or material reuse—and across all levels of governance, from European to national, regional, municipal, and building scales, ensuring that homes are simultaneously affordable, sustainable, and socially inclusive. Achieving this goal demands coordinated action by national and local authorities, private developers, professionals in the design, planning, and construction sectors, community organisations, and academic researchers.

To advance this agenda, RE-DWELL established a transdisciplinary learning and research environment to prepare professionals to implement these integrated principles—cross-disciplinary collaboration, life cycle thinking, multilevel governance alignment, affordability, and sustainability—in practical, scalable, and socially inclusive housing projects.

RE-DWELL RESEARCH FRAMEWORK

RE-DWELL adopts a comprehensive approach, bringing together representatives from diverse disciplines—architecture, urban planning, economics, and sociology—with non-academic stakeholders to advance research on affordable and sustainable housing in Europe. By fostering collaboration across academic and practice-based perspectives, the project promotes holistic, transdisciplinary solutions that address the social, economic, and environmental dimensions of housing. The consortium, comprising ten academic institutions and twelve professional partner organisations, brings together a range of disciplines, sectors, and stakeholders involved in the provision of housing.

The RE-DWELL cross-disciplinary and collaborative research framework comprises three interrelated areas, each addressing a distinct dimension of affordable and sustainable housing through a specific functional lens:

- **Design, Planning and Building** focuses on technical and spatial aspects, spanning urban planning, building design, and construction, including energy efficiency, sustainable materials, cost-effective life cycle methods, accessibility, and urban integration.
- **Community Participation** addresses social and participatory dimensions, fostering inclusive design, co-creation, community engagement, social cohesion, and the empowerment of residents in decision-making processes.
- **Policy and Financing** examines governance, economic, and regula-

⁴ <https://ec.europa.eu/eurostat/web/interactive-publications/housing-2023>

⁵ https://employment-social-affairs.ec.europa.eu/policies-and-activities/european-pillar-social-rights-building-fairer-and-more-inclusive-european-union_en

⁶ <https://op.europa.eu/webpub/empl/european-pillar-of-social-rights/en/>

⁷ https://housing.ec.europa.eu/european-affordable-housing-plan_en

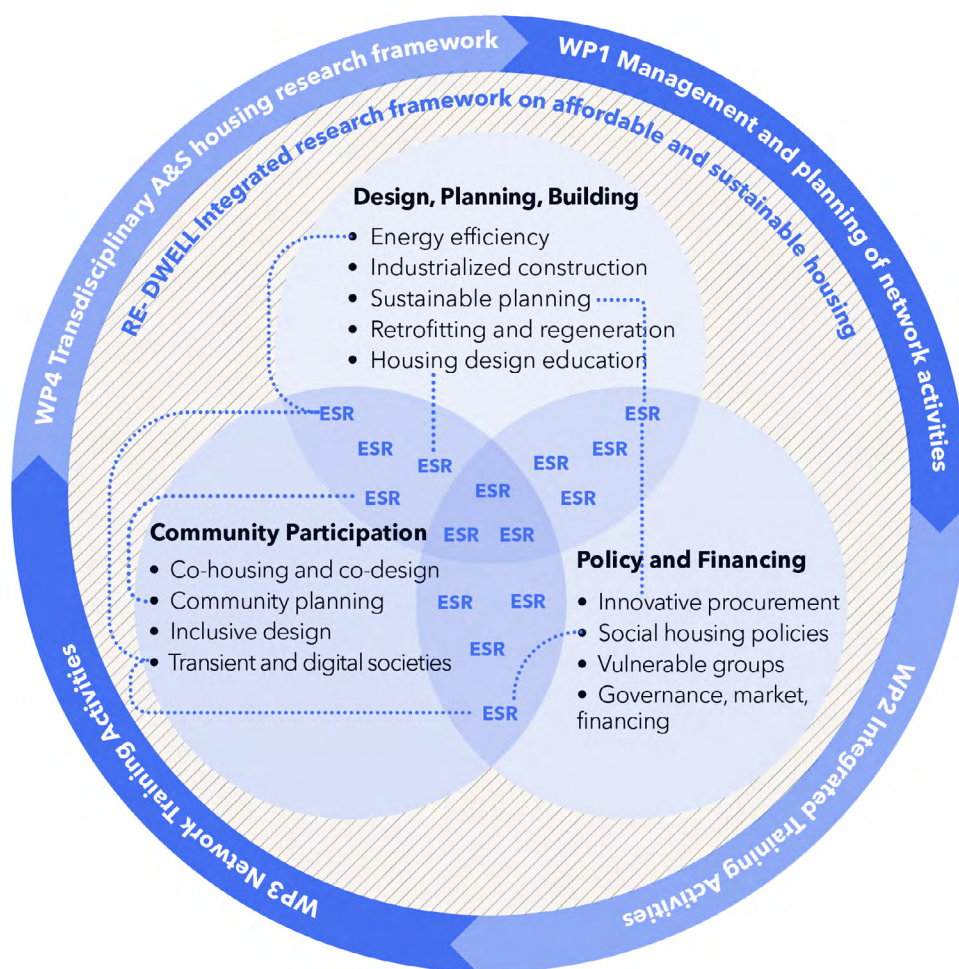
⁸ <https://www.iut.nu/wp-content/uploads/2022/04/Informal-Housing-Ministers-meeting-2022-The-Nice-Declaration.pdf>

⁹ https://new-european-bauhaus.europa.eu/index_en

tory frameworks to ensure housing solutions are feasible, financially viable, scalable, and socially equitable, while also considering funding mechanisms, public-private partnerships, incentives, and long-term sustainability.

The delineation between these areas is purpose-driven, reflecting the distinct perspectives each brings,

while their intentional overlaps foster interdisciplinary collaboration. Through their individual research projects, researchers interweave these three areas, ensuring that the collective research addresses all critical dimensions of housing—technical, social, and institutional—while preparing them to develop integrated solutions that are affordable, sustainable, and socially inclusive.



RE-DWELL framework showing three interrelated areas and their interdisciplinary overlaps.

Cohousing illustrates how the RE-DWELL research framework can be applied across its three core domains. In Design, Planning and Building, research focuses on architectural layouts, adaptable spaces, and energy-efficient construction methods that support shared living. The effectiveness of these designs, however, relies on insights from Community Participation, including residents' co-creation, governance practices, and social cohesion, which shape how spaces are used and managed. Simultaneously, Policy and Financing mechanisms—such as supportive legal frameworks, social housing policies, and innovative funding models—determine which design solutions and participatory approaches are feasible and scalable. In turn, the success of cohousing initiatives in practice feeds back into policy development and informs future architectural and planning strategies.

BUILDING A TRANSDISCIPLINARY TRAINING AND RESEARCH ENVIRONMENT

The first nine months of the project were dedicated to selecting the 15 early-stage researchers (ESRs) from the 246 applications received worldwide and establishing the blended learning structure.

The selected candidates come from diverse backgrounds, including architecture, urban planning, economics, social innovation, governance, financing, sociology, and political science. Each researcher was assigned a project linked to one of the network's three main research areas—Design, Planning and Building (6 projects), Community Participation (3)

and Policy and Financing (6)—ensuring that their work contributes to the overall goal of integrating technical, social, and policy perspectives in affordable and sustainable housing.

From July 2021 to September 2024, RE-DWELL implemented a transdisciplinary research and training environment combining courses, networking activities (workshops, summer schools, conferences), and secondments with academic and professional partners. These activities enabled ESRs to develop the skills needed to address affordable and sustainable housing while fostering cross-disciplinary collaboration, knowledge exchange, and connections between academia and society. Over these three years, the project members produced publications, white papers, and policy recommendations on financial incentives, citizen participation, sustainable construction, energy equity, and education reforms.

Building on this collective experience, the book presents the conceptual frameworks, research methods, and collaborative processes developed within RE-DWELL, offering academic researchers, students, policymakers, housing practitioners, and community stakeholders a comprehensive overview of how transdisciplinary research can inform policy, practice, and education in the field of affordable and sustainable housing.

The book serves as both a synthesis and a practical guide to the work of the network, including links to the RE-DWELL website to access additional resources and outputs.

STRUCTURE AND CONTENT OF THE BOOK

The book is structured in six parts, tracing a progressive expansion of collaboration in housing research—from cross-disciplinary understanding, to interdisciplinary knowledge building, and ultimately to full transdisciplinary integration. Part 1 outlines contemporary housing challenges, followed by Part 2, which introduces the conceptual foundations of transdisciplinarity in affordable and sustainable housing. Part 3 presents the training and research framework developed within RE-DWELL, while Part 4 examines how interdisciplinary collaborations inform policy, participation, and learning. Building on this foundation, Part 5 addresses collaboration with communities in research, and Part 6 focuses on the integration of academic and professional practice as a key dimension of transdisciplinary housing research.

The Appendix features a round table in which scholars from housing studies, architecture, urban planning, and energy systems discuss transdisciplinary approaches to affordable and sustainable housing, highlighting its complexity and implications for both research and practice.

Part 1. Setting the stage: A cross-disciplinary view of contemporary challenges in affordable and sustainable housing

Three guest-author contributions engage with central contemporary issues in the pursuit of affordable and sustainable housing. Organised

around the project's three thematic areas—Design, Planning and Building (1.1), Community Participation (1.2), and Policy and Financing (1.3)—they reveal the field's systemic interconnectedness, highlight the importance of cross-disciplinary collaboration, and identify areas requiring further transdisciplinary research.

Part 2. Transdisciplinary innovation in housing research and academic development

Transdisciplinarity is explored in the context of affordable and sustainable housing, providing a critical overview of its core concepts (2.1), and presenting an abridged account of the RE-DWELL learning and research environment (2.2). Together, these chapters articulate the conceptual foundations of the RE-DWELL transdisciplinary learning and research environment.

Part 3. Developing a shared framework: Disciplinary insights and collaborative knowledge building

Showcasing the body of knowledge generated in the RE-DWELL transdisciplinary learning and research environment, this part summarises the fifteen ESRs' research projects (3.1) and provides an account of collective insights and structured resources compiled in the vocabulary, case library, and challenges repositories (3.2). This content represents the core of the collective knowledge, gathered and systematised to support shared understanding, inform future research, and guide practical applications in affordable and sustainable housing.

Part 4. Exploring affordability and sustainability in housing: Policy, people, and learning

This part focuses on interdisciplinary collaborations, with ESRs and supervisors jointly reflecting on transversal issues in affordable and sustainable housing. These include social housing policy (4.1), resident engagement in sustainable building retrofits (4.2), and community-based architectural education (4.3), highlighting the roles of governance, resident participation, and educational practices in influencing housing, community, and policy development.

Part 5. Interlinking research domains with community engagement and co-creation

It includes reflections on connecting research fields in affordable and sustainable housing (5.1), engaging communities as drivers of sustainable dwelling (5.2), and applying participatory methods to collaboratively define problems and develop solutions with experts and other stakeholders (5.3). Collectively, these insights highlight how the notion of community is embedded in the RE-DWELL transdisciplinary learning and research environment.

Part 6. Integration of academia and practice in transdisciplinary research

This part examines the interaction of academia and professional practice within RE-DWELL's transdisciplinary learning and research environment. It includes reflections on the value of secondments in housing research (6.1) and dialogues on bridging theory

and practice (6.2), highlighting how collaboration with professionals fosters the co-production of actionable knowledge.

Each part includes editor's notes that offer reflective insights, creating a continuous narrative that runs throughout the book.

1

Setting the stage: A cross-disciplinary view of contemporary challenges in affordable and sustainable housing

An overview of contemporary challenges in affordable and sustainable housing, revealing the field's systemic interconnectedness and the cross-disciplinary issues that drive the need for transdisciplinary research.

1.1

Reduce, Space, Share

by Marta Peris and José Toral

1.2

The co-production turn in community participation in housing

by Darinka Czischke and Sara Brysch

1.3

Housing policy and finance: Balancing affordability, sustainability, and social need

by Kath Scanlon

Design, Planning, and Building

REDUCE, SPACE, SHARE

Sustainability

Achieving a balance among environmental, economic, and social dimensions, articulated through architectural design that delivers resilient, high-quality living environments.

Reduce

Minimising resources, energy, and materials while optimising multifunctional construction for greater efficiency and reduced environmental impact.

Space

Creating in-between spaces (courtyards, atria, gardens) that regulate climate, reduce energy use, and foster social interaction.

Share

Promoting equity and community through shared housing, facilities, mobility, and collaborative infrastructure.

Integration and ethics

Combining Reduce, Space, and Share, and embracing scarcity, collaboration, and environmental limits to achieve housing that is viable, bearable, and equitable.

Through thoughtful design and planning, professionals can create housing that balances affordability, energy performance, and social cohesion, translating policy and community input into sustainable living environments.

Community Participation

THE CO-PRODUCTION TURN IN COMMUNITY PARTICIPATION IN HOUSING

Shift from participation to co-production

Traditional citizen participation is often superficial or technocratic; co-production instead positions residents as active collaborators in design, implementation, and governance.

Collaborative housing models

Co-production is embodied in cohousing, housing cooperatives, community land trusts, and other collective self-organised initiatives that emphasise shared decision-making and distributed responsibilities.

Co-design as integral

Residents actively co-design housing projects with professionals, shaping spatial layouts, shared facilities, and communal values, fostering collective ownership.

Transforming professional roles

Architects and planners shift from sole authorship to roles as facilitators, mediators, and co-designers, requiring skills in negotiation, facilitation, cultural sensitivity, and ethical awareness.

Social and environmental benefits

Co-produced housing strengthens social cohesion, inclusion, adaptability, and sustainability by integrating energy efficiency, communal living, and flexible spatial configurations.

Challenges and institutional barriers

Risks include overburdened residents, rigid planning systems, limited collaborative training, and reliance on voluntary effort; institutional support is crucial for scalability and long-term success.

Collaborative design and co-production position residents as active partners, fostering flexible, efficient, and socially connected housing while supporting energy- and resource-efficient outcomes.

Policy and Financing

HOUSING POLICY AND FINANCE: BALANCING AFFORDABILITY, SUSTAINABILITY, AND SOCIAL NEED

Affordability and supply gaps

Housing costs are rising as demand outpaces supply, constrained by planning, land availability, and construction bottlenecks.

Social vs. market housing

Social housing supports low-income households, while broader affordable housing policies must clearly define eligibility, pricing mechanisms, and policy objectives to prevent gaps.

Environmental sustainability

Upgrading energy efficiency and reducing carbon emissions in new and existing homes is crucial, though it requires substantial investment and may influence overall housing costs.

Social sustainability and community

Well-designed homes and neighbourhoods, including community-led initiatives, enhance wellbeing, social cohesion, and inclusive urban living.

Finance and policy mechanisms

Subsidies, public-private partnerships, and innovative financing shape the feasibility of housing policies and determine who benefits.

Policy context and trade-offs

Local legal frameworks, market conditions, and competing objectives—affordability, sustainability, and social value—require careful balancing to achieve equitable and effective housing outcomes.

Policy frameworks that guide housing design, finance, and sustainability enable well-planned developments that deliver public value, enhancing livability, climate performance, and community cohesion.

1.1

Reduce, Space, Share

Marta Peris and José Toral

The first major international environmental conference, the Conference on the Human Environment, held in Stockholm in 1972 (United Nations, 1972), marked the first formal acknowledgment that environmental issues were of worldwide concern.

Sustainable development was consolidated as a key concept with the Brundtland Report (World Commission on Environment and Development, 1987), titled *Our Common Future*, which defined it as: “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

This definition laid the groundwork for a broader debate at the Rio Earth Summit (United Nations, 1992), with the identification of three fundamental dimensions: environmental sustainability, aimed at preserving ecosystems and natural resources; economic sustainability, understood as the ability to generate wealth and employment efficiently; and social sustainability, focused on community cohesion and quality of life.

In 1994, John Elkington introduced the concept of the triple bottom line (TBL) (Elkington, 1997), which reframed the sustainability debate by emphasising the need to balance these three dimensions simultaneously: People (social), associated with equity, justice, and improved quality of life; Planet (environmental), linked to the preservation of ecosystems and the responsible use of natural resources; and Profit (economic), understood not only as corporate profit, but also as the ability to generate wealth and employment in an efficient and fair way. This integrative approach situated sustainability beyond mere environmental stewardship, consolidating it as a framework that interdependently articulates the social, the economic, and the ecological.

Derived from the TBL and from the debates of the Rio Summit, a graphic representation known as the three-circle model became popular in the late 1990s and early 2000s, depicting sustainability as the intersection of the three realms; environmental, social, and economic (Figures 1.1.1 and 1.1.2). In this framework, what is viable arises from the overlap between environmental and economic factors; what is equitable, from the relationship between social and economic dimensions; what

is bearable, from the combination of social and environmental considerations; and what is fully sustainable, from the balance among all three realms.

Subsequent Earth Summits further expanded this framework: the Johannesburg Summit (United Nations, 2002), also known as Rio+10, which focused on poverty and social equity; the Rio+20 Summit (United Nations, 2012), whose final document, *The Future We Want*, paved the way for the Sustainable Development Goals; and the New York Summit (United Nations, 2015), where the *2030 Agenda* and its 17 SDGs were adopted.

While global agendas have defined sustainability in policy and economic terms, architecture and urban design translate these frameworks into spatial, material, and social realities. Built environments mediate between ecological constraints, economic resources, and collective needs, materialising the balance between what is viable, bearable, and equitable. Within this context, our projects position architecture as an active instrument of sustainability.

We recognise that purely environmental solutions may lack economic viability; economic proposals are not always socially equitable; and social initiatives, if they ignore ecological limits, may cease to be environmentally feasible. Our work develops precisely at the intersection of these three realms, balancing them through three complementary strategies: Reduce, to ensure efficiency and viability; Space, to integrate environmentally bearable limits; and Share, to strengthen the equitable and community dimension. Crucially, this work is underpinned by an ethical imperative that guides the commitment to sustainability of the architecture profession.

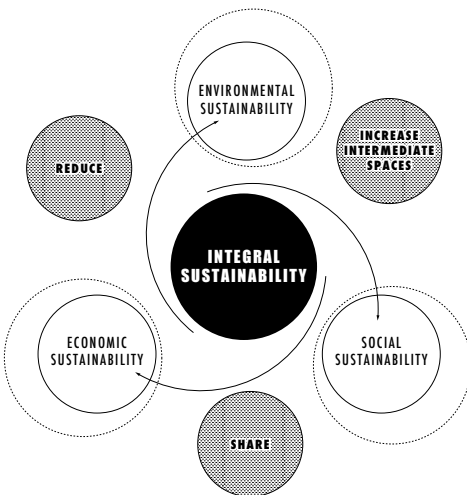


FIGURE 1.1.1: Reduce, Space, Share. Drawing by Peris+Toral.

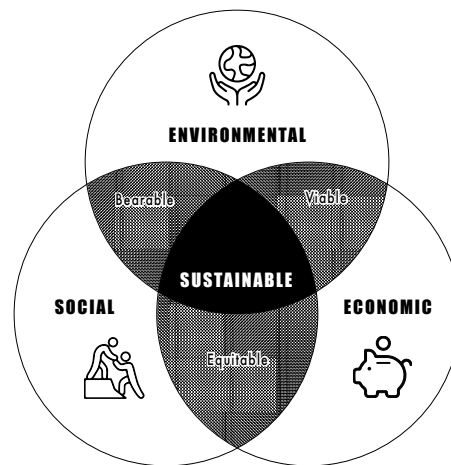


FIGURE 1.1.2: Bearable, Viable, Equitable. Drawing by Peris+Toral.

1. REDUCE: MORE WITH LESS

The concept of the three Rs—Reduce, Reuse, and Recycle—was formulated in environmental policy during the 1970s and has since become a foundational principle in sustainable design. The first level of this hierarchy is Reduce. This strategy is not limited to a call for material efficiency; it constitutes a guiding principle across contemporary architectural practice: fewer resources, less energy, less waste, and, consequently, lower costs and reduced environmental impact. The underlying philosophy is clear: achieving more with less, pursuing construction solutions that dispense with superfluous finishes and require fewer layers, less thickness, and less weight—without renouncing spatial quality, architectural expressiveness, or a constructive aesthetic based on simplicity and plainness.



FIGURE 1.1.3: MODULUS MATRIX. Social Housing in Cornellà, 2021, by Peris+Toral. Photograph by José Hevia.

Mies van der Rohe famously summarised his architectural philosophy with the dictum, “less is more”. For Mies, simplicity and clarity were essential paths to high-quality design. Reducing elements to their core served a dual purpose: it liberated architecture from unnecessary artifices while highlighting the intrinsic beauty of materials and the power of structure to shape space. In this sense, “less is more” is not merely an aesthetic statement but also a design principle grounded in efficiency, economy of means: the pursuit of maximum effect with minimal resources.

Mies’s legacy was reformulated in the context of postwar London, marked by scarcity of resources and material austerity. In 1953, Alison and Peter Smithson proposed a project for a small house in Soho which, according to their memo published in *Architectural Design* (Smithson & Smithson, 1953), would have been the first example of New Brutalism in England. In the project specifications, they advocated the full exposure of the structure, avoiding any internal finishes wherever possible. For the Smithsons, reduction meant stripping construction of added finishes and superfluous layers, revealing both the rawness of materials and the sincerity of structure as a response to material scarcity and as an ethical stance in design.

Our interpretation of this material honesty is oriented toward a performance-based design that values the intrinsic properties of materials, prioritising those capable of meeting multiple requirements at once, thereby reducing the number of construction layers. This challenges the Modern Movement’s logic of specialisation, which divided each requirement into an isolated component or system, thereby increasing constructional complexity. In contrast, we propose multifunctional layers that serve structural, acoustic, and thermodynamic purposes simultaneously. Ultimately, this emphasises the wisdom of valuing what is good and sufficient,

cautioning against the endless pursuit of what is merely perceived as better as Voltaire (1770-1772) famously noted in *Questions sur l'Encyclopédie*, drawing on an older Italian proverb: “*Le mieux est l'ennemi du bien*” (“The best is the enemy of the good”).

While the Smithsons associated reduction with the elimination of layers and artifices, Frei Otto and Buckminster Fuller oriented it toward extreme lightness through geometry and structural efficiency. Otto, in his form-finding studies at the University of Stuttgart during the 1960s (Otto & Rasch, 2006), liberated our understanding of architecture, shifting it from a view of closed, static volumes to one of active structures emerging from physical laws. Tension, membranes, and nets became means to reveal optimal geometries, tuned to minimal material use and maximum load-bearing capacity. Fuller, for his part, framed reduction as a universal principle of material and energy efficiency. His famous call to “do more with less” (Fuller, 1969) was not about an aesthetic of simplicity, as in Mies, but about optimising resources on a planetary scale. His geodesic domes and insistence on reducing weight—exemplified in his question to Norman Foster, “How much does your building weigh, Mr. Foster?”—pointed to the urgency of decreasing construction mass and ecological footprint. In doing so, he anticipated a way of thinking in which structural lightness and technological innovation become fundamental strategies for architecture capable of responding to today’s environmental limits.

Vernacular architecture had already intuited this geometric logic: when labour was inexpensive and materials costly, craftsmanship was applied to shaping each element precisely, optimising its structural behaviour and minimising material use. Geometry, in this sense, functioned as a resource for material economy expressed in vaults, arches, or interlaced structures—where human labour compensated for scarce resources. However, twentieth-century globalisation inverted this equation. The relative cheapening of materials and the progressive rising cost of labour transformed construction practices. Speed of assembly began to be favoured over geometric optimisation, often increasing material used to reduce execution time. This shift was further reinforced by the aesthetic movement of minimalism and abstraction, where formal purity became a value in itself. Thus, minimalism validated the use of simplified geometries, even when their apparent austerity entailed greater material consumption.

Today, in the face of the high environmental cost of materials, we propose rethinking this logic from a contemporary design perspective. Returning to geometry no longer entails resorting to artisanal labour but instead harnesses technological innovation. Prefabrication and numerically controlled manufacturing (CNC) systems make it possible to integrate complex geometries without intensive manual work. Understood in this way, geometric form ceases to be an artisanal luxury or formal excess and regains its essential condition: an effective means to align materials to their structural behaviour, reduce consumption, and simultaneously uphold both ethical and aesthetic aims in architecture.

In this sense, the strategy of reduction should not be understood solely as a matter of saving material or energy, but as an intellectual and cultural attitude toward design. To reduce is to embrace scarcity as an opportunity to rethink construction techniques, value the expressive rawness of materials, and advocate an aesthetic of simplicity in which constructive sincerity replaces nonessential detailing. At the same time, it responds to the need for viability, seeking solutions that optimise resources and costs without compromising spatial quality or architectural meaning. Ultimately, it means working within limits—of resources, energy, environmental impact—to find new forms of creativity and design rigour within them.

Thus, reduction emerges as a transversal principle connecting the formal synthesis of the Modern Movement, the austerity ethics of Team X, the technological lightness of High Tech, and geometry understood as a resource for efficiency. At this intersection, architecture finds a framework from which to contribute actively to contemporary sustainability: less weight, less matter, less energy—but more clarity, more honesty, and more meaning.

2. SPACE: SECOND SKIN

Throughout their service life, constant physical and biological processes turn buildings into active systems. The movement of air and heat, solar radiation, material inertia, and water evaporation—together with biological phenomena such as plant evapotranspiration or rain capture and filtration—generate dynamics that influence comfort, energy use, and environmental quality. Far from being inert objects, buildings can be understood as open systems where matter and energy flow in continuous interaction with the environment.

The strategy of spatial articulation seeks to give architectural form to these processes through the creation of in-between spaces, such as gardens, courtyards, elevated streets, solar chimneys, and atriums. Instead of serving as voids or transitional areas, these realms function as active bioclimatic devices, enhancing exchanges with the environment and supporting both environmental performance and social interaction.

As Victor Olgyay noted in *Design with climate* (Olgyay, 1963), understanding the relationship between architecture and climate is a foundational pillar of design. In-between spaces operate as thermodynamic thresholds, regulating the energy balance between inside and outside. They function as thermal buffers, moderating



FIGURE 1.1.4: GREENH@USE 140. Social housing in Barcelona, 2024, by Peris+Toral. Photograph by José Hevia.

temperature swings, storing solar heat in winter, and facilitating its dissipation in summer. By performing these bioclimatic functions, in-between spaces and the building's materiality provide thermal comfort directly, reducing reliance on mechanical HVAC systems. Grounded in the principles of conduction, convection, and radiation, this strategy can significantly reduce both energy consumption and related greenhouse gas emissions.

The significance of these in-between spaces extends beyond environmental performance. When connected to building circulation, they act as catalysts for social interaction, helping to foster cohesive communities. By integrating vegetation, water, and daylight, they also materialise E. O. Wilson's biophilia hypothesis (Wilson, 1984), which highlights humans' innate affinity with nature.

Ultimately, spatial articulation is more than the insertion of voids into the built mass. It creates habitable ecosystems where physical, thermodynamic, and biological processes converge. Architecture thus functions as an active second skin, mediating between humans and their environment, and promoting both environmental and social wellbeing throughout the building's life.

In the Mediterranean climate, the atrium of the Roman house is a paradigmatic example of this principle. Located at the heart of the dwelling, it organised the distribution of rooms around an impluvium that collected rainwater through the compluvium, an opening in the roof. Its operation was profoundly thermodynamic: the upper aperture admitted light and natural ventilation, while the body of water acted as a hygrothermal regulator—absorbing latent heat by evaporation to cool the air in summer and storing thermal energy in winter. In this way, the atrium fulfilled a double function: social, as a space for reception and ceremonies; and environmental, as a device for climate regulation and the capture of natural resources.

During the nineteenth century, the Industrial Revolution radically expanded the possibilities of in-between spaces through the mass production of flat glass and cast-iron structures. These innovations made it possible to cover large surfaces, giving rise to new building types such as greenhouses, galleries, and covered passages, designed to take advantage of thermal dynamics and create more comfortable and efficient interior microclimates. In cities like Paris or London, entire streets were transformed into covered arcades that protected pedestrians from rain and cold, while in other European cities, courtyards were reinterpreted with glass roofs, effectively functioning as solar collectors that stored heat during the day and slowly released it at night.

A representative example is the *Cité Napoléon* in Paris, designed in 1851 by the architect Marie-Gabriel Veugny and built in 1853. Developed on the initiative of Napoleon III, it reflected his commitment to social and urban improvement, which later culminated in his collaboration with Baron Georges-Eugène Haussmann on the great urban reform of Paris from 1853 to 1870. This transformation modernised the medieval city into an efficient, hygienic metropolis, laying the foundations

of contemporary urban planning. Within this hygienist framework, and inspired by the ideas of Charles Fourier, residential complexes for workers were promoted to provide not only housing but also basic sanitary conditions and community services. The *Cité Napoléon*, located on Rue Rochechouart, was one of the first social housing experiments in Europe. Conceived as a miniature *familistère*, it accommodated around 200 working-class families, most of whom were employed at the district's gasworks. The complex was organised around central walkways and courtyards covered by glass roofs, which provided daylight and acted as thermodynamic devices, maintaining a stable interior microclimate and storing heat in winter. Beyond their environmental role, these intermediate spaces served hygienist and productive aims: they improved workers' quality of life and health while supporting job performance. Shared facilities, including lavatories at corridor ends, a nursery, medical assistance, laundry, and drying rooms, fostered both efficiency and social cohesion.

In a similar vein, the *Familistère de Guise* (1860), promoted by Jean-Baptiste André Godin and inspired by Fourier's ideas, revived the logic of the Roman atrium from both social and environmental perspectives. Its large glass-covered courtyards provided protected settings for social interaction, play, and community life, while simultaneously functioning as thermal regulators: in winter they captured and stored solar heat under the roof and, in summer, they could be ventilated through operable skylights. In this way, the building supported both the community's social needs and fundamental environmental principles, achieving a balance between collective wellbeing and comfortable, climate-responsive living.

The nineteenth century, with its technical and material innovations, reimagined the legacy of the Roman atrium, endowing it with new capacities through the use of glass and iron. These spaces, combining light, air, and heat, expanded the tradition of courtyards and atria into bright, efficient, and protective interiors that integrated passive heating and cooling strategies into residents' daily lives.

In the twentieth century, however, the expansion of fossil fuels and the invention of air conditioning shifted the achievement of comfort from architectural design to mechanical systems. This model revealed its limits amid successive energy crises: the first (1973–1974) and second oil crises (1979–1980) linked to conflicts in the Middle East, the Gulf crisis (1990–1991), and the 2008 crisis, when the price of a barrel reached 147 US dollars. These episodes highlighted that reliance on fossil energy not only imposed unaffordable economic burdens, but also produced escalating environmental impacts. The latest crisis in 2021–2022, intensified by Russia's invasion of Ukraine, again underscored the fragility of a fossil-fuel-based energy model.

In the twenty-first century, rising concerns over energy consumption and greenhouse gas emissions have refocused attention on architecture's role in mediating comfort, emphasising strategies that integrate environmental performance into building design. And it does so with a broader perspective: not only by recovering passive and bioclimatic strategies, but also by renaturalising buildings, conceiving

them as ecosystems in which the physical, thermodynamic, and biological dimensions are interwoven.

Across history—from the Roman atrium to the *Cité Napoléon* and the *Familistère de Guise*—courtyards and atria have demonstrated the capacity to integrate social and environmental functions. They are spaces where climate regulation, social cohesion, and connection with nature converge, offering a lesson contemporary architecture can reclaim: designing-between spaces that reduce energy demand, foster collective life, and make truly bearable built environments possible.

3. SHARE: FROM ACCESS TO COMMUNITY

An equitable architecture—economically and socially sustainable—is closely tied to the strategy of sharing and the logic of the collaborative economy. In *The Age of Access*, Jeremy Rifkin (2000) anticipated that the internet would radically transform the contemporary economy. His central thesis is that in an interconnected world, ownership ceases to be essential, as what truly matters is not possessing a good, but having access to its use when needed. In this paradigm, the car, the home, or even knowledge lose their status as exclusive, permanent objects and instead become shared services, temporary subscriptions, or collective experiences. The network facilitates this shift by reducing transaction costs and instantly connecting supply and demand, paving the way for what we now call the collaborative economy.



FIGURE 1.1.5: LIVING IN LIME. Social housing in Son Servera, Mallorca, 2023. Photograph by José Hevia.

The models that emerged in the platform economy clearly materialise Rifkin's ideas. In the realm of mobility, car sharing—preceded by neighbourhood initiatives in Zurich in the 1950s—was institutionalised at the end of the twentieth century with initiatives such as *SwitzerlandMobility* (1995), followed by *Zipcar* in the United States (2000) and *BlaBlaCar* in France (2006). These platforms consolidated a model that evolved from a local practice into a global network, reshaping the relationship between car ownership and use and reducing the need for private vehicles.

In accommodation, the collaborative economy has profoundly transformed the way we travel. Platforms such as *HomeAway* (2005) and *Airbnb* (2008) expanded the supply of temporary housing and diversified forms of hospitality, offering more personalised and flexible experiences compared to the traditional hotel model.

This shift not only democratised access to tourist services but also reconfigured neighbourhoods and cities by introducing new dynamics of exchange between residents and visitors.

In parallel, coworking opened up new forms of organising work, based on sharing infrastructure, services, and social networks. Although its antecedents go back to spaces like *C-Base* in Berlin (1995) or the *Coworking Space* founded in San Francisco in 2005, it was with *WeWork*, created in New York in 2010, that the model reached a global scale. The company revolutionised the office real estate market by offering flexible contracts, integrated services—from internet access to cafés and event rooms—and, above all, a community of interconnected users. Coworking evolved from being an economical option for freelancers and small businesses into a new paradigm of workspace occupation, capable of competing with traditional offices and influencing their evolution toward more flexible, collaborative formats.

In housing, the collaborative economy has a clear precedent in the cooperative movement, which since the late nineteenth and early twentieth centuries has explored collective strategies to ensure equitable access to goods and services. In the realm of housing, this legacy is exemplified in Vienna, where approximately 75% of primary residences are rented and more than 60% of the population lives in social or affordable housing. What distinguishes the Viennese model is not so much the presence of large private developers—though they exist—but the strong involvement of the city council and nonprofit cooperatives (*Gemeinnützige Bauvereinigungen*, GBVs). Since the 1920s, in the era of *Rote Wien* (Red Vienna), the city has directly promoted large residential complexes and today manages around 220,000 municipal homes, making it one of the largest public housing authorities in Europe. In parallel, housing cooperatives—some 185 active entities in Austria—develop and manage nearly a quarter of Vienna's housing stock, offering long-term, regulated rents well below market prices. Complementing these efforts are subsidised private developers, who build under the *Wohnbauförderung* framework and maintain accessible, controlled prices. The result is a robust and balanced model that guarantees high-quality, long-term affordable housing, and has become an international benchmark in urban and social policy.

In Zurich, the trajectory of housing cooperative spans more than a century. Their origin dates back to 1908, when workers of the Swiss Federal Railways (SBB/CFF/FFS) founded the city's first rental cooperative, shortly after the municipality promoted its first public housing building in 1907. During the interwar period, these initiatives were consolidated in response to strong demand for social housing, becoming a key instrument of urban policy. Decades later, following the economic and urban crises of the 1980s and 1990s—marked by deindustrialisation and real-estate speculation—cooperativism in Zurich gained new momentum. In this context, architects and activists such as Andreas Hofer spearheaded pioneering projects like *Kraftwerk 1* (1999), which incorporated sustainability criteria, social mix, and vibrant community life. Building on this foundation, the *Mehr als Wohnen* (2015) project, also led by Hofer, represents the contemporary culmination of this trajectory: an innovative model that organises housing in clusters, strengthens collective

life through shared spaces, and activates ground floors with workshops, shops, childcare, and cultural facilities. In this way, shared spaces cease to be mere add-ons and become genuine urban and social infrastructure, articulating community, sustainability, and city.

In Copenhagen, cohousing has its roots in the 1960s, with proposals by Jan Gudmand-Høyer and the Andel model, which inspired architects such as the Vandkunsten collective, pioneers in designing cooperative communities that balanced private and common spaces. These environments incorporated shared laundries, collective kitchens, dining rooms, and guest rooms—not only to optimise resources, but also to foster community life. Far from being a mere economic strategy, this model introduced a cultural and social dimension: sharing appliances helped reduce planned obsolescence, while common spaces strengthened neighbourly support networks and mitigated isolation. The Danish tradition, particularly in Copenhagen, thus emerged as one of the strongest precedents of the collaborative economy applied to the residential sector, demonstrating that cooperative housing can serve as social infrastructure, articulating community, sustainability, and new ways of living.

Taken together, Vienna, Zurich, and Copenhagen, represent the most advanced expression of the collaborative economy applied to housing. While the initial purpose of cooperatives was the creation of collective financing systems that pooled economic resources to guarantee access to housing, their scope has broadened in recent decades. Today, it is no longer just about financing and building; it is about sharing ways of life, creating living environments where the common becomes a structural principle of sustainability, mutual support, and urban resilience.

In the twenty-first century, it is our turn to learn to share. Homeowners' associations have traditionally functioned as spaces for problem management, with far less emphasis on imagining collective aspirations. At present, however, the challenge is to build infrastructures that foster social bonds and cultivate community in a society marked by a rise in single-person households, population aging, and undesired loneliness. Sharing thus emerges as a strategy of social sustainability, to be across different scales and with varying intensities. In cluster housing, sharing involves reducing private floor areas—limited to bedrooms, bathrooms, and kitchenettes—and compensating with shared spaces for three to five units, including collective kitchens and living rooms designed to combat isolation and support intergenerational coexistence. On landings, spaces such as satellite rooms or community laundries not only encourage social interaction but also contribute to extending the life cycle of objects and fighting planned obsolescence.

At the building scale, sharing takes the form of collective kitchens, multipurpose rooms, or common libraries that connect with the neighbourhood, anchoring dwelling within a broader community. At the urban scale, sharing manifests in community gardens, communal facilities, energy communities, and shared mobility systems. These resources can be organised through simultaneous or alternating use,

flexibly managed via digital platforms that enable users to reserve and coordinate access.

Car sharing deserves particular attention. Beyond reducing the number of privately owned vehicles, it introduces a structural change in the city: communities are already experimenting with shared fleets and, in the near future, autonomous mobility will require a rethinking of parking functions. When the need for underground residential parking disappears, an opportunity arises to renaturalise the freed ground, allowing roots and foundations to reconnect directly with the earth.

All this invites a rethinking of the boundaries between the private and the common: we are no longer referring to spaces rigidly separated by opaque doors, but to a continuum of transitions, filters, and in-between areas that blur borders and enable more flexible ways of living. The goal is not to dissolve the individual into the collective; rather, it is to strike a balance between privacy and community, recognising that equity and sustainability rely on shared infrastructures that optimise resources and strengthen social cohesion.

4. CONCLUSIONS

The historical trajectory of sustainability—from the Stockholm Conference to the 2030 Agenda—shows that preserving ecosystems or ensuring economic efficiency is insufficient: true sustainability exists only at the intersection of the environmental, the economic, and the social. In architecture, this integral vision translates into strategies capable of addressing all three realms simultaneously.

To reduce is not merely to save resources, but to adopt a critical stance toward excess. It entails stripping building construction of superfluous layers, favouring lighter, multifunctional systems, and transforming scarcity into a catalyst for creativity. Ultimately, it embodies the principle of sufficiency: designing and building only what is necessary, avoiding waste, and acknowledging material and energy limits as integral to design. This ethics of reduction—heir to Miesian essentiality, High-Tech lightness, and Brutalist honesty—turns efficiency and sufficiency into opportunities for innovation and design rigour.

Spacing in architecture acknowledges that buildings are open systems in constant dialogue with climate and the biosphere. In-between spaces function as bioclimatic thresholds that—grounded in thermodynamics principles—moderate energy, regulate comfort, and harness natural resources. At the same time, they provide settings for meaningful encounters, where human interaction and biophilic connections unfold. In this sense, spacing forms an active second skin—a living membrane that mediates between environmental comfort and social cohesion throughout the life of the building.

To share, finally, shifts the focus toward equity and redefines the paradigm of ownership, replacing it with access. The collaborative economy and cooperativism demonstrate that the common can become genuine urban and social infrastructure. By extending the useful life of objects and mitigating planned obsolescence, sharing addresses contemporary challenges such as social isolation, fragmentation, and the energy transition. It offers a framework in which privacy and community do not exclude one another but instead balance and reinforce each other.

Taken together, Reduce, Space, and Share function as interconnected dimensions of a single design ethic. They translate sustainability into lived experience, shaping environments that optimise efficiency, foster meaningful social interaction, and align seamlessly with ecological limits.

In short, the challenge for contemporary architecture is to move beyond the paradigm of the purely individual and embrace the potential of the collective, imagining new ways of living that are viable, bearable, and equitable. Only through this threefold strategy can architecture become a decisive tool for shaping the housing–wellbeing systems of the twenty-first century.

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1.2

The co-production turn in community participation in housing

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Since the 1970s, the concept of *public participation* has become a central tenet in discourses on housing and urban planning globally. Advanced by influential scholars such as Jacobs (1961), Arnstein (1969), and later Healey (1997) and Sanoff (1999), participation has inspired an expansive array of conceptual frameworks, policy instruments, and practical methodologies. Over time, its meaning and purpose have evolved (Glucker et al., 2013), reflecting divergent theoretical positions—from Arnstein’s (1969) radical democratic critique of citizen participation as “the redistribution of power that enables the have-not citizens, presently excluded from the political and economic processes, to be deliberately included in the future” (p. 216), to the OECD’s (2001) policy-oriented framing as the active involvement of citizens in decision-making and policy-making processes, including the provision of information, consultation, and active participation. This evolution marks a broader shift toward a managerial and procedural interpretation of participation, one that has constrained its potential as a meaningful vehicle for empowering non-professionals. In many contexts, participatory processes have been appropriated, instrumentalised, or rendered superficial—diminishing their transformative capacity and undermining residents’ agency in shaping the spatial and social conditions of their everyday lives (Cooke & Kothari, 2001; Purcell, 2006).

In response to this impasse, recent scholarship and practice have begun to coalesce around the concept of *co-production* as a more robust and reciprocal model of engagement. Unlike conventional participatory approaches, in which end-users are consulted or invited to provide input on projects already conceived, co-production is predicated on a relational paradigm that positions residents not merely as consultees but as active collaborators in the design, implementation, and governance of housing and urban initiatives (Ostrom, 1996; Brandsen & Honingh, 2016).

Within the housing sector, co-production can be defined as a relational process in which residents actively collaborate with professionals in the design, delivery, and governance of housing, emphasising empowerment, agency, and collective responsibility. Housing co-production is increasingly recognised as essential for fostering more inclusive, democratic, and resilient forms of provision—particu-

larly through collaborative and community-led housing models such as cohousing, housing cooperatives, and community land trusts. Collaborative housing has been conceptualised as a multi-stakeholder process, emphasising the role of intermediary actors, such as housing associations and local authorities, in either enabling or constraining these initiatives (Czischke, 2018). In this sense, collaborative housing can be considered a practical manifestation of the broader co-production paradigm. Moreover, co-production in housing requires not only institutional support but also a reframing of professional roles and capabilities, particularly in contexts historically dominated by top-down or market-led housing provision (Czischke & Huisman, 2018).

From an architectural perspective, the design phase of collaborative housing projects is often referred to as a *co-design* process, in which end-users—the residents—are highly involved in design decisions and collaborate both among themselves and with architects to co-produce a housing project that reflects the collective values and needs established by the resident group (Czischke, 2018; Brysch, 2023). This shift entails significant epistemological and practical implications for professionals, whose roles must evolve to support co-learning, negotiation, and facilitation across diverse groups (Frediani & Boano, 2012; Albrechts, 2013; Czischke et al., 2023). Consequently, planning systems and educational institutions must reconsider how they prepare future professionals for these emerging modes of practice.

Collectively, these developments call for a critical analysis of the contours of the emergent co-production paradigm within the field of housing. Such an examination must interrogate the institutional and pedagogical transformations required to support this shift and explore the individual and collective capabilities that both residents and professionals must cultivate to engage meaningfully in co-productive processes.

1. FROM PARTICIPATION TO CO-PRODUCTION IN HOUSING

Over recent decades, the concept of co-production has gained increasing prominence, often celebrated as a more democratic articulation of participation. As Gonçalves (2025, p. 447) observes, “Participation is frequently operationalized as a formal requirement rather than a transformative political practice, resulting in a model that privileges informational transparency over deliberative agency.” This critique underscores a broader concern with technocratic approaches to participation that neglect its political and emancipatory dimensions. Furthermore, Gonçalves notes that, according to Cornwall (2004) and Miraftab (2009), context-specific knowledge, everyday practices, and informal processes play a crucial role in shaping participatory processes, thereby deepening our understanding of participation’s complex and multifaceted nature.

Arnstein’s (1969) seminal “ladder of participation” has been critiqued for its linearity, rigidity, and universalist assumptions, which fail to account for the situated, iterative, and culturally embedded nature of participatory practices. In response,

co-production is frequently associated with the upper rungs of Arnstein’s ladder—particularly “citizen control”—reframed through collaborative design processes (Figure 1.2.1). Gaete Cruz et al. (2023) refer to these collaborative design dynamics and more horizontal decision-making as a possible “additional step on the ladder”.

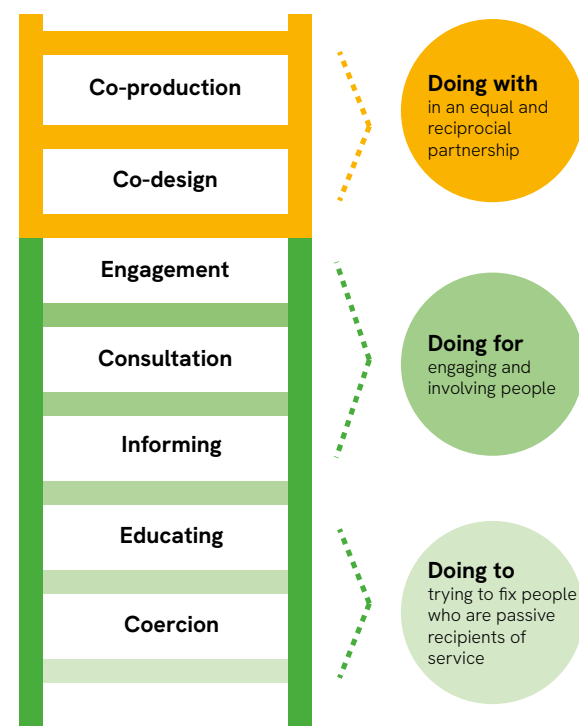


FIGURE 1.2.1: Co-production ladder.

Source: www.thinklocalactpersonal.co.uk (adapted from Arnstein, 1969).

This conceptual shift in participatory paradigms is closely linked to broader transformations in the role of the state in public service provision within advanced capitalist societies. Historically, the welfare state emerging in Western Europe after the Second World War positioned citizens as ‘recipients’, ‘subjects’, or ‘users’ of public services (Gofen, 2015; Needham, 2008). From the mid-1980s onward, however, a neoliberal orientation redefined citizens as ‘consumers’ (Clarke, 2007) or ‘customers’ (Mathiasen, 1999), expected to be “served, satisfied, and provided with a choice between alternative service providers” (Gofen, 2015, p. 405). Within this context, co-production emerges as a transformative approach to service delivery, emphasising the dual role of citizens as both producers and consumers. First introduced by Elinor Ostrom (1996; Ostrom & Baugh, 1973), the concept has since been revisited by scholars examining contemporary public service arrangements. Following Parks et al. (1981), co-production can be defined as the mix of activities jointly undertaken by public service agents and citizens in the provision of public

services. Public service agents participate as professionals or ‘regular producers’, while ‘citizen production’ refers to the voluntary efforts of individuals and groups to enhance the quality or quantity of the services they use.

From a public management perspective, Pestoff and Brandsen (2013, p. 5) describe co-production as “the arrangement where individual citizens produce their own services in full or part with public service professionals.” Similar developments can be observed in the architectural design field (Alexander et al., 1977; Turner, 1988), which has witnessed an evolution from participatory design toward collaborative design or co-design (Manzini, 2015; Stenberg et al., 2022).

In the housing sector, these broader socio-economic shifts have coincided with a steady retreat from public housing provision. Since the late 1990s, state withdrawal—intensifying across Europe and accelerated by the 2008 global financial crisis and subsequent austerity measures—has reshaped the landscape of social support. During the same period, responsabilisation discourses have gained traction, reframing social risks as matters of individual responsibility. In the housing domain, this has manifested in narratives and policy approaches that emphasise personal accountability for managing housing insecurity and related social challenges.

Housing co-design processes have facilitated the emergence of alternative dwelling typologies and have contributed to a redefinition of minimum quality standards (Brysch, 2023; Lacol & La Ciutat Invisible, 2018). These projects often reflect trade-offs aimed at reducing environmental impact and enhancing sustainability, while maintaining privacy, quality, and affordability. Common spatial features include compact private units paired with generous shared spaces, reduced reliance on individual appliances, unfinished surfaces, and improved energy efficiency.

The co-production process in collaborative housing is most clearly exemplified through self-organised collective housing initiatives. Following an earlier conceptualisation of collaborative housing (Czischke, 2018), the term can be understood as an umbrella concept encompassing housing arrangements in which “a group of people co-produce their own housing in full or part in collaboration with established providers. The degree of user involvement in this process may vary from a high level of participation in delivery and design within the context of a provider-led housing project, to a leading role of the user group in the different stages of the housing production process” (p. 7). It includes a variety of collective self-organised housing models, such as cohousing, housing cooperatives, ecovillages, living groups, and community land trusts.

The co-production process underpinning collaborative housing projects operates along two interconnected dimensions. Internally, residents collaborate to establish the project’s core parameters—such as financial models, spatial layouts, and long-term management arrangements. Externally, the resident group collectively engages with stakeholders and professionals throughout the development process. These internal and external forms of collaboration together constitute the broader co-production dynamic.

Collaborative housing projects are frequently the outcome of co-design processes, characterised by the active involvement of residents and the cooperative engagement of multiple stakeholders in shaping the project. While co-design and co-production are often conceptualised as distinct yet complementary components of co-creation—co-design relating to early design stages and co-production to implementation (Vargas et al., 2022; Etgar, 2008)—knowledge, skills, and project outcomes are in fact co-produced throughout the design process. Therefore, co-design is here understood as a constitutive element of the broader co-production process in collaborative housing (Figure 1.2.2).

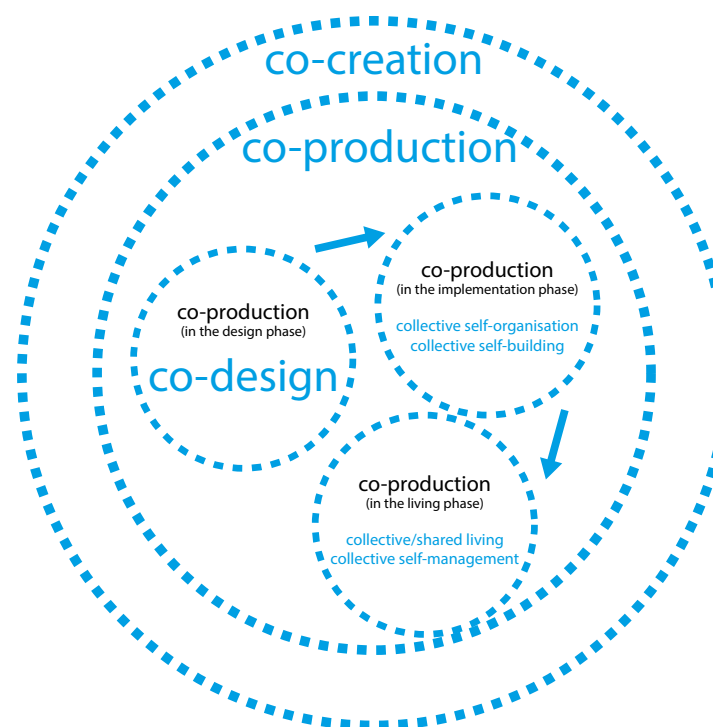


FIGURE 1.2.2: Different phases of co-production in a collaborative housing project: Source: Authors.

Co-design extends beyond the conventional user-centred design paradigm (Sanders & Stappers, 2008), drawing instead on traditions of participatory design associated with self-management and community-led development (Turner, 1988; Montaner, 2001; Stenberg et al., 2022). Alexander’s (1977) pattern language, for example, introduced design tools that enable non-professionals to shape their built environments.

Housing co-production in collaborative housing frequently extends into the inhabitation phase, integrating residents directly into both the creation and ongoing adaptation of their living environments. Through Do-It-Yourself or Do-It-Together methods—such as joint procurement of materials, finishing work, or painting (Brysch, 2023)—residents not only contribute to the construction but also to the management of shared domestic tasks, including cleaning communal areas or preparing meals for the community. Many initiatives are deliberately designed to support spatial flexibility and long-term adaptability. Design strategies that distinguish between permanent structural supports and adaptable infill elements (Habraken, 1972) enhance spatial flexibility, enabling future transformations of layouts and greater user control over dwelling configuration. Similarly, incremental housing (Aravena & Iacobelli, 2012) provides a foundational unit that can be expanded over time to accommodate residents' evolving needs and financial capacities. This approach largely departs from the more static and highly top-down Modern Movement, based on standardisation and industrial prefabrication. In many co-designed housing projects, the building is not conceived as a finished product but as an ongoing process of appropriation and co-production—an architecture of possibility an openness.

Applying a co-production lens to housing provision positions architects and other professionals in a reciprocal relationship with residents, recognising the latter as experts of their lived experience (Czischke et al., 2023). Within co-design processes, residents participate directly in shaping the design alongside professionals—particularly architects—who share responsibility for co-producing the project (Van der Velden & Mörtberg, 2015; Sanders & Stappers, 2008). In this context, the label “co-designers” applies to both residents and professionals, disrupting traditional hierarchical dynamics and replacing the conventional architect–client relationship with a more egalitarian and participatory framework. Residents contribute experiential knowledge, while architects and other professionals provide expertise in design and technical domains (Manzini, 2015).

Unlike product co-design, which typically involves individual users, multifamily housing co-design revolves around a collective client: a group of future residents who must collaboratively articulate and negotiate shared values to be embedded in the project (Brysch, 2023; Brysch et al., 2024; Czischke, 2018). Residents thereby shift from passive recipients to active agents in design and, in some cases, construction. Their shared aspiration to live communally also shapes spatial arrangements, requiring negotiation between individual preferences and collectively defined needs.

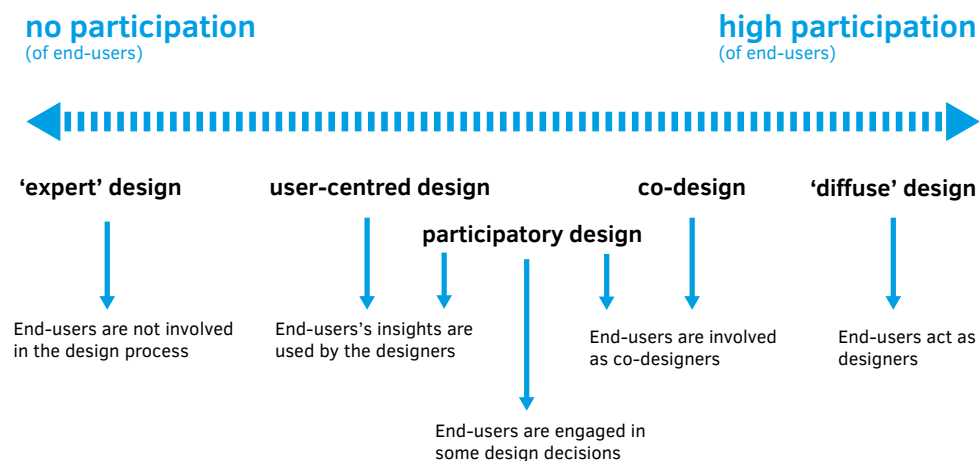


FIGURE 1.2.3: Different levels of participation in the design phase.
Source: Brysch (2023).

Participation levels among residents vary across projects and phases (Figure 1.2.3). Engagement tends to peak during early design stages when core concepts and features are co-defined (Lacol & La Ciutat Invisible, 2018). Architects must adapt their professional roles to facilitate meaningful resident participation, which involves rethinking design tools and communication methods and cultivating soft skills that facilitate dialogue and collective decision-making (Brysch, 2023; Czischke et al., 2023). Empirical research highlights that “architects who are often involved in these projects do not work for, but together with, the future residents” and that “sometimes they are fellow residents, sometimes they share the collective's vision, sometimes they themselves have an innovative vision of living, and sometimes they co-design as part of a large team” (Czischke et al., 2023, p. 81).

Within this collaborative framework, the expertise of residents and professionals converges through iterative problem-solving and negotiation, culminating in a shared vision of the housing project. This co-production process yields a distinct form of knowledge, contributing to “a repertoire of approaches and methodologies that have sought to break out of confining, disciplinary expertise” (Levy & Lipietz, 2025, p. 319). Lévy's (1997) notion of “collective intelligence” offers a valuable lens for understanding the epistemological and social dimensions of collaborative housing design.

2. PRACTICAL AND EPISTEMOLOGICAL IMPLICATIONS OF CO-PRODUCTION

The preceding discussion illustrates how both the final housing outcome and the process of its creation are fundamentally shaped by co-production. Unlike conventional top-down housing developments, co-production enables alternative spatial configurations that better reflect the specific needs and values of resident com-

munities. These configurations are collectively defined by the residents, fostering a participatory ethos throughout the project life cycle (Brysch et al., 2024). From initial conception to ongoing building management, co-produced housing initiatives generate not only economic and environmental benefits but also social value, including community cohesion and a shared sense of belonging.

In collaborative housing contexts, architects assume differentiated roles depending on their level of engagement, often developing enhanced soft skills and adopting alternative design methodologies. Co-design distinguishes itself from conventional participatory or consultation approaches through a “fundamental change in the relationship between architects and end-users” (Czischke et al., 2023, p. 87). Residents, acting as both collective clients and co-designers, gain a more accountable and empowered position within decision-making processes. This shift, however, introduces a critical tension: balancing the empowerment of non-experts with the professional authority of technical professionals. As Levy and Lipietz (2025, p. 313) observe:

Co-production is a relational practice where different knowledge brokers come together to share, learn, and respond. Bringing different knowledge bearers together is premised on power sharing and the flattening of power constellations. In reality, in spite of work to establish common norms and values, power relations can never be completely erased.

Co-design, as a key phase within the broader co-production process, should not be viewed merely as a means to an end. It generates awareness, values and competencies that transcend the physical outcome (Brysch et al., 2024). The co-design process cultivates a form of collective intelligence, enabling diverse actors—often excluded from conventional planning—to contribute meaningfully toward shared objectives. In light of this epistemological shift, co-production demands a transdisciplinary approach “building on a recognition of the interdependence of knowledges required to grasp complex processes and causalities” which “further reflects the growing call for epistemic justice” in planning and city making (Levy & Lipietz, 2025, p. 323).

These insights raise an important question: What knowledge and skills must architects—both current practitioners and future professionals—develop to engage effectively in co-produced housing projects? Addressing this requires a rethinking of architectural education and practice. Architects must combine technical expertise with competencies in facilitation, negotiation, and participatory design. They need to navigate complex social dynamics, mediate between diverse stakeholder interests, and embrace uncertainty as a productive design condition. Cultivating reflexivity, cultural sensitivity, and ethical awareness becomes essential in fostering inclusive and equitable design processes. Ultimately, the architect's role evolves from sole author to collaborator, mediator, and enabler within a broader ecosystem of knowledge, agency, and shared responsibility.

3. CONCLUSIONS

The transition from conventional citizen participation models—which typically involve consultation, advisory roles, or procedural engagement without shared decision-making—to a co-production paradigm in housing presents significant opportunities for resident empowerment and contextual responsiveness. Nonetheless, scholarly critiques highlight several limitations—practical, institutional, educational, and conceptual/power-related challenges—that warrant careful consideration.

A primary concern is that co-production can shift responsibilities from the state to citizens, particularly in contexts shaped by austerity. Such transfers may inadvertently overburden communities with responsibilities they are ill-equipped to manage, effectively outsourcing public duties without adequate support (Williams et al., 2020). Questions of sustainability and scalability further complicate the landscape. Many co-produced housing initiatives rely heavily on the voluntary labour and commitment of a small group of individuals. In the absence of sustained institutional backing, these projects often remain fragmented and vulnerable to political and economic fluctuations (Curtin & McMullin, 2025).

Institutional constraints also pose significant barriers. Planning systems are frequently rigid and poorly adapted to accommodate flexible, bottom-up approaches. This misalignment can lead to procedural delays and the dilution of community-driven visions. The tension between formal regulatory frameworks and informal participatory practices may inhibit innovation and discourage continued engagement.

Despite growing interest in collaborative living arrangements and co-design processes—particularly in North-Western European contexts—significant progress is still needed to develop innovative and effective methodologies for architects working with collective clients. These methodologies encompass techniques for participatory design, co-design facilitation, collaborative decision-making, and project management that engage residents as active contributors throughout the design and construction process. They include tools such as workshops, prototyping, iterative feedback, pattern language, and negotiation frameworks that enable equitable participation and consensus-building among diverse stakeholders. Architectural education has been slow to adapt, with curricula often failing to equip students with the skills and perspectives necessary for collaborative practice. Those pursuing co-design and participatory approaches require both new pedagogical tools and alternative professional role models.

In summary, while co-production offers a promising avenue for democratising urban development, its limitations must be critically addressed. Future initiatives should aim to clarify conceptual boundaries, redress power asymmetries, and embed co-production within robust and supportive institutional infrastructures.

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1.3

Housing policy and finance: Balancing affordability, sustainability, and social need

Kath Scanlon

Housing policy and housing finance are inextricably linked: financial mechanisms determine what housing policies can achieve, and policy decisions shape the flow of housing finance. The goals that appear in published housing strategies often relate to the number of new homes built, the price of housing and a reduction in homelessness. In the period following World War II, housing policy in many developed countries focused on the first of these: addressing a numerical shortage of homes, often with the active involvement of government. For a few decades, housing supply and demand were relatively balanced across most of Europe, and indeed in the wake of the Global Financial Crisis of 2007–2009 there were serious problems of oversupply and a glut of vacant homes in parts of Ireland, Spain and eastern Germany, as well as in Sun Belt areas of the USA (Bardhan et al., 2011).

The supply-affordability nexus has once again become a central policy concern, with cities across Europe declaring a housing crisis or emergency due to the shortage of affordable housing. Spearheaded by Barcelona (Ajuntament de Barcelona, 2025), several of the worst-affected cities have formed a new alliance under the auspices of the EU to strengthen the role of cities as central actors in shaping and implementing housing policies, ensuring that the needs of urban populations are effectively addressed.

Fundamentally, the decline in housing affordability reflects an imbalance between demand and supply. This mismatch may occur at the level of the housing market as a whole (for example, because of strong population growth unmatched by new construction), and/or be concentrated within the affordable housing sector, perhaps a legacy of the privatisation of former social units.

In many prosperous cities, the heightened demand for housing has pushed market prices and rents up to levels that local residents cannot afford. Economists often blame rigid planning systems that reduce or even completely eliminate the supply response that higher prices should trigger, noting that the tighter the planning constraints, the less new housing built (Cheshire & Hilber, 2024). Spain, Germany and the UK are among the countries revising and updating their planning systems

to stimulate more construction of new housing, but the process is often legally complex and politically fraught.

Local communities can often influence the shape of new developments through consultation mechanisms built into planning systems. But a strong focus on community consultation can result, ironically, in less new housing: those whose interests are harmed by planned development are easily identified, spatially concentrated and vocal, while those who would benefit from new homes are dispersed and have no voice in the debate.

1. AFFORDABILITY VS SUSTAINABILITY

Numerous academic and policy analyses of housing affordability have examined the relationship between the cost of housing and the income of residents. There is no universally accepted standard of affordability¹, as residents, governments, developers and neighbours may have different views (Haffner & Hulse, 2021). Nevertheless, there are rules of thumb about what this ratio should be: traditionally, households were expected to spend no more than a third of their income on housing, though this threshold has risen over time. The EU, for instance, defines households paying more than 40% of their disposable income on housing as “overburdened.” In many European cities, it is not uncommon for young renters to pay 60% or more of their income on rent, levels which no one would deem affordable.

While housing affordability has no universal standard, affordable housing in most jurisdictions is precisely defined, typically including physical quality standards, eligibility criteria, and price or rent ceilings. These ceilings, however, may not always accord with public perceptions of what is truly affordable.

The terms social housing and affordable housing are often used interchangeably, but are not synonymous. Social housing is one type of affordable housing—generally the least costly. Social housing is often directly subsidised by government and provided by specific types of landlords² to eligible (usually low-income) households. Other forms of affordable housing, by contrast, may rely more on incentives and planning tools rather than direct subsidies. Conflating social and affordable housing can obscure the different needs each addresses and may lead to ineffective housing strategies. Misunderstandings of this kind can also fuel resistance to new developments, especially when the concept of “affordable” is perceived as “not affordable enough.”

Compared to affordability, environmental sustainability is a relatively recent concern of housing policy, driven largely by the shared goal of achieving net zero carbon. Many initiatives that aim to improve the environmental performance of housing—such as requirements for double or triple glazing, solar panels or heat

¹ Similarly, there is no universal definition of housing costs: for example, some jurisdictions include utility charges and others do not.

² In most countries social housing is rented but in Spain social housing is also sold to qualifying households.

pumps—are handled not by housing ministries or departments, but by government bodies responsible for energy security, climate change or decarbonisation. These policies are having profound effects, not only because of the much higher performance standards imposed on new housing, but also due to progressively more demanding requirements applied to older housing stock. Current discussions around environmental sustainability in housing largely focus on energy performance and embodied carbon, with a vast array of KPIs and metrics tracking the sector’s progress toward net-zero goals.

By contrast the policy framework surrounding social sustainability in housing is less concrete (Alaie et al., 2022). In an urban context, social sustainability can be understood as the process of creating places that promote wellbeing by understanding and meeting the needs of the people who live and work in them. Policymakers generally accept that social sustainability is a worthwhile goal, but there is less consensus on what it means in practice, how to measure it or value it, and which instruments are most effective for achieving it.

Affordability and sustainability can often pull in opposite directions, at least in the short term. Improving affordability suggests driving costs down, whereas enhancing environmental sustainability usually requires sizeable upfront investment, although it may result in lower utility costs over time.

Housing affordability and sustainability are also affected by decisions in other policy areas, including spatial planning, the macroeconomy, taxation, and the welfare benefit system. The goals of these different strategic areas can sometimes contradict each other, and policy mechanisms that improve matters in one area may have unintended negative effects in another.

2. HOUSING AS A HUMAN RIGHT VS HOUSING AS A COMMODITY

Housing is a recognised human right but at the same time is (mostly) a market product. Across Europe and the developed world, most housing—whether new or existing—is provided by the market, while public provision remains limited. But especially in high-demand cities, the market has consistently failed to supply sufficient affordable housing.

Governments can take steps to correct this market failure. In housing, as in other sectors, the main policy tools fall into three categories: taxation, subsidy and regulation. The public sector can also provide housing directly, which remains the most powerful form of intervention in certain contexts. In the second half of the twentieth century, many national governments built substantial amounts of housing themselves or provided generous subsidies to other public or nonprofit bodies, such as local authorities and housing associations. Those days are gone: since the 1990s the public sector has increasingly worked with—or through—the private sector to achieve its housing objectives.

Although international law has deemed adequate housing to be a human right since 1948, the campaign to enforce this right has gained momentum in recent years. High-profile housing advocates have pushed the issue up the agenda of international organisations at the European level and beyond—for example, the EU created the position of Housing Commissioner in 2024.

3. POLICY TRANSFER: SIMILAR CHALLENGES, DIFFERENT CONTEXTS

Our cities and countries share many concerns and can learn from each other's approaches to resolving them, but history, climate, culture and institutional factors will always condition both the housing issues and the possible policy solutions in each context. For example, across most of Europe, owner-occupation is the majority tenure, whereas in Germany and Switzerland renting predominates, and in Vienna more than 70% of households rent their homes. Those locations have highly stable rental systems which grant tenants many of the rights that only homeowners enjoy in other nations. While the German rental market is often upheld as a good example in other countries, the characteristics of that system cannot be transferred wholesale to other jurisdictions.

Every city or country faces constraints when selecting policies and instruments. Especially in Europe, most of the future housing stock exists already, as new construction accounts for a relatively small proportion of homes. Once built, homes may last for hundreds of years, and legal frameworks, political boundaries, and street patterns can be similarly enduring. Family structures are also evolving, and dwellings originally designed for large, long-term households often need to be adapted to accommodate smaller, more transient ones. Incremental changes are generally easier to implement and more widely accepted than wholesale transformations. All of this suggests that policies that work effectively in one country may be relatively ineffective, or even too difficult to implement, in another.

But radical change is not always impossible: the Overton Window, which frames the options acceptable to politicians and voters, does shift over time. Some approaches that would have been unthinkable in decades past are now commonplace: think of public/private partnerships for new residential development. And some housing policies of the past, such as the wholesale demolition in the 1960s and 70s of “worn out” homes in historic city centres, would now be considered unthinkable.

Policy makers routinely use formal policy evaluation tools, such as cost-benefit analysis and cost-effectiveness analysis, to weigh up different policy options and choose the most appropriate instruments. Economists use the term “externalities” to capture those wider economic, social and environmental impacts that are not reflected in the market price of a product or service. Cost-benefit analyses that incorporate these externalities are known as social cost-benefit analyses (SCBAs). There are various competing techniques and toolkits for assessing and monetising the social value of housing investment in SCBAs (Gibb & Christie, 2024),

and in some jurisdictions, including the UK, social value must now be included in public-sector policy assessments.

Social value assessments in housing tend to focus on the procurement and construction phases, where indicators such as job training opportunities or use of local suppliers are relatively easy to track. Techniques for evaluating and monetising the social value of inhabited schemes in terms of intangibles such as community cohesion are less developed, even though these effects are far more important in the long term. The UK has been a leader in developing these approaches and in incorporating social value in decision making.

Advocates of monetising social value argue that it helps decision-makers weigh it appropriately against other considerations. Critics, however, contend that attempting to assign a financial value to social impacts can be arbitrary and misleading, potentially resulting in poor decisions.

3.1 Financing affordable housing

Much of the literature on housing finance focuses on private mortgage markets, but the creation of new affordable housing requires government intervention in some form. Governments may directly build and operate affordable homes and/or employ a variety of financial and regulatory instruments to incentivise their construction. These range from direct nonrepayable grants for housing providers to government loan guarantees and requirements for residential developers to include affordable homes in their schemes. The pattern in each country reflects its historic practice and political decisions; nevertheless over the past 40 years, there has been a general shift away from grant funding and direct government provision toward greater reliance on contributions from the private sector. This shift was intended to improve efficiency and reduce costs to the public sector, but it may also create split incentives.

Social landlords have traditionally relied heavily on public funding. In some countries, including the Netherlands, the UK and Ireland, they have long been able to access private capital markets as well. Lenders may regard social landlords as relatively low-risk borrowers, since they own valuable assets producing a reliable and secure income stream that is often backed by government guarantees. In addition, loans to social landlords may enhance lenders' environmental, social, and governance (ESG) ratings.

Given limited public and private resources for affordable housing, the choice between providing homes for the most vulnerable/lowest income households or helping middle-income working people (who are increasingly excluded from market housing in very high-cost cities) is inevitably controversial. Various types of “intermediate housing” have been developed for households that cannot afford market prices or rents, but do not qualify for social housing. The associated income ceilings give an indication of how strong the market distortions are: in London, for

example, households earning up to £90,000 (Euros 103,000)—more than twice average earnings—are eligible for certain types of affordable housing.

4. CURRENT DEBATES IN EUROPE

Housing policy is currently at the forefront of political and public debate across Europe, as cities and governments grapple with the twin pressures of rising costs and growing needs. Here, we examine some of the key issues shaping these debates and their implications for urban life, social equity, and sustainability.

4.1 The cost of housing

The most high-profile housing policy issue today is the cost of market housing in affluent cities such as Amsterdam, Barcelona and London. Although affordability is inexorably linked to supply, popular discussions tend to focus more on the cost of housing than on the number of dwellings.

There is a lively debate amongst academics and housing advocates about the relative importance of the various drivers of high housing costs. Economists point to a sustained period of low interest rates that raised the price of assets, including housing. They also highlight weak supply responses caused by planning, political or physical constraints that limit new construction. Financialisation theorists, led by Dutch academic Manuel Aalbers (2016), argue that housing increasingly functions as a financial asset rather than a place to live. They blame the growing involvement of market actors interested in short-term profit maximisation, such as hedge funds, for pushing up prices and excluding local buyers.

Short-term rentals on platforms such as Airbnb are blamed for removing urban dwellings from the housing stock and reducing access to housing for local residents. The proliferation of short-term lets has become a political issue in many high-cost cities, both because they can affect housing markets and because of the nuisance caused by high concentrations, especially in dense city centres. Recent price developments have led to a widening gap between owners and renters in the market housing sector. As buying a first property draws ever further out of reach, studies have demonstrated ripple effects on family formation, birthrates and the falling numbers of pupils in some urban schools. Gentrification has altered the composition of neighbourhoods, as high-income newcomers replace lower-income households, who move to less expensive areas.

In high-cost areas, demand for social housing almost always exceeds supply, so the private rented sector tends to house a disproportionate number of lower-income households. Many continental European countries have long regulated private-sector rents, whereas Anglo-Saxon countries traditionally have not. Rising rents for new leases, and increases in rents for existing lets—often in connection with renovations or energy efficiency improvements—have prompted pressure in many cities and regions to impose tighter rent controls. Edinburgh, Berlin, Dublin and

Catalonia have all recently introduced or tightened rent regulations. While such measures are generally politically popular, they have sometimes led to supply disruptions, as landlords have withdrawn from the market (Scanlon et al, 2016).

4.2 Funding improvements to reduce carbon emissions from housing

The push for environmental sustainability through reduced carbon emissions has wide-ranging social, economic and urban implications. It also affects the entire building stock. Housing is an important contributor to greenhouse gas emissions: in the UK, housing accounted for 20% of such emissions in 2022. To achieve the COP21 goal of limiting global temperature increases, all homes must become energy efficient.

Realising energy efficiency in new homes is relatively straightforward from a technical point of view, but in mature European housing markets new construction accounts for only a tiny proportion of the housing stock each year. Upgrading the existing stock is therefore necessary. This often requires sizeable upfront investment and can be disruptive for residents. Moreover, the payback period through reduced utility bills may be long, making upgrades unaffordable without public subsidy. Modifications that reduce carbon emissions do not always lower residents' costs: the UK government subsidises installation of air source heat pumps, but take-up has been low, in part because the high cost of electricity means users could end up paying more to heat their homes than with gas.

How best to ensure that all homes are upgraded and that costs and benefits are shared equitably is a question that policymakers everywhere are grappling with. In almost all European countries, most homes are owner occupied. Low-income homeowners are most likely to live in homes that need upgrading but least able to afford the cost. If fairness is a key concern, well-designed subsidy systems can help them to improve their homes without providing funds to those who could afford to finance the work themselves. If reducing carbon emissions is the main goal, untargeted subsidies are likely to be more effective, despite the deadweight loss incurred.

In the rental sector in Northwest Europe, large (usually social) landlords benefit from economies of scale and are skilled at applying for and administering subsidies or grants. In the Netherlands and Denmark, for example, asset-rich social landlords have gradually upgraded existing stock and built high-quality new homes. They may also be able to access capital market funding or private ESG finance for decarbonisation upgrades.

By contrast, in many post-socialist countries, the remaining social rented stock after widespread privatisation is small and in poor condition. Social housing organisations struggle to meet even routine maintenance costs and lack resources for energy-efficiency upgrades. While private ESG finance could enable such landlords to carry out upgrades, the market is still underdeveloped in these countries.

Finally, the poorest-quality homes are frequently found in the private rental sector, especially those owned by small landlords. Such owners often lack the resources to undertake improvements and are, in many areas, ineligible for public support.

4.3 Creating neighbourly places to live

Housing has a major impact on social sustainability. Architects, planners and urbanists increasingly recognise that the design of homes, from the individual dwelling to the neighbourhood and its location within the city, can have a profound effect on residents' wellbeing. Scholars and practitioners are working to identify which factors contribute most.

The policies that matter are often more related to urban planning and neighbourhood design than to housing per se. An emerging consensus suggests that the most socially sustainable housing is located in relatively dense neighbourhoods, with a range of uses and facilities within walking distance. Mix (or in French, *mixité*) is crucial: socially sustainable neighbourhoods feature a diversity of uses, incomes, ages, tenures and housing types. This type of mixing is now considered best practice, yet it is not a natural outcome of market forces, particularly in cities. Neighbourhood mix is therefore often encouraged or required in new developments within established urban areas; for example, new developments in London generally must include at least 20% affordable housing.

Perhaps the greatest challenge is to densify and increase mix in existing areas of sprawl. Car-dependent development of single-family homes on large lots is a quintessentially American model, but similar low-rise schemes have also been built on peripheral sites across much of Europe.

Arguably, the most socially sustainable residential environments are those designed with community and neighbourliness at their heart. Community-led housing (CLH) encompasses a range of models including cohousing, community land trusts and self-build. These schemes are typically managed by residents and foster social interaction through both their physical design and participation in shared activities. Many also incorporate cutting-edge environmental features. But mainstream housing developers, whether public or private, are not geared up to produce CLH, and in any case, part of its appeal lies in its unconventional character.

Governments are starting to recognise the benefits of these schemes, not only for residents but also for the wider community. Research indicates that residents of CLH are less lonely than those living in conventional housing; older people are more active, socially engaged, and less likely to require costly public care services (Scanlon et al, 2021).

The case for public subsidies for environmentally sustainable housing was accepted decades ago, and many jurisdictions now offer financial incentives for carbon-reduction measures in both existing and new homes. By contrast, few

governments offer financial support for community-led housing schemes. Many existing schemes have been developed by relatively affluent residents themselves using their own resources—financial, professional and even physical. Upscaling CLH and making it accessible to a wider income and social range may therefore require greater government intervention, particularly in relation to access to land. The City of Barcelona stands out in this regard: it has supported collaborative housing schemes for lower-income and migrant households, partly by providing access to low-cost land.

4.4 Reducing homelessness

The ultimate victims of the housing crisis are, of course, those who have no homes at all. The roofless, who sleep in doorways or in tents along rivers and in parks, are highly visible, but broader definitions of homelessness also include those living in temporary, unsuitable or poor-quality accommodation. These “hidden homeless” vastly outnumber those who are unsheltered.

Homelessness is a complex phenomenon that cannot be attributed solely to high housing costs, though rising rents exacerbate the problem and make it harder to resolve. The simplest solution to homelessness is to allocate an appropriate home to each homeless household, but that would require a stock of appropriate vacant housing, which is simply not available in many cities. A permanent resolution also depends on welfare and financial measures to bridge the gap between the cost of housing and what homeless households can afford to pay.

Policy responses may focus on preventing homelessness in the first place, by intervening to reduce evictions or provide extra financial or personal support to vulnerable individuals. Some local authorities accommodate homeless households in purpose-built hostels or other forms of interim accommodation. Ideally, such stays would be short-term, but in practice, many homeless households remain in “temporary” accommodation for months or even years.

5. CONCLUSIONS

Housing affordability has become a major political issue—in some places *the* political issue—in high-cost cities across the developed world. The underlying reality is that the growth in demand for housing has not been matched by a growth in supply due to planning constraints, construction bottlenecks, land shortages, and a host of other contributing factors. The political promise to invest more in housing is generally a vote-winner, and housing issues are increasingly framed as human rights issues by progressive mayors. Many governments are relaxing or streamlining planning systems to encourage more housing production. Yet even though the principle of increasing supply may be popular, local communities often oppose individual schemes proposed for their areas.

One way of improving housing affordability is, of course, to produce affordable housing. This is not the tautology it may seem: affordable housing is a legally defined category, with subsidised rents or prices, and access restricted to qualifying households. Social housing represents the lowest-cost form of affordable housing, but variants aimed at middle-income households may have relatively high rents, raising the question: affordable for whom?

Discussions of housing affordability inevitably centre on cost and finance, but housing policy is no longer confined to economic considerations. The sector's profound impacts on the environment and society are now widely recognised.

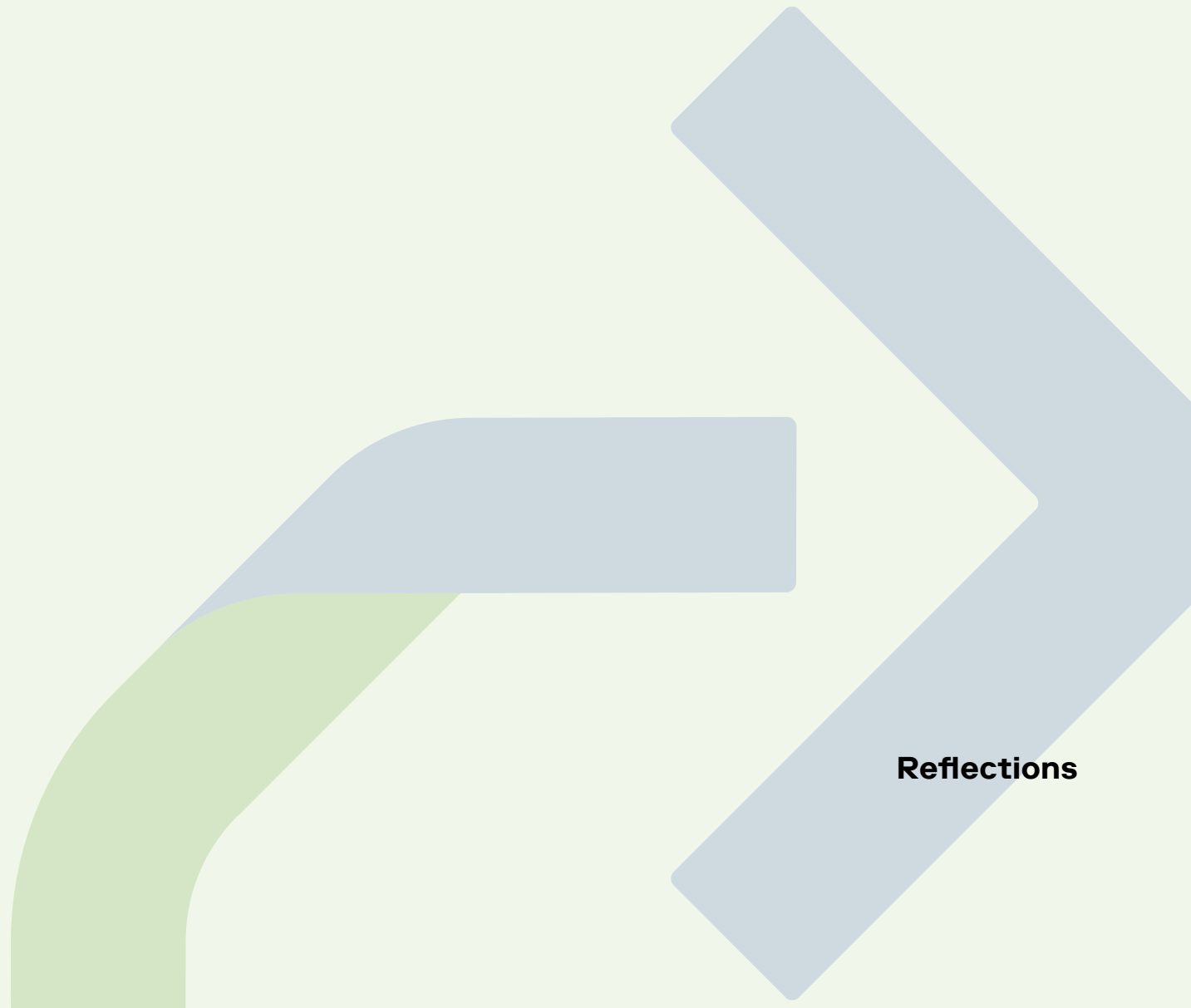
Housing plays a critical role in environmental sustainability. Buildings—particularly residential ones, which make up the majority of the urban building stock—are responsible for a large share of carbon emissions. Achieving net zero therefore requires major improvements in the energy performance of homes. While constructing energy-efficient new housing is relatively straightforward, the far greater challenge lies in upgrading the existing homes. Renovation is often expensive, and there is an inherent tension between financing new development and funding the retrofit of existing dwellings.

Housing also shapes social sustainability. There is plenty of research about existing estates and developments that have nurtured real communities, and conversely about schemes that have failed to cohere. Experts can apply tools such as social value analysis to estimate the contribution of housing to individual and collective wellbeing, as well as to the economy—community-led housing tends to perform particularly well. Urbanists continue to explore the essential ingredients of community in new housing in order to develop models that can be replicated more widely.

Despite the enormous diversity of European cities, they share many housing challenges and controversies: the high cost of housing, especially in the private rented sector; the role of profit-oriented investors and short-term lets; and the difficulty of improving energy performance without increasing costs for residents. Municipalities and urbanists across Europe are now collaborating more closely to share knowledge and tailor successful approaches to their local contexts.

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Reflections

Achieving affordability and sustainability in housing requires navigating architectural, social, and policy dimensions, each offering guidance for harmonising environmental, economic, and social goals.

Peris and Toral address this complexity through a sustainability framework built on three principles: Reduce, Space, and Share, which guide both the conception and performance of housing design. Their philosophy draws on enduring architectural values such as material honesty, climatic responsiveness, and spatial articulation, which are reinterpreted to meet contemporary sustainability imperatives. Most of their projects, primarily social housing developed under tight budget constraints, exemplify these principles through efficient resource use, bioclimatic design, and the creation of shared communal spaces. Courtyards and atria function as thermally efficient, climate-responsive environments that reduce dependence on mechanical systems while fostering community interaction and social cohesion. Cohousing and shared living models underpin these environmental strategies, optimising resource use and cost reduction while strengthening social bonds. In their architectural practice, sustainability becomes both a fundamental principle and a guiding design framework, shaping spatial organisation as well as technical strategies.

Czischke and Brysch describe a shift in housing from models of public participation, where residents are passive consultees, toward co-production, a relational practice in which residents actively collaborate with professionals across design, construction, management, and governance. In co-production, residents are recognised as knowledgeable contributors, exercising agency, shared responsibility, and decision-making power throughout the project life cycle. Co-design is a specific phase within this process, where residents participate in shaping spatial layouts, shared spaces, and other physical and social features, enabling collective decision-making, adaptable housing solutions, and sustained community engagement. The tangible outcomes of these engagements, referred to as collaborative housing, include cohousing, cooperatives, ecovillages, and community land trusts, where physical and social dimensions are co-created.

Co-produced housing often feature adaptable designs, shared resources, participatory governance structures, and environmentally responsive strategies, generating social value through cohesion, empowerment, long-term stewardship, and innovation. However, challenges such as residents overburdened with participatory responsibilities, reliance on voluntary labour, rigid planning systems, insufficient professional training, and unresolved power dynamics highlight the need for robust institutional support, practical capacity building, and new participatory tools to enable inclusive and sustainable housing initiatives.

Scanlon frames affordable and sustainable housing as a complex interplay between social equity, environmental goals, and financial mechanisms. Housing policy and finance influence each other: policies determine resource allocation, while financial constraints limit what policies can achieve. Policymakers must balance support for low-income households with assistance for middle-income families increasingly excluded from high-cost urban markets. Housing affordability extends beyond

supply-demand imbalances; structural barriers, such as restrictive planning, land scarcity, and political opposition constrain housing expansion. It is also essential to distinguish between social housing and broader affordable housing, as each targets different income groups and relies on distinct financing mechanisms. Achieving environmental sustainability, including net-zero carbon targets and the retrofitting of existing stock, requires substantial investment, which can create tensions with affordability objectives. Socially sustainable housing, in turn, emphasises community cohesion and the development of mixed-use neighbourhoods, ensuring that both social and environmental objectives are integrated into housing provision.

Market dynamics, intensified by short-term rentals, push up rents and accelerate gentrification, displacing lower-income households. Funding mechanisms and regulatory frameworks can exacerbate these effects, favouring higher-income groups and limiting social landlords' ability to expand or upgrade housing. Scanlon emphasises that integrated strategies—combining regulation, subsidies, financial innovation, and social outcomes—are essential but must be adapted to local historical, cultural, and institutional contexts to be effective.

Taken together, these three perspectives— Design, Planning and Building; Community Participation; and Policy and Financing— illustrate how these domains intersect, suggesting integrated ways of thinking about affordable and sustainable housing that address social, environmental, and economic dimensions (→ see page 28):

Design and planning strategies that encourage shared spaces and foster community engagement are essential for creating sustainable living environments. Integrating collaborative housing models, such as cohousing and cooperatives, further strengthens social interaction and resource sharing. Financial mechanisms, including subsidies and public-private partnerships, play a vital role in maintaining long-term affordability while supporting the overall sustainability of these developments.

: **Collaborative design and co-production engage residents as active partners, fostering flexible, efficient, and socially connected housing.**
: **Involving residents in decisions about materials, energy systems, spatial organisation, and shared resources ensures that housing is both**
: **responsive to community needs and environmentally sustainable.**

: **Policy frameworks for housing design, finance, and sustainability enable developments that enhance liveability, climate performance, and community cohesion. By guiding architects and planners to balance resources, foster collaboration, and respect environmental limits, these frameworks support resilient housing that benefits both residents and the wider community.**

2

Transdisciplinary innovation in housing research and academic development

An introduction to transdisciplinarity and its relevance to affordable and sustainable housing, presenting its core concepts and their application within the RE-DWELL learning and research environment.

2.1

Rethinking dwelling: Affordability, sustainability, and transdisciplinary knowledge

by Leandro Madrazo

2.2

Transdisciplinary education in practice: The RE-DWELL learning and research environment

by Leandro Madrazo

2.1

Rethinking dwelling: Affordability, sustainability, and transdisciplinary knowledge

Leandro Madrazo

A conceptual framework is developed to examine the interrelations between housing affordability, sustainability, and transdisciplinarity, situating the RE-DWELL project within its broader theoretical context. It is organised in three parts. The first traces affordability and sustainability as historically distinct yet increasingly interconnected ways of framing housing, showing how both operate as relational and normative constructs shaped by urban systems, governance arrangements, policy regimes, and assessment practices. The second is dedicated to transdisciplinarity, outlining its emergence as a response to the limits of disciplinary science in addressing complex, uncertain, and value-laden societal problems, and tracing its evolution toward problem-oriented, participatory, and process-based research. The third examines how transdisciplinary approaches have taken shape within housing research, architecture, and urban planning, highlighting both early integrative traditions and contemporary challenges in transforming transdisciplinary ambitions into sustained, context-sensitive change in research and practice.

INTRODUCTION

Housing is a fundamental human need, a basic right recognised by the United Nations, and a central determinant of social wellbeing (UN, 1948; UN-Habitat, 2009). Beyond providing shelter, a home offers the material, physical, and psychological conditions necessary for health, security, and personal development. Housing anchors individuals within social networks and fosters identity and belonging; it is not merely a space enclosed by a physical structure, but a precondition for meaningful living. Dwelling encompasses more than the individual housing unit, extending across multiple spatial scales—from the home and the building to neighbourhoods and cities that shape access to services, mobility, social interaction, and environmental resources. In this sense, dwelling (*Wohnen*) can be understood, following Heidegger (1971), as a fundamental mode of being-in-the-world,

grounded in care as an ongoing involvement through which places acquire meaning and human existence is situated and sustained.

The global shortage of affordable housing has become an urgent societal challenge, excluding large segments of the population from secure and adequate homes. While public debate often focuses on immediate supply deficits, addressing the housing crisis requires situating affordability within the broader framework of sustainable development. Contemporary sustainability concerns foreground the interdependence between ecological limits, social justice, and long-term collective wellbeing, shaping the conditions of our being-in-the-world. The ways in which housing is planned, built, financed, and inhabited are therefore inseparable from sustainability imperatives. In this sense, the lack of adequate housing reflects more than a shortage of physical units; it signals a broader failure to organise housing systems in ways that support social belonging, security, and collective wellbeing.

Framing the housing crisis solely as a problem of resources or production risks overlooking the environmental, social, and economic interdependencies that shape dwelling. The persistent lack of affordable housing cannot be treated as a discrete technical, political, or economic issue; rather, it is embedded within wider societal transformations related to resource allocation, urban organisation, market dynamics, and welfare systems. These transformations encompass demographic change—including migration patterns, population ageing, and shifting household and family structures—as well as evolving lifestyles and forms of cohabitation, all of which reshape housing needs and spatial demands. Integrating affordability and sustainability is therefore essential to avoid perpetuating housing solutions that are environmentally harmful, socially inequitable, economically fragile, and ultimately ineffective.

Large-scale construction and renovation activities carry substantial ecological footprints, meaning that any expansion of affordable housing supply is inherently linked to decarbonisation, circularity, and resource efficiency. At the same time, homes that are affordable at the point of access but energy-inefficient, poorly designed, or poorly located impose high long-term costs, exacerbate energy poverty, and restrict access to employment and services—thereby undermining both social and environmental sustainability. Sustainable housing, therefore, is not an optional complement to affordability, but a prerequisite for its durability over time.

1. THE PROBLEM OF AFFORDABLE AND SUSTAINABLE HOUSING

This part examines affordable and sustainable housing as a complex and evolving societal problem, tracing how affordability and sustainability have emerged, developed, and become increasingly intersected within housing research, policy, and practice. It follows the historical formation of these concepts, their normative foundations, and the ways they have been operationalised through policy instrumentation, planning frameworks, and measurement practices. By considering affordability and sustainability as both distinct framings and interdependent dimensions of

housing systems, the discussion highlights how housing issues emerge and how they are mediated by urban, economic, environmental, and institutional contexts. In turn, the resulting conceptual, methodological, and evaluative choices shape what is recognised as a housing problem and how it is addressed.

1.1 Affordable housing

Affordable housing and housing affordability are often used interchangeably, yet they refer to distinct dimensions of the housing (Diaconu et al., 2024). Affordable housing denotes the provision of dwellings accessible to households across different income levels, whereas housing affordability describes the relationship between housing costs and household income. Although conceptually distinct, the two are inseparable in practice: a household's ability to afford housing depends on the characteristics and cost of the available supply, while the adequacy of affordable housing can only be assessed through affordability measures.

Historically, the problem of affordable housing has been framed around a persistent gap between household incomes and the cost of securing adequate housing. Scholarly and policy debates first emerged prominently in the United States, where early housing programmes and subsidy mechanisms later influenced international discussions, across Anglo-Saxon contexts such as the United Kingdom, Australia, and New Zealand.

Prior to the 1970s, housing policy in the United States was strongly shaped by social-welfare concerns associated with the expansion of federal intervention during the New Deal, particularly in relation to public and low-income housing. As McDougall (1987) notes, although federal housing policy expanded substantially during this period, its postwar evolution increasingly emphasised indirect and market-oriented forms of support, including public–private arrangements, rather than large-scale public production. From the 1960s onward, this reorientation coincided with a gradual decline in direct federal subsidies for publicly assisted housing, a trend that intensified during the 1970s and 1980s. McDougall argues that the cumulative effects of this shift included reduced new construction and growing difficulties in sustaining the existing assisted housing stock. Within this context, he contends that by the late twentieth century the central housing problem had shifted from substandard conditions to affordability, reflecting a widening structural gap between household incomes and housing costs—one that market mechanisms alone cannot resolve due to constraints in land, construction, and finance, and which increasingly displaced responsibility onto state, local, and voluntary actors with limited capacity.

Von Hoffman (2016) shows that these developments gave rise to a parallel policy concern: the preservation of affordability within the existing, privately owned but government-subsidised housing stock. As federal support for new public housing declined and reliance on public–private programmes expanded, large numbers of subsidised rental units became vulnerable to deterioration, conversion, or loss

when long-term subsidies expired. In response, housing advocates, policymakers, and eventually property owners increasingly reframed preservation as a central objective of low-income housing policy, emphasising the need to maintain affordability over time rather than relying solely on new construction.

Against this backdrop, affordability emerged as the central organising concern of U.S. housing policy debates, as reflected in the legal and policy analyses that increasingly framed housing problems in terms of the income–cost gap. This conceptual shift was formally institutionalised with the *Cranston–Gonzalez National Affordable Housing Act* (1990), which affirms that “every American family should be able to afford a decent home in a suitable environment” (§ 101, 42 U.S.C. § 12701), and establishes a comprehensive framework to promote affordable rental housing and homeownership, preserve affordability over time, and mobilise public–private partnerships.

To support policy design and evaluate the effectiveness of interventions, governments increasingly sought standardised measures of housing affordability. One widely adopted benchmark was the 30 per cent rule, introduced into U.S. housing policy through the *Brooke Amendment* of 1969, which initially limited public housing tenants’ rent contributions to 25 per cent of household income. This threshold was later raised to 30 per cent in the early 1980s. The rule was intended to ensure affordability for low-income households while allowing housing agencies to recover operating costs, with federal subsidies covering the gap between tenant rents and maintenance costs. Over time, however, this benchmark evolved from a context-specific policy instrument into a general indicator of housing-cost burden, becoming a widely used rule of thumb in research, advocacy, and international comparative studies, often detached from the institutional and policy conditions under which it was originally developed.

This U.S.-led reframing of housing problems around affordability subsequently influenced housing policy debates in other countries. As Whitehead (1991) argues, the growing emphasis on affordability in the United Kingdom reflected the partial adoption of market-oriented frameworks and policy language. However, while policy discourse increasingly invoked affordability, the institutional architecture of UK housing provision remained firmly anchored in needs-based social housing systems, characterised by regulation, subsidised rents, and administrative allocation. Whitehead demonstrates that this disjunction between conceptual framing and institutional practice rendered both need and affordability weakly operational: affordability was invoked without the market conditions necessary for it to function as a guiding principle, while needs-based approaches persisted without integrating considerations of cost, efficiency, or resource constraints. The result was a hybrid policy regime that neither fully embraced market mechanisms nor consistently secured socially acceptable housing outcomes.

1.1.1 Assessing housing affordability

Whitehead’s critique of affordability as a policy concept—used without reference to prices, household resources, or institutional context—rests on an explicitly relational definition of affordability as the opportunity cost of housing relative to other goods and services (Whitehead, 1991). Building on this formulation, Stone (2006) argues that “affordability is not a characteristic of housing—it is a *relationship* between housing and people” (p. 153). This relation must be operationalised through analytical measures that specify how housing costs are assessed relative to household resources and needs.

The ratio method—assessing affordability by comparing housing costs to gross household income—is simple, intuitive, and historically entrenched through policy practice. However, it fails to account for variations in household size, essential non-housing expenditures, and differences in living costs. By contrast, the residual income approach defines affordability in terms of whether households retain sufficient income after paying for housing to meet socially defined minimum non-housing needs, such as food, healthcare, and transportation, offering a more conceptually robust—though more complex—measure of affordability (Stone, 2006).

Although affordability is often operationalised through household-level metrics, these measures abstract from the urban, spatial, and institutional conditions that shape affordability outcomes in practice—an understanding that has gained increasing prominence over time. *The World Resources Report* (WRI et al., 1996) highlights how many urban environmental problems—including congestion, air pollution, urban decay, and the lack of affordable housing—are rooted in land-use patterns and practices, and that poorly managed urban growth exacerbates both environmental stress and social inequities, particularly for low-income populations. Building on this perspective, Whitehead (2005) similarly emphasises the link between land-use planning and affordable housing in England, showing that planning can enable affordable housing provision by regulating land use and capturing land value through development control, rather than by reducing housing costs per se. Planning also integrates housing into wider urban objectives—such as equity, social inclusion, and access to services—through spatially coordinated strategies.

Subsequent research has reinforced and expanded this understanding of housing affordability as a multifaceted concept. Drawing on comparative analysis across EU Member States, Haffner (2018, p. 26) argues that “the affordability definition will not be precise enough without a standard for housing quality, as affordability and quality are two sides of a coin,” highlighting that housing costs may reflect underconsumption of space or inadequate dwelling standards rather than genuine affordability. From this perspective, affordability measures necessarily embed normative judgements about what constitutes reasonable housing costs and acceptable living conditions—judgements that are context-specific, politically contested, and often obscured by reliance on national-level indicators that mask substantial local variation. In a context of ongoing marketisation, this raises unresolved questions about the appropriate role of government in mediating affordability outcomes.

Galster and Lee (2020) show that emerging global forces—such as international migration and investment, tourism and short-term rentals, and climate-related risks—are intensifying affordability pressures by reshaping housing demand, supply, and costs, often disproportionately affecting lower-cost housing and redirecting demand toward safer, high-demand locations. Haffner and Hulse (2021) similarly reframe affordability as a complex urban issue that links long-standing research on poverty and housing costs with contemporary processes of financialisation, gentrification, and urbanisation. These dynamics reshape access to adequate housing and generate new urban inequalities, including uneven wealth effects, intergenerational disparities, and spatial segregation affecting both lower- and middle-income households.

In sum, housing affordability has evolved from a primarily economic concern into a broader systemic issue encompassing environmental impacts, social equity, urban planning, and global dynamics—an evolution that directly informs contemporary debates on the relationship between affordability and sustainability in housing.

1.2 Sustainable housing

The Brundtland Report, *Our Common Future* (WCED, 1987, p. 54) defined sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”, thereby establishing a strong normative commitment to intergenerational responsibility. It emphasised the interdependence of economic development, social equity, and environmental protection, arguing that environmental degradation, poverty, and inequality are causally interlinked and cannot be effectively addressed through fragmented, sectoral policies. In doing so, the report marked a decisive shift away from narrowly environmental or conservation-based approaches, reframing sustainability as a comprehensive model of long-term societal change across economic, social, and environmental domains. Public participation—involving citizens, NGOs, scientists, and industry—is presented as both a democratic principle and a practical necessity, since achieving sustainable development depends on informed public involvement, local empowerment, and shared responsibility to legitimise and implement decisions within ecological limits.

By the mid-1990s, housing policy debates increasingly incorporated sustainability considerations, situating housing within a broader framework of social, environmental, and governance dimensions. This shift is clearly articulated in *An Urbanizing World*, which states that “the world’s cities must become sustainable, productive, safe, healthy, humane, and affordable” (UNCHS–HABITAT, 1996, p. v). In doing so, the report frames housing affordability and urban sustainability not as isolated technical challenges, but as systemic issues rooted in institutional capacity, public policy, and long-term planning. Furthermore, the report documents a historic transition toward a predominantly urban world driven by demographic change and economic globalisation. It identifies a deepening urban crisis—characterised by housing shortages, homelessness, rising urban poverty, social exclusion,

and environmental degradation—and argues that these challenges are systemic and interconnected. In response, an *enabling approach* is advanced in which governments actively shape regulated markets, partnerships, and planning systems to improve housing affordability, social equity, and environmental sustainability, thereby emphasising the social dimensions of sustainable development alongside economic and environmental concerns.

Building on this diagnosis, the *Report of the United Nations Conference on Human Settlements-Habitat II* (United Nations, 1996) translates analytical insights into a normative and political framework for global housing and urban policy. It institutionalises sustainability as the guiding principle for human settlements policy, articulating a universal vision of settlements that are safe, liveable, equitable, and environmentally sustainable. Sustainable development is adopted as the integration of economic, social, and environmental objectives, while adequate housing is positioned as a rights-based concern grounded in non-discrimination, security of tenure, and equitable access to land and shelter. Although the role of markets in housing delivery is acknowledged, the document reaffirms the primary responsibility of governments to secure socially and environmentally responsible outcomes through regulation, planning, and public action.

A decisive shift occurs with the adoption of the 2030 Agenda for Sustainable Development in 2015, which establishes the Sustainable Development Goals (SDGs) as a universal, integrated, and measurable framework for guiding global development policy. The SDGs reposition housing not only within urban policy, but within a broader cross-sectoral agenda linking poverty reduction (SDG 1), inequality (SDG 10), health (SDG 3), energy (SDG 7), climate action (SDG 13), and sustainable cities (SDG 11). In this context, housing affordability and sustainability become explicitly connected to global commitments on inclusion, resilience, and long-term planetary limits.

The *New Urban Agenda* (UN-Habitat, 2017), adopted at the United Nations Conference on Housing and Sustainable Urban Development (Habitat III) in 2016, operationalises the urban dimension of the 2030 Agenda. While Habitat II framed sustainability primarily at the level of human settlements, Habitat III explicitly aligns housing and urban policy with the SDGs—particularly SDG 11—through the formulation of “affordable and sustainable housing” as a central policy objective. This marks a shift from sustainability as an abstract settlement-scale condition to more concrete, spatially and socially grounded housing objectives. The *New Urban Agenda* employs a more rights-based, spatially explicit, and operational vocabulary, emphasising location, connectivity, resilience, climate responsiveness, and resource efficiency, thereby positioning housing as a key instrument for delivering inclusive, resilient, and sustainable cities.

Because sustainability entails contested values, long-term trade-offs, and decisions about distribution and responsibility, participation plays a critical role in ensuring democratic legitimacy and effective implementation. In both Habitat II and Habitat III, participation is recognised as essential, though its function evolves

over time. In Habitat II, participation is embedded within the enabling approach, where communities, NGOs, and local actors contribute through partnerships and consultation. By contrast, Habitat III—shaped by the governance logic of the 2030 Agenda—elevates participation to a core principle, embedding it across the full urban policy cycle and directly linking it to the delivery of affordable and sustainable housing, spatial planning, resilience, and social inclusion.

1.2.1 Sustainable housing, housing sustainability

Following the Brundtland Report, the terms sustainability and sustainable development have frequently been used interchangeably; however, there are important conceptual differences between the two. Sustainability refers to an overarching principle or desired long-term condition—a state in which environmental integrity, social wellbeing, and economic viability can be maintained over time without undermining the systems on which they depend. In contrast, sustainable development denotes the process or pathway through which societies seek to achieve sustainability, involving policy choices, governance arrangements, and trade-offs among competing objectives (Basiago, 1998; Baker, 2006). Sustainability can therefore be understood as a dynamic equilibrium among social, economic, and environmental systems within planetary limits, while sustainable development refers to the deliberate integration of these systems through development practice and policy (Mensah, 2019). As such, sustainable development is inherently normative and political, as it entails decisions about priorities, distribution, and responsibility across generations and social groups (Baker, 2006).

A similar conceptual distinction can be observed in housing debates between sustainable housing and housing sustainability. Sustainable housing refers primarily to the sustainability characteristics of individual buildings, often emphasising environmental performance, building design, and resource efficiency. Housing sustainability, by contrast, concerns the long-term sustainability of housing systems as a whole, including issues of affordability, access, governance, and the capacity of housing provision to support social, economic, and environmental objectives over time. This distinction shifts the analytical focus from isolated technical solutions to the systemic and political processes through which housing outcomes are produced and sustained.

In its narrower usage, sustainable housing is often understood in predominantly environmental terms, referring to housing that reduces negative impacts at the level of the individual dwelling and aligns with green building principles such as efficient resource use, renewable energy integration, waste and pollution reduction, healthy indoor environmental quality, and the use of non-toxic materials. Within this framing, Priemus (2004) conceptualises sustainable housing as housing that minimises environmental harm in relation to climate change, pollution, resource depletion, and biodiversity loss. While this perspective usefully underpins the technical performance of housing, it risks narrowing sustainability to design and technological optimisation, potentially overlooking wider social, economic, and institutional

dimensions, particularly in contexts marked by housing shortages and socio-spatial inequality.

In contrast to environmentally focused views of sustainable housing, Choguill (2007), writing in the context of housing for low-income populations in the Global South, argues that housing cannot be considered sustainable if it fails to meet basic human needs or remains inaccessible to large segments of the population, regardless of environmental performance. This position highlights a fundamental tension between environmentally efficient dwellings and socially sustainable housing systems and reframes sustainability as a multi-scalar and normative concept encompassing affordability, access, governance, and long-term system viability. Rejecting universal “best practices”, Choguill emphasises that sustainability depends on context-sensitive policy interventions, including community participation, access to affordable building materials, flexible building standards, and innovative housing finance. Within this framework, housing affordability is not separate from sustainability but constitutes a core criterion of it.

1.3 Integrating affordability and sustainability in housing

Historically, discourses on affordable housing and environmentally sustainable housing have developed along parallel yet largely separate trajectories. Affordability has typically been associated with minimising construction and maintenance costs, while sustainability has been linked to higher-quality materials, energy-efficient technologies, and environmentally responsible design—features that often increase upfront development expenses. This separation has reinforced the assumption that progress toward affordability necessarily comes at the expense of sustainability, and vice versa.

This tension between housing sustainability and affordability has been examined in depth by Australian scholars. Randolph et al. (2007) provide an empirical starting point by demonstrating that sustainability and affordability have evolved as parallel but disconnected policy agendas in Australia. Sustainable housing has largely been delivered to higher-income households through regulatory and green-building initiatives that raise upfront costs, while affordable housing has focused narrowly on minimising capital costs, often at the expense of environmental performance and long-term household expenditure. The authors show that framing affordability in short-term financial terms obscures higher life cycle and transport costs borne by low-income households, and that reliance on market “trickle-down” mechanisms entrenches environmental inequality. They therefore argue for reframing sustainable housing as a social equity issue, requiring integrated housing, planning, and financing interventions.

Arman et al. (2009) deepen this analysis by explaining why such disconnections persist. They conceptualise sustainability as a contested and ongoing process, shaped by unresolved debates over needs and wants, consumption, intergenerational equity, environmental justice, and opportunity costs. Affordable hous-

ing is used as a critical test case, revealing that those who would benefit most from sustainable housing—low-income households—are least able to access it within existing market structures. Rather than viewing this ambiguity as failure, the authors argue that negotiated, context-specific solutions are essential to achieving meaningful sustainability outcomes.

Building on these insights, Karuppannan and Sivam (2010) explicitly integrate affordability into housing sustainability. Challenging the separation of the two, they show that compact city policies, higher densities, and eco-efficient construction often increase housing costs, producing environmentally efficient but socially exclusionary outcomes. They advance a multi-scalar, triple-bottom-line conception of sustainability that includes social wellbeing, dignity, and stability, positioning affordability as a core condition of sustainable housing. Reconciling the two therefore requires integrated governance, well-located development, and recognition of sustainability as a normative and political process shaped by trade-offs.

Although their analytical emphases differ, these studies share a common conceptual orientation: housing is understood as embedded within broader urban, environmental, economic, and social systems, extending beyond dwelling-level or purely technical concerns. Randolph et al. expose the structural and distributive failures of prevailing housing systems; Arman et al. explain the conceptual and ethical conditions under which these failures persist; and Karuppannan and Sivam provide a normative and spatial framework for reintegrating affordability into housing sustainability. Across these contributions, a shared conclusion emerges: housing cannot be considered sustainable if it is so costly that it excludes those who need it most. Sustainability, in this sense, is inseparable from social equity and must be addressed through integrated and explicitly political choices, not limited to technical fixes alone.

1.3.1 A systems approach to assessing affordable and sustainable housing

Across discussions of affordability, sustainability, and their intersection, a consistent issue emerges: housing problems are constituted through the concepts and measures used to define them. Affordability and sustainability are relational and normative constructs, operationalised through indicators, thresholds, and evaluative frameworks. Such measures do not merely describe housing conditions; they shape how housing problems are identified, prioritised, and addressed, underscoring the need for integrated, system-aware approaches to assessing affordable and sustainable housing.

As Mulliner and Maliene (2015) contend, reducing affordability to a set of financial metrics obscures its wider social and environmental implications, including housing quality, spatial location, and access to services and amenities. Conceptualising affordable and sustainable housing therefore involves complex interconnections between economic, social, and environmental dimensions, which interact through household trade-offs, spatial conditions, and policy frameworks in ways that are

neither fully explicit nor linear. Policies and strategies aimed at improving housing affordability can also contribute to social and economic sustainability by reducing residents' energy consumption, car dependence, and barriers to services, reflecting the systemic interconnections between resource use, mobility, and social equity highlighted in sustainability theory (Baker, 2006). At the same time, environmental features such as rainwater harvesting, solar hot water systems, or strategic vegetation can generate long-term social and financial benefits while preserving natural and human capital. However, these measures often require higher upfront investment, creating tensions between immediate affordability and longer-term sustainability outcomes (Brandon & Lombardi, 2005).

Adopting a systems perspective makes it possible to examine how different dimensions of housing interact, and how emphasis on particular objectives gives rise to distinct but overlapping subsystems. Within an overall housing system, these subsystems reflect the prioritisation of specific sustainability dimensions. *Equitable housing* foregrounds social justice, inclusion, and affordability, ensuring access for marginalised populations; *green or ecohousing* prioritises environmental performance through energy efficiency, sustainable materials, and reduced carbon emissions; *resilient housing* addresses climate risks and natural hazards; *healthy housing* enhances occupant wellbeing through indoor air quality, natural lighting, and thermal comfort; and *cooperative housing* fosters social cohesion and shared resource management.

Housing systems and their subsystems, in turn, are embedded within wider urban systems. Affordable and sustainable housing cannot be adequately understood at the level of the individual dwelling alone, but must be situated within neighbourhood and city-scale dynamics, including density, mixed-use development, access to services, transport networks, green infrastructure, and urban governance (Basiago, 1999; Winston & Eastaway-Pareja, 2008). Housing outcomes—such as affordability, accessibility, quality, and environmental performance—are shaped by land-use planning, infrastructure provision, and spatial coordination, through which affordability and sustainability emerge as interconnected urban processes.

If affordable and sustainable housing is understood as a system, its assessment must also be systemic. Evaluating whether housing is both affordable and sustainable cannot rely on single indicators or isolated metrics. Instead, it requires multi-dimensional assessment frameworks that identify key system components—such as costs, social outcomes, environmental impacts, spatial conditions, and governance arrangements—and examine their interrelationships and intended objectives. Indicators play a central role in this process by summarising complex information and providing an overview of system performance (Brandon & Lombardi, 2005). However, indicators are not neutral. As Baer (1976, as cited in Stone, 2006), usefully distinguishes, an indicator empirically measures relationships (for example, between housing costs and income), whereas a standard specifies normatively what values those indicators should take or not exceed. This distinction reinforces earlier critiques of affordability benchmarks, such as the 30 per cent rule, by highlighting the difference between measurement and judgement.

A growing body of research demonstrates how such systemic assessment can be operationalised in practice. Pullen et al. (2010) propose an integrated framework combining affordability and sustainability indicators, identifying key characteristics such as cost thresholds, location, energy performance, and life-cycle considerations, and developing an interim set of eleven indicators. Mulliner and Maliene (2011) advance a 17-criteria framework for sustainable housing affordability, encompassing access to employment and services, housing quality, energy efficiency, safety, and tenure diversity; this framework was later operationalised through a multi-criteria decision-making method (Mulliner et al., 2013). More recently, UN-Habitat (2024) has proposed a comprehensive monitoring framework for housing adequacy across diverse contexts, structured around eight core dimensions—security of tenure, access to services, affordability, habitability, accessibility, location, cultural adequacy, and sustainability—while explicitly integrating contextual drivers and policy conditions.

Given that housing systems are shaped by multiple actors and interests, and draw on technical expertise, professional practice, policy rationales, and lived experience, addressing the problems of affordable and sustainable housing requires collaborative and transdisciplinary approaches. Effective assessment and intervention depend not only on specialist and analytical capacities but also on the active involvement of residents, practitioners, policymakers, and industry actors, whose everyday experience and practical insight illuminate constraints, trade-offs, and priorities that often remain invisible in abstract assessments. By integrating diverse stakeholder perspectives through processes of co-creation, system-aware approaches can move beyond abstract concepts toward context-sensitive solutions that are socially inclusive, economically viable, and environmentally sustainable. In this sense, transdisciplinarity is not an optional add-on but a necessary response to the complexity and interdependence that characterise affordable and sustainable housing systems.

1.4 Concluding reflections: Housing affordability and sustainability

The conceptual progression from affordability, to sustainability, and ultimately to their integration reflects a widening understanding of the nature of housing and the issues it raises. Affordability initially frames housing in terms of access and cost, focusing on the relationship between household incomes and housing expenses and the distributional implications of this relationship. This perspective emphasises short-term access and the socio-economic conditions that shape who can obtain adequate housing.

Sustainability extends this view by introducing long-term, environmental, and inter-generational considerations. It situates housing within broader urban, social, economic, and ecological systems and shifts attention from immediate access to the enduring performance of housing systems over time. From this standpoint, housing quality and energy performance are inseparable from spatial location, connectivity, access to services, transport dependence, resource use, and social cohesion, as housing outcomes are shaped by the interaction between dwellings, neighbour-

hoods, and wider urban infrastructures. Sustainable provision therefore concerns not only how housing is built, but how it is embedded within urban systems that condition long-term environmental impact, social inclusion, and economic viability.

Bringing affordability and sustainability together reveals that the widely assumed tension between them is not inherent, but arises from fragmented conceptual and evaluative frameworks, reflected in the sectoral organisation of housing and urban policy. Housing that appears affordable in the short-term may prove environmentally or economically unsustainable, while environmentally efficient housing may become socially exclusionary if its costs render it inaccessible. An integrated perspective therefore does not subsume affordability within sustainability; rather, it positions affordability as a constitutive dimension of sustainable housing. This reframing highlights housing as a systemic issue in which access, cost, quality, location, and long-term viability function as interdependent dimensions rather than competing priorities.

Understanding housing in these terms has clear methodological implications. Housing issues shaped by interacting values, diverse knowledge systems, and evaluative practices cannot be adequately addressed through single disciplinary lenses or specialised techniques alone. Approaches capable of engaging with complexity are therefore required—ones that integrate diverse forms of expertise and lived experience and respond to the interconnected nature of affordability and sustainability.

Viewed through this lens, housing exhibits many of the characteristics of a wicked problem as articulated by Rittel and Webber (1973): it is defined differently by different actors, involves competing objectives and trade-offs, resists definitive solutions, and is shaped by the very interventions intended to address it. Recognising housing in these terms reinforces the need for transdisciplinary practices capable of navigating such tensions, accommodating plural values, and engaging with the dynamic, multi-scalar nature of housing systems.

2. TRANSDISCIPLINARITY

The second part of this chapter provides a historical and conceptual overview of transdisciplinarity, tracing its emergence as a response to the limitations of disciplinary approaches in addressing complex societal problems. It reviews the key intellectual traditions, definitions, and debates that have shaped transdisciplinary thinking, following its development through discussions on disciplinary organisation, epistemological plurality, and evolving relations between science and society. Particular attention is given to the shift from early ambitions of epistemological integration toward problem-oriented and sustainability-driven research, as reflected in the Swiss-based transdisciplinarity research trajectory. These developments frame transdisciplinarity not as a unified theory or method, but as a reflexive research practice shaped by societal problem contexts and institutional conditions, thereby providing the conceptual groundwork for its application to affordable and sustainable housing.

2.1 The foundations of transdisciplinarity

During the 1960s and early 1970s, growing awareness of a widening mismatch between established disciplinary knowledge and the scale, urgency, and complexity of emerging societal problems prompted a fundamental reassessment of prevailing models of scientific organisation. Problems such as environmental degradation, rapid urbanisation, public health crises, technological risk, energy scarcity, and global development increasingly appeared irreducible to any single disciplinary perspective. It became increasingly evident that addressing these systemic societal problems would require coordinated insights across the natural sciences, engineering, social sciences, and humanities, as well as closer linkages between research, teaching, and societal action.

Against this backdrop, the Organisation for Economic Co-operation and Development (OECD, 1972) convened the international seminar on *Interdisciplinary Research and Education* in Nice in 1970, bringing together scholars from diverse disciplinary and national contexts to examine existing forms of interdisciplinary collaboration, clarify emerging concepts, and explore how universities might adapt their research and teaching structures to changing knowledge conditions and societal expectations.

Central to the discussions in the meeting was a critical examination of the concept of the discipline itself. Heckhausen (1972) conceptualised disciplines as epistemologically differentiated systems defined by their objects of inquiry, methods, and analytical tools, levels of theoretical integration, and historical and institutional contingencies, arguing that differences in theoretical integration both distinguish disciplines and shape the possibilities for interdisciplinary collaboration. Boisot (1972) similarly described disciplines as structured systems composed of objects, phenomena, and explanatory laws grounded in shared axioms and validated through empirical observation. In this view, disciplines were understood not merely as epistemic categories, but also as institutionalised formations encompassing curricula, professional training, organisational structures, and normative standards.

This dual epistemic–institutional understanding foregrounded the ambivalence of disciplinary systems. While disciplinary organisation enables depth, rigour, and cumulative knowledge production, it also generates cognitive, organisational, and normative constraints that limit responsiveness to societal problems whose causes and consequences exceed disciplinary boundaries. Reflecting this tension, the OECD (1972) defined a discipline as “a specific body of teachable knowledge with its own background of education, training, procedures, methods and content areas” (p. 23), while transdisciplinarity was described as “establishing a common system of axioms for a set of disciplines” (p. 24). Even at this early stage, transdisciplinarity was framed as more than the coordination of disciplinary contributions, pointing towards a qualitative shift in the organisation of knowledge itself and in how disciplines are related and reconfigured.

Within the framework established at the OECD seminar, Piaget (1972) proposed the now-canonical distinction between multidisciplinary, interdisciplinary, and transdisciplinarity. While multidisciplinary involves the juxtaposition of disciplines and interdisciplinary their reciprocal interaction, transdisciplinarity is an epistemological ideal aimed at the unity of knowledge through higher-order integration across disciplines. By contrast, Jantsch (1972) reframed transdisciplinarity as a problem-oriented mode of coordinating knowledge and action across science, policy, and society. Rejecting epistemological unity as its central ambition, Jantsch emphasised the organisation of research around concrete societal challenges, laying the groundwork for later practice-based and sustainability-driven approaches to transdisciplinarity.

Subsequent scholarship has retrospectively positioned the OECD seminar as a foundational moment in the development of transdisciplinarity. Building on this legacy, Klein (2014) identifies three partially overlapping discourses that have structured the field over time. The first, *transcendence*, reflects Piaget’s aspiration toward epistemological unity across disciplines. The second, *problem solving*, articulated most clearly by Jantsch, emphasises the coordination of knowledge and action in response to complex societal challenges. A third discourse, *transgression*, developed later, foregrounds the critique of dominant knowledge systems, institutional norms, and power relations, questioning not only disciplinary boundaries but also the social and political conditions under which knowledge is produced and legitimised.

In sum, the OECD seminar brought into focus the limits of disciplinary organisation, the tension between epistemic integration and institutional differentiation, and the question of whether coordination among disciplines is sufficient when societal problems exceed disciplinary boundaries.

2.2 Ontology and epistemological plurality

The *Charter of Transdisciplinarity*, jointly signed by de Freitas, Morin, and Nicolescu (1994), articulated transdisciplinarity as an approach grounded in epistemological openness, ethical responsibility, and cultural plurality, while explicitly rejecting reductionism, disciplinary enclosure, and purely instrumental conceptions of knowledge. Rather than proposing a unified theory or methodology, the *Charter* formulates shared principles concerning education, dialogue, and the relationship between knowledge and humanity, thereby establishing a common normative horizon across otherwise diverse transdisciplinary perspectives.

A more philosophically articulated position is developed by Nicolescu, whose work departs both from disciplinary epistemologies and from instrumental, problem-solving accounts of knowledge production. In the *Manifesto of Transdisciplinarity* (Nicolescu, 2002), this departure is grounded in a core ontological distinction between the Real (*le Réel*), whose existence is independent of human representation and resists totalisation, and Reality (*la Réalité*), understood as the contextual

and constructed manifestations through which the Real becomes partially accessible to knowledge. This distinction underpins Nicolescu's conception of transdisciplinarity as operating across multiple levels of Reality (*niveaux de Réalité*), without reducing them to a single explanatory framework.

Each level of Reality is governed by its own logic and laws and cannot be fully subsumed by another. Whereas disciplinary knowledge typically operates within a single level, applying specialised methods to delimited domains, transdisciplinarity is concerned with the relations and dynamics between levels of Reality. It relies on the logic of the included middle (*le tiers inclus*) to mediate discontinuities between them, engaging the dynamics generated through their interaction. In this sense, transdisciplinarity does not constitute a new discipline, metadiscipline, or overarching synthesis, but concerns "that which is at once between the disciplines, across the different disciplines, and beyond all discipline" (Nicolescu, 2002, p. 44). Its overarching aim is to advance understanding of the contemporary world, guided by an imperative of coherence and unity in knowledge without negating epistemic plurality.

Ramadier (2004) extends this critique of unification from an ontological to an epistemic register. He argues that aspirations toward unified knowledge risk oversimplifying the irreducibly heterogeneous, contradictory, and conflictual nature of reality. From this perspective, neither multidisciplinary nor interdisciplinarity can adequately address the tensions and incommensurabilities inherent in disciplinary knowledge systems. Ramadier therefore proposes "articulation" as the core epistemic operation of transdisciplinarity: a mode of knowing that maintains plurality while seeking coherence through confrontation and productive engagement among differences.

Considered together, Nicolescu's ontological pluralism and Ramadier's emphasis on articulation position transdisciplinarity not as a project of synthesis or theoretical closure, but as a reflexive field of inquiry oriented toward managing epistemic plurality. Instead of offering unifying ontology or epistemology, they conceptualise transdisciplinarity as a space in which heterogeneous rationalities are brought into relation without being reconciled, establishing conditions for coherence that remain open, provisional, and context-dependent.

2.3 Transdisciplinarity as a mode of knowledge production

Beyond discipline-centred debates, transdisciplinarity has increasingly been conceptualised as a distinct mode of knowledge production, reflecting broader transformations in the relationship between science and society. From this perspective, transdisciplinarity does not simply reorganise disciplinary knowledge, but redefines how, where, and with whom knowledge is produced, particularly in relation to complex societal challenges that exceed disciplinary capacities.

A decisive contribution to this shift was made by Gibbons et al. (1994) through their distinction between two ideal-typical modes of knowledge production. Mode 1

refers to knowledge generated within clearly bounded disciplines and validated according to internal scientific criteria. It is characterised by a hierarchical separation between fundamental and applied research, in which theoretical insights are subsequently transferred into practical applications. Mode 2, by contrast, is socially distributed, application-oriented, and inherently transdisciplinary. Such knowledge is produced in the context of application, through projects and problem situations rather than within disciplinary frameworks, involving a "constant flow back and forth between the fundamental and the applied, between the theoretical and the practical" (Gibbons et al., 1994, p. 19). In this mode, heterogeneous forms of expertise are mobilised to address complex real-world problems, and knowledge claims are provisional and context-dependent, validated not only by scientific standards but also by criteria such as usability, relevance, and social robustness.

This Mode 2 understanding was further refined by Nowotny et al. (2003), who foreground the context of application as the defining feature of contemporary knowledge production. They distinguish between weak contextualisation, typical of centralised research programmes; intermediate forms relying on local contingencies and "trading zones" between epistemic cultures; and strong contextualisation, in which knowledge production becomes deeply entangled with societal debates, values, and social movements. In this latter form, knowledge is co-produced through sustained engagement between science and society, giving rise to what they term "socially robust knowledge".

By the early 2000s, transdisciplinarity had thus shifted from an epistemological aspiration within academic debate to a widely circulating concept embedded in research policy, professional practice, and problem-oriented fields. In their introduction to a special issue of *Futures*, Lawrence and Després (2004) observe that transdisciplinarity had become a word "*à la mode*," even as its origins and conceptual transformations remained insufficiently examined. They characterise transdisciplinarity as a context-sensitive, hybrid, and reflexive mode of knowledge production designed to address complexity and overcome disciplinary fragmentation in real-world problem domains. In this account, transdisciplinary research accepts uncertainty and local specificity, treating knowledge production as a negotiated process shaped by social, organisational, and material contexts and sustained "as mediation space and time" (Després et al., 2004).

Building on these developments, Jahn et al. (2012) situate the emergence of transdisciplinarity within a longer and more heterogeneous discourse. While the 1970 OECD conference, and particularly Jantsch's contribution, are widely identified as formative moments, the authors contend that transdisciplinarity gained much of its contemporary prominence through post-normal science and Mode 2 knowledge production. Importantly, despite decades of debate, the discourse has not converged toward a unified concept or terminology; instead, transdisciplinarity has stabilised as a reflexive, practice-oriented research approach defined less by theoretical coherence than by shared concerns with integration, societal relevance, and problem-oriented inquiry.

2.4 Problem orientation, sustainability, and knowledge transformation

Within this shift from discipline-centred to context-oriented and co-produced knowledge production, transdisciplinarity is understood less as disciplinary integration or abstract epistemology than as the reflexive translation of complex, situated problem situations into collaborative research processes. Problem solving is framed not as technical solution-finding but as structured problem transformation, involving iterative problem framing, the integration of heterogeneous forms of knowledge, and the identification of feasible pathways for change. This reframing recognises that many societal challenges are not clearly bounded in advance but emerge through contested interpretations, normative commitments, and material constraints.

As Becker (2006) argues, particularly in fields such as environmental science, global change research, social–ecological research, and technology and risk assessment, transdisciplinarity signals a fundamental transformation in the relationship between science and society. Following Bunge (1967), Becker distinguishes between everyday problems and scientific problems, placing their relationship to knowledge at the centre of transdisciplinary inquiry. Everyday problems arise in social practice as situations of difficulty or constraint that demand action when desired goals cannot be readily achieved. A problem becomes a scientific problem only through its reformulation in concepts and theories, typically requiring the translation of practical concerns into the language of science.

For transdisciplinary research in sustainability contexts, this transformation poses a central challenge: practically embedded socio-ecological problem situations must be reformulated as research questions without reducing their complexity, uncertainty, or normative content. Problems and knowledge are thus mutually constitutive. Existing bodies of knowledge shape how problems are articulated, while newly formulated problems expose limitations, blind spots, and directions for further knowledge development.

In this processual sense, transdisciplinary research treats problems as socially constituted through framing and articulation, while simultaneously engaging with materially real and often urgent socio-ecological conditions that exceed the analytical reach of any single discipline. From this perspective, many of the most pressing sustainability challenges originate in social practice yet cannot be adequately addressed within disciplinary boundaries alone. Effective solutions to such issues require transdisciplinary research processes capable of translating practical concerns into theoretically robust and action-relevant formulations, while remaining responsive to uncertainty, value conflict, and real-world constraints.

2.5 Sustainability, participation, and societal transformation

At this juncture, two historically intertwined developments are central to the understanding of transdisciplinarity: the evolution from environmental science to

sustainability science, and the parallel rise of participation as a normative, epistemic, and institutional principle in research and governance. While analytically distinct, these trajectories progressively converged around shared concerns with complexity, uncertainty, contested values, and the need for societal transformation.

2.5.1 From environmental science to sustainability science

Environmental science emerged as a problem-oriented field in the late 1960s and early 1970s in response to the growing recognition that environmental degradation and human–environment interactions could not be adequately addressed within disciplinary frameworks. Integrative critiques such as Carson's *Silent Spring* (1962) challenged expert authority by exposing systemic ecological and health impacts, thereby foregrounding the limits of expert-led knowledge production and the need to link scientific analysis with policy and societal action.

During the 1990s, these concerns were extended through the emergence of sustainability science, building on the Brundtland Report's reframing of environmental degradation as a long-term societal challenge linking development, equity, and intergenerational responsibility. Articulated most prominently by Kates et al. (2001), sustainability science moved beyond a primary focus on environmental problems toward long-term societal transformation. Sustainability was framed as a normative, systems-based challenge encompassing social, economic, institutional, and ecological dimensions, requiring understanding of coupled social–ecological systems and society's capacity to intentionally steer development pathways. This reframing intensified demands for integrative, action-oriented, and reflexive forms of knowledge production that later became central to transdisciplinary research.

2.5.2 The rise of participation: From critique to transformation

In parallel, participation emerged in response to the shortcomings of technocratic, expert-driven decision-making. Early participatory models developed in the late 1960s and 1970s as a normative critique of technocracy, emphasising legitimacy, inclusion, and citizen power (Arnstein, 1969). Participation initially functioned primarily as a democratic corrective to top-down planning and policy processes.

From the 1980s onward, participation was increasingly reconceptualised as a functional and epistemic requirement for addressing complex and contested problems. Action-oriented research traditions challenged the separation between knowledge production and social change, treating participation as a constitutive element of inquiry, learning, and transformation rather than as a consultative add-on. In parallel, theory of change frameworks elucidated the causal assumptions linking collective action, intermediate outcomes, and longer-term change (Weiss, 1995; Connell & Kubisch, 1998), providing tools for reflexive learning under conditions of uncertainty, plurality, and contested goals.

Commons theory further extended this shift by building on empirical studies of collective resource management to show that sustainable governance can emerge from self-organised collective action. These studies conceptualised participation not merely as a normative ideal or causal mechanism, but as an institutional condition for sustainability, embedded in durable social arrangements that enable cooperation, learning, and adaptation over time (Ostrom, 1990).

By the 1990s, participation was thus understood as simultaneously normative (legitimacy and inclusion), causal (learning and change mechanisms), and institutional (collective governance arrangements). This understanding was reinforced by post-normal science (Funtowicz & Ravetz, 1993), which explicitly addressed problem contexts characterised by uncertainty, value conflict, high stakes, and urgency. Under such conditions, participation was framed not as optional, but as an epistemic necessity, requiring the inclusion of extended peer communities in knowledge appraisal and decision-making.

Building on these developments, theories of transformative change understood sustainability not as incremental improvement, but as deep, systemic reconfiguration of social, technological, and institutional arrangements (Walker et al., 2004; Folke et al., 2010). From this perspective, participation constitutes a central arena in which values, problem definitions, and transformation pathways are negotiated. As Augsburg (2014) later observed, early research on transdisciplinary collaboration in the 2000s can retrospectively be understood as addressing not only how transdisciplinarity is enacted, but also who is included in its processes.

2.5.3 *Convergence with transdisciplinarity*

Environmental and sustainability problems exemplify complexity because they cut across ecological, social, economic, political, and cultural domains, operate at multiple scales, and involve uncertainty, contested values, and long-term consequences. This complexity makes sustainability a privileged domain for transdisciplinary research (Klein et al., 2001). In this context, transdisciplinarity raises not only questions of problem solving, but also of problem choice, foregrounding which problems are selected for research, by whom, and according to which normative priorities.

By this point in its development, transdisciplinarity was articulated at the intersection of problem-oriented environmental and sustainability science and participatory, action-oriented research traditions. Action research and participatory action research rejected detached knowledge production in favour of engagement, reflexivity, and change-oriented practice, an orientation later consolidated in explicitly transdisciplinary formulations. As articulated by Stokols (2006), transdisciplinary action research coordinates collaboration across disciplines, societal actors, and governance levels within integrated research–action cycles, treating collaboration itself as a central object of inquiry.

Against this background, the relationship between sustainability, participation, and transdisciplinarity can be analytically differentiated. *Convergence* highlights their gradual alignment around shared problem pressures; *subsumption* treats sustainability as an overarching normative paradigm within which participation and transdisciplinarity are incorporated as research and governance requirements; *instrumentalisation* frames them as means to predefined sustainability outcomes, particularly in policy-driven research programmes; and *intersection* emphasises partial overlaps, recognising that participation and transdisciplinarity also operate beyond sustainability contexts while intersecting with them in specific problem fields.

2.6 *Process-oriented and problem-driven transdisciplinarity*

A distinctive contribution to the contemporary understanding of transdisciplinarity emerged from a Swiss-based, problem-oriented research tradition that progressively stabilised transdisciplinarity as a process-integrated mode of research. Through institutional platforms such as ProClim and td-net, as well as international conferences and programmatic publications, this body of work moved transdisciplinarity beyond conceptual debate toward explicit design principles, quality criteria, and operational guidance for addressing complex societal problem fields at the science–society interface.

2.6.1 *ProClim: Institutional foundations and early problem orientation*

An important point of departure for this trajectory was the establishment of ProClim—the Forum for Climate and Global Change—in the mid-1990s under the auspices of the Swiss Academies of Arts and Sciences. ProClim conceptualised climate change and sustainability as complex socio-ecological challenges characterised by uncertainty, long time horizons, and contested values, thereby exceeding the explanatory and problem-solving capacities of isolated disciplinary approaches. In response, it explicitly promoted inter- and transdisciplinary research as necessary conditions for meaningful assessment and action.

Within this framework, transdisciplinarity was defined as an extension of interdisciplinarity toward participation, emphasising collaboration between researchers and affected societal actors. Scientific knowledge was positioned as essential but insufficient on its own, contributing to societal problem-solving without replacing political judgment or normative decision-making. A key conceptual outcome of this work was the formulation of a tripartite heuristic distinguishing systems, target, and transformation knowledge. Initially developed for policy contexts, it clarified how different forms of scientific insight contribute to sustainability governance while preserving a principled separation between analytical inquiry and societal responsibility for defining goals and implementing change.

2.6.2 The Zurich conference: From science–policy framing to research practice

A decisive step in the evolution of this tradition was the *International Transdisciplinary Conference* held in Zurich in 2000. While earlier contributions had largely framed transdisciplinarity in relation to science–policy interaction, the Zurich discussions shifted attention toward research practice and process. Societal relevance was no longer treated as an external criterion applied to scientific outputs, but as insight constituted through joint problem framing, sustained collaboration, and mutual learning throughout the research process.

Knowledge was thus reconceptualised as co-produced through iterative interaction, negotiation, and reflexive dialogue across disciplinary, institutional, and societal boundaries. At the same time, the conference foregrounded the organisational and procedural conditions required for effective transdisciplinary research, including shared problem definitions, early and continuous stakeholder involvement, appropriate project management, and supportive institutional and funding structures. In doing so, it contributed to establishing transdisciplinarity as a research practice with identifiable design requirements and operational principles.

In her reflective account of the conference outcomes, Klein emphasised that transdisciplinarity does not constitute a single method or unified epistemological model, but an evolving and plural field of practice shaped by societal problem contexts (Klein et al., 2001). Its coherence lies not in theoretical unification, but in a shared commitment to linking knowledge production with action, fostering mutual learning, and adapting research practices to the conditions of real-world problem fields.

2.6.3 Institutional consolidation and systematisation of process-oriented transdisciplinary research

Building on earlier conceptual and practice-oriented developments, the establishment of the Network for Transdisciplinary Research (td-net) in the early 2000s marked a phase of institutional and conceptual consolidation of transdisciplinary research as a cross-cutting research mode. It provided a stable framework for methodological development, capacity building, and the articulation of shared quality criteria, enabling cumulative learning beyond individual, project-based initiatives.

This consolidation was articulated most clearly in the *Principles for Designing Transdisciplinary Research* (Pohl & Hirsch Hadorn, 2007) and subsequently systematised in the *Handbook of Transdisciplinary Research* (Hirsch Hadorn et al. 2008). Instead of proposing a unified theory or a fixed method, these works positioned transdisciplinarity as a process-oriented research practice defined by explicit design principles and conditions of application.

The *Principles* identify four defining characteristics of transdisciplinary research: an orientation toward societally relevant problem fields marked by uncertainty and high stakes; the integration of disciplinary and extra-scientific knowledge through joint problem framing and analysis; the production of knowledge that is both scientifically valid and socially relevant; and an explicit orientation toward the common good, accompanied by reflexive engagement with normative assumptions while maintaining a distinction between scientific contributions and societal decision-making. In addition, the *Principles* review a broad range of existing definitions of transdisciplinarity. The four characteristics are used as analytical criteria for comparison, shifting attention from terminological debates to process design, where integration is realised through practice and research organisation.

Within this framework, transdisciplinary research is understood as recursive organised around three interrelated phases—problem identification and structuring, problem analysis, and bringing results to fruition—which may be revisited and reconfigured as understanding develops. To support the design and conduct of such research, four guiding principles are articulated: reducing complexity through selective attention to relevant knowledge needs and actors; achieving effectiveness through contextualisation in both scientific and life-world settings; enabling integration through structured encounters among disciplines and societal actors; and fostering reflexivity through iterative learning over time. Together, these principles integrate the core features of transdisciplinarity into operational guidance for research design, implementation, and evaluation.

The *Handbook* further systematises and theoretically grounds this process-oriented conception. Drawing on exemplary research experiences, it addresses recurring conceptual, methodological, and organisational challenges of transdisciplinary work, arguing that disciplinary specialisation and linear models of expert-driven knowledge transfer are insufficient for addressing complex, uncertain, and value-laden societal problems. At the same time, it underscores the importance of organisational structures such as td-net, given that the temporary and context-specific nature of transdisciplinary projects makes experiential knowledge difficult to retain and transfer without institutional continuity.

The concluding chapter of the *Handbook* synthesises these insights in fifteen propositions that articulate transdisciplinary research as an evolving and reflexive research mode. The propositions clarify the scope, purposes, and expected outcomes of transdisciplinary research, identify recurring practical and institutional challenges, and indicate strategic directions for strengthening research practice, integration, and capacity building at the science–society interface.

Overall, these contributions consolidated transdisciplinarity as a process-integrated research practice, defined less by methodological prescription and more by shared design principles, quality criteria, and institutional conditions supporting integration across science and society. In this sense, as Bammer (2013) argues, framing transdisciplinary research as a method risk reifying what is fundamentally

a dynamic and context-dependent mode of inquiry, whereas a process-oriented understanding foregrounds integration, reflexivity, and adaptation over time.

The institutionalisation of transdisciplinarity as a research practice was accompanied by a parallel epistemic clarification concerning how knowledge integration is achieved within transdisciplinary processes. This clarification principally focused on the evolving role of the tripartite distinction between systems, target, and transformation knowledge.

2.6.4 The tripartite knowledge structure as a process-integrated framework of transdisciplinary research

Across its development, researchers progressively redefined the tripartite structure of systems, target, and transformation knowledge. In the ProClim report, the framework functioned primarily as a policy-oriented heuristic that clarified science's differentiated contributions to sustainability governance while preserving a conventional boundary between knowledge production and action. Following the Zurich conference and the formulation of the *Principles*, this boundary was reworked. The tripartite distinction became internal to the research process itself, guiding problem framing, analysis, and action as part of ongoing inquiry. Normative orientations and transformation pathways were thus recognised as legitimate objects of inquiry within research practice, incorporated directly into the production of scientific knowledge.

Within this process-oriented understanding, integration emerged as the core epistemic challenge of transdisciplinary research. Pohl et al. (2008) define integration as the capacity to relate heterogeneous forms of knowledge, perspectives, and interests to concrete life-world problems. Integration is understood as a situated, iterative, and context-dependent process unfolding across all phases of research, resulting in partial, provisional, and practice-oriented syntheses. It is therefore both a cognitive and a social accomplishment, requiring explicit process design, facilitation, and reflexive attention to values, power relations, and uncertainty.

The *Handbook* further consolidated this epistemic shift by situating transdisciplinary research within German intellectual traditions of *Wissen* and a phenomenological understanding of *Lebenswelt* (life-world) as the shared horizon of lived experience, social practices, and meaning within which both everyday action and scientific knowledge are embedded. Engaging with earlier philosophical reflections by Mittelstraß (1992), Hirsch Hadorn et al. (2008a) reconceptualise the tripartite distinction between systems, target, and transformation knowledge not as discrete bodies of codified, propositional knowledge, but as interrelated, situated, and processual forms of knowing oriented toward action in life-world problem fields. Systems knowledge (*Systemwissen*) addresses how societal problems emerge and evolve; target knowledge (*Zielwissen*) renders explicit the normative orientations and value judgements involved in defining desirable futures; and transformation knowledge (*Transformationswissen*) concerns the practical strategies and means

through which change can be realised. In this formulation, epistemic, normative, and practical dimensions are intrinsically entangled, underscoring transdisciplinarity as a mode of inquiry in which understanding, valuation, and action cannot be analytically or operationally separated.¹

2.6.5 Methods and tools for transdisciplinary research

Over the past two decades, transdisciplinary research has increasingly shifted from conceptual debate toward the development of practical resources that support collaboration, integration, and reflexive learning across science and society. A central aim of these initiatives is to foster communities of practice and enable cumulative learning across projects, disciplines, and societal contexts.

The *GAIA Toolkits for Transdisciplinarity* (GAIA, n.d.) represent one of the earliest systematic efforts to curate and adapt methods relevant to different phases of transdisciplinary research. The toolkits address recurring challenges such as collaboration, knowledge co-production and synthesis, integration across disciplines and societal actors, systems thinking, and enabling societal change. They adopt a pragmatic distinction between methods—established approaches for addressing specific challenges—and tools, which organise, adapt, and contextualise these methods for use in concrete research settings.

The SCNAT Knowledge portal (SCNAT, n.d.) similarly focuses on transforming scientific knowledge into useful forms of decision-making across policy, public administration, professional practice, and academia. Within this platform, the td-net Toolbox provides a practice-oriented collection of methods and tools supporting joint project development, research conduct, and exploration of societal impact pathways. Notably, the three types of knowledge framework (td-net & Pohl, 2022), originally developed as an analytical concept, is now operationalised as one of the tools to help researchers and practitioners clarify which forms of knowledge are required at different stages of a transdisciplinary process.²

2.7 Recent directions in transdisciplinary research

Contemporary transdisciplinarity builds on longstanding concerns identified in the preceding sections, particularly the limits of disciplinary science in addressing complex societal problems and the challenge of linking knowledge production with action. While these concerns remain ongoing, developments in environmental science, sustainability science, participatory research, and process-oriented transdis-

¹ As noted in the translator's introduction to *Principles for Designing Transdisciplinary Research*, several key concepts—including *Wissen*, *Lebenswelt*, and process-related terms—resist direct translation into English without loss of meaning. The English term knowledge risks obscuring the processual, normative, and practice-oriented dimensions carried by *Wissen*, reinforcing the need to interpret systems, target, and transformation knowledge as modes of knowing embedded in social practice rather than as discrete epistemic outputs.

² https://naturalsciences.ch/co-producing-knowledge-explained/methods/td-net_toolbox/three_types_of_knowledge_tool

ciplinary practice have shifted attention toward questions of implementation, institutional conditions, power relations, and normativity. As transdisciplinarity has evolved from a largely conceptual project into a reflexive, action-oriented research practice, recent scholarship increasingly focuses on the conditions under which transdisciplinary research—and science itself—can contribute to societal transformation.

2.7.1 From conceptual vision to practice-oriented transdisciplinary research

Recent debates draw directly on the insights of the 1970 OECD seminar while incorporating several decades of methodological refinement and empirical experience. The OECD (2020) report *Addressing Societal Challenges Using Transdisciplinary Research* reaffirms that transdisciplinary research is particularly suited to contested, high-stakes problem contexts characterised by uncertainty and value conflict. At the same time, it shifts emphasis away from conceptual legitimisation toward procedural and institutional guidance, focusing on research design, implementation, and integration in practice.

Rather than positioning transdisciplinarity as a competing paradigm, the report situates it alongside adjacent research modes and policy frameworks. It distinguishes transdisciplinary research from approaches prioritising disciplinary integration (such as team science and convergence research) or co-creation alone (such as action and development research), while positioning it in relation to broader initiatives including open science, responsible research and innovation, mission-oriented research, and post-normal science. Importantly, the report avoids rigid conceptual boundaries, emphasising complementarities and the selection of research approaches according to problem context.

Alongside policy- and practice-oriented developments, a parallel epistemological strand emphasises that transdisciplinarity involves not only new research designs, but also transformations in how knowledge is organised and how inquiry is conducted. Montuori (2023) articulates this dimension by framing transdisciplinarity as a response to disciplinary fragmentation that requires changes in research practices, in the organisation of knowledge, and in the stance of the inquirer. Central to this shift is the cultivation of what Morin describes as complex thought: a systemic, dynamic, and reflexive mode of thinking attentive to uncertainty, interdependence, and context.

From this perspective, transdisciplinarity is particularly suited to problems characterised by complexity, stakeholder plurality, and value conflict. Montuori extends its relevance beyond sustainability to fields such as creativity research, intersectionality, and professional education, where integration across epistemic, cultural, and experiential boundaries remains limited. His emphasis on intellectual humility, reflexivity, and the transformation of the researcher underscores that effective transdisciplinarity depends not only on methods or institutional arrangements, but also on epistemic dispositions and communicative practices.

Structural constraints and the problem of integration

Despite broad rhetorical endorsement of transdisciplinarity, empirical studies consistently identify persistent structural barriers to effective integration. Evaluation metrics, disciplinary career pathways, and institutional silos—already recognised in earlier phases of the discourse—have become increasingly entrenched, frequently undermining integrative ambitions. Across this literature, integration re-emerges as the central yet unresolved challenge of inter- and transdisciplinary research.

Building on insights from commons theory, Dedeurwaerdere (2024) understands transdisciplinary collaboration as a collective action problem embedded in governance dynamics. Drawing on Ostrom's work on self-governance, he shows that integration failures often arise from weak coordination frameworks, unequal contributions, and unresolved value disagreements among research partners, particularly in collaborations involving non-academic actors. From this perspective, participation without explicit governance arrangements risks devolving into symbolic inclusion or “window-dressing,” undermining both knowledge co-production and transformative potential.

Deutsch et al. (2025) analyse this problem through a structure–agency perspective, showing that integrative outcomes are shaped by interacting conditions across multiple levels—individual, team, programme, institutional, and socio-political. Misalignments across these levels routinely undermine integration in practice. The authors consider integration as a structurally conditioned challenge embedded in incentive systems, evaluation regimes, and institutional logics that privilege disciplinary outputs. Their analysis foregrounds power relations and epistemic politics, shifting attention from project-level design toward the systemic conditions under which integration and societal impact can occur.

Navigating tensions, plural logics, and collaboration

Complementing structural analyses, recent research focuses on the lived dynamics of collaboration within transdisciplinary projects. Harris et al. (2024) argue that the central challenge of transdisciplinary research for sustainability lies not in conceptual justification, but in the persistent tensions that arise when researchers and non-academic actors collaborate across disciplines, sectors, and institutional contexts.

From an institutional logics perspective, the authors show how competing values—such as academic credibility, societal impact, policy relevance, and commercial objectives—generate frictions throughout the research process. Rather than treating these tensions as failures, they are understood as inherent and potentially productive features of transdisciplinary work. Successful transdisciplinary practice is shown to depend on the capacity to recognise, negotiate, and work with them through strengthened relational, reflexive, and communicative competencies.

Reflexive tools and theories of change

In response to both structural and relational challenges, recent contributions consider reflexive research design as a means of strengthening the link between transdisciplinary processes and societal outcomes. Within this line of work, theory of change has gained renewed prominence as a key analytical and practical device.

Kny et al. (2023) understand theory of change both as a process—supporting shared visioning, reflection, and integration across disciplines and sectors—and as a product that makes explicit the assumptions, causal pathways, and anticipated impacts linking research activities to societal change. Thus, this theory functions as a boundary object that supports coordination while remaining open to revision as learning unfolds.

Extending this approach, Marciniak et al. (2024) turn the lens of theory of change toward science itself, developing a framework for transformative sustainability science. Moving beyond a sole focus on individual projects, they identify three interlinked pathways for this transformation: strengthening researchers' skills and competencies, advancing transformative concepts and methods, and reshaping institutional contexts. Accordingly, transdisciplinarity is positioned not as an auxiliary research strategy, but as a constitutive feature of sustainability science oriented toward reflexive societal change.

Narratives, imaginaries, and critical transformation

In addition to formal frameworks and tools, recent scholarship increasingly highlights the role of meaning-making processes in transdisciplinary research. Augenstein et al. (2024) argue that transformative transdisciplinary research is essential for addressing climate and biodiversity crises because it enables engagement with deep leverage points such as values, worldviews, and collective imaginaries.

They identify five priorities for advancing this transformative research: clearer conceptual guidance; people-centred research practices grounded in trust, care, and long-term relationships; engagement with deep leverage points; meaningful inclusion of diverse knowledge systems while addressing power asymmetries; and critical reflection on digitalisation. Achieving these priorities, they argue, requires institutional change and sustained collaboration between research and society.

Building on this orientation, Augenstein et al. (2025) foreground narratives as performative devices through which futures, responsibilities, and pathways for action are negotiated. Unlike scenarios or models, narrative futures mobilise affective and experiential dimensions, shaping imaginaries and motivations for change. In parallel, Sahle et al. (2025) reaffirm sustainability science as a problem-oriented, normative, and systems-based field whose transformative potential depends on critical engagement with power, institutions, and values embedded in research and governance processes.

Finally, Ludwig and El-Hani (2025) sharpen this critique by cautioning that transdisciplinary approaches, when insufficiently reflexive, may reproduce existing political, institutional, and epistemic hierarchies. Although transdisciplinarity often promises inclusivity and knowledge diversity, these ideals can become symbolic, legitimising dominant actors while marginalising alternative perspectives. Their call for transformative transdisciplinarity underscores the need to confront how power, norms, and structural conditions shape both research practices and societal change if transdisciplinary work is to support more equitable and effective sustainability transformations.

2.8 Concluding reflections: Transdisciplinary knowledge production

The key premise of transdisciplinarity has remained consistent over time: the co-production of knowledge to engage complex societal challenges through collaboration among academic, professional, and experiential domains. Transdisciplinarity has nevertheless retained an aura of innovation because it addresses persistent problems that resist closure, standardisation, and definitive solutions. Consequently, transdisciplinarity does not adhere to a fixed methodology or transferable body of know-how, but relies on context-specific, situated practices. When successful, it tends to dissolve into the structures, processes, and outcomes it helps to shape, rather than persisting as a formalised method. Absent such integration into practice and institutional routines, however, transdisciplinarity risks collapsing into a largely self-referential and ultimately sterile theoretical exercise, in which the concept is continually refined, debated, and repositioned within academic discourse while its practical ambitions remain unrealised.

In mapping the spatiotemporal and conceptual landscape of transdisciplinarity—across historical trajectories and shifting epistemic alignments—we have followed multiple paths rather than a single linear route. Some trajectories were traced chronologically, moving from early epistemological ambitions of disciplinary integration toward problem-oriented and participatory approaches shaped by changing societal challenges and institutional contexts. Others were identified through cross-temporal conceptual alignments, linking approaches such as systems thinking, sustainability science, and action-oriented research that are historically distant yet epistemically proximate.

Along this journey, distinct strands have interwoven around shared diagnoses of disciplinary limits and the need to reconnect knowledge with action, science with society, and analytical practice with accountability, for example, in the coming together of sustainability science, post-normal science, and participatory research around problem-oriented, context-sensitive knowledge production. At the same time, such interweavings have opened points where trajectories diverge, as seen in tensions between philosophical approaches emphasising ontological plurality and process-oriented frameworks seeking operational guidance, or between participatory ideals and critical concerns with power, legitimacy, and institutional constraints.

At certain points in our exploration, a shift in perspective helped to situate these developments within a broader epistemic landscape, clarifying how transdisciplinarity has been rearticulated rather than cumulatively stabilised. Over the course of its development, transdisciplinarity has been repeatedly redefined in relation to emerging research frameworks such as sustainability science, participatory and action-oriented research, and other problem-driven paradigms. The term transdisciplinarity has been claimed by established and emergent fields (e.g. architecture, environmental psychology), attached to or qualified by neighbouring paradigms (e.g. transdisciplinary action research, transformative transdisciplinarity), and operationalised as a method or tool, most notably within sustainability science. From the perspective of these broader paradigms, transdisciplinarity is often treated less as a distinct mode of knowledge production than as an instrumental resource for organising research processes, as reflected in the repurposing of its conceptual frameworks—such as process models or distinctions between systems, target, and transformation knowledge—into toolkits for research design and implementation.

Seen across time, transdisciplinarity emerges as more of a series of iterative re-articulations than as a cumulative progression. Recurrent motifs—complexity, integration, participation, reflexivity—are reassembled into new constellations as transdisciplinarity adapts to shifting problem contexts, institutional arrangements, and epistemic displacements. Its coherence lies not in theoretical unification, but in its capacity to remain open, adaptive, and reflexive in the face of uncertainty, plurality, and contested values.

Within the present configuration of societal challenges and institutional expectations, this dynamic is further intensified by the convergence of multiple, interrelated problems and by the contexts in which transdisciplinarity is increasingly expected to operate. As transdisciplinary approaches become embedded in research policy and funding frameworks, they are tasked not only with integrating knowledge but with demonstrating societal relevance and impact under conditions of urgency and constraint. Against this backdrop, and following the historical and conceptual journey mapped in this chapter, transdisciplinarity can be understood as a reflexive, context-sensitive orientation toward producing knowledge with society for society, characterised less by conceptual closure than by its sustained engagement with complexity, uncertainty, normativity, and change.

3. TRANSDISCIPLINARITY IN HOUSING RESEARCH

The third part examines how transdisciplinarity has taken shape within housing research through evolving conceptions of dwelling, human–environment relations, and architectural and planning practice. It traces early ecological and behavioural perspectives that understands housing as a lived, relational, and context-dependent condition, thereby prefiguring key transdisciplinary concerns with problem framing, intervention, and situated knowledge. Building on this foundation, the discussion explores designerly and practice-based modes of knowledge

production—grounded in reflection-in-action—that blur the boundary between research and practice. The analysis then turns to contemporary housing and renovation research, highlighting both the growing recognition of transdisciplinarity and the persistent difficulties of translating integrative ambitions into sustained, context-sensitive transformation as necessary conditions for addressing complex housing challenges.

3.1 Transdisciplinarity, architecture, and urban planning

From the mid-twentieth century onwards, growing attention to the reciprocal interplay between environment and behaviour marked a significant shift across several fields concerned with the built environment. As noted by Stokols and Altman (1987), the relationships between people and their everyday environments had received only sporadic attention from behavioural scientists prior to the mid-1960s. Rising concerns about environmental degradation, urban violence, resource scarcity, and pollution-related health impacts brought environment–behaviour research to the foreground of social science during the late 1960s. During this period, environmental psychology was emerging as a field “focused on understanding the relationship between the physical environment and the behavior of man” (Proshansky et al., 1970, p. v). Instead of constituting a self-contained discipline, environmental psychology came to be understood as part of a broader, multidisciplinary field integrating perspectives from architecture, urban planning, psychology, anthropology, sociology, and geography (Stokols, 1995).

Within architectural theory, a comparable concern with the environment is to be found in Rapoport’s (1969) work, which treats architecture and settlement form as expressions of the social, cultural, and symbolic dimensions of human–environment relations. Drawing on comparative studies of vernacular buildings and settlements, Rapoport argues that built form cannot be explained solely through technical or stylistic criteria, but must be understood in relation to everyday practices, cultural meanings, and social organisation. By foregrounding variation across cultures and scales, his work situates architecture within a broader environmental context shaped by human use and interpretation, emphasising its relational and socially constituted character.

Along similar lines, Lawrence’s (1987) *Housing, Dwelling, Homes* establishes an early process-oriented understanding of housing that anticipates later transdisciplinary approaches. By distinguishing between the house as a physical and economic artefact, the home as an affective and symbolic locus of meaning and identity, and dwelling as the ongoing set of practices through which people actively inhabit, negotiate, and transform space over time, Lawrence integrates architectural, social, cultural, psychological, and temporal dimensions. Housing is thus understood as a complex, situated, and value-laden condition that requires forms of inquiry capable of bridging research and practice, explanation and intervention, and spatial design and social life.

3.1.1 Transdisciplinarity and housing

In later work, Lawrence (2004) conceptualises housing and health as interrelated components of a broader residential environment shaped by dynamic interactions between people and their physical, social, economic, and institutional contexts. Housing is thus understood not as a technical object or market commodity, but as a lived environment whose effects on health and wellbeing emerge through multi-dimensional, context-dependent, and value-laden processes. Under such conditions, Lawrence argues that problem recognition and problem solving cannot be separated: housing challenges are not predefined technical problems but evolving societal situations. It is precisely this inseparability that calls for transdisciplinary research, enabling problem framing and intervention to develop in tandem through the integration of scientific, professional, and experiential perspectives.

In a similar vein, Salama and Alshuwaikhat (2006) examine the intersection of housing affordability and environmental performance through a transdisciplinary lens. Rejecting narrow economic definitions of affordability and purely technical interpretations of sustainability, they conceptualise sustainable affordable housing as a complex societal challenge shaped by interdependent environmental, social, cultural, economic, spatial, and institutional factors operating across multiple scales. Their analysis highlights persistent fragmentation, whereby affordability is addressed primarily through policy and economic instruments, while sustainability is pursued through technical standards and design guidelines, often with limited connection to early-stage planning and participatory processes.

Salama's (2011) later work advances a transdisciplinary framework of knowledge types for affordable housing research, integrating architectural, social, economic, environmental, and behavioural perspectives, with particular emphasis on lifestyle theories as a missing yet crucial form of knowledge. By making explicit how people live, use space, and attribute meaning to their environments, this framework positions transdisciplinary knowledge as a means of expanding architectural inquiry beyond disciplinary synthesis toward socially grounded knowledge production.

3.1.2 Transdisciplinarity as designerly practice

In the editorial introduction to *Transdisciplinary Knowledge Production in Architecture and Urbanism*, Doucet and Janssens (2011) contend that transdisciplinarity is more a distinctive mode of knowledge production than a stable concept. They identify three recurring elements that align transdisciplinarity with architecture and urbanism: the integration of discipline and profession (theory and practice), an explicit ethical orientation, and the central role of experimental, designerly inquiry—understood, following Cross (1982), as being characterised by abductive reasoning, engagement with ill-defined problems, solution-led exploration, and constructive synthesis supported by non-verbal modes of reasoning.

This practice-oriented understanding is mirrored in their treatment of architecture, design, and urban planning, which are presented not only as distinct disciplines but as overlapping and practically entangled fields. Their boundaries are shown to shift in response to complex, real-world problem contexts, reflecting a productive tension between disciplinary differentiation and practical integration. Designerly inquiry provides a shared epistemic basis through which these fields converge, translating transdisciplinarity from an abstract ambition into an operational mode of practice.

Following the transdisciplinary research process articulated in the *Handbook of Transdisciplinary Research* (Hirsch Hadorn et al., 2008), Doucet and Janssens emphasise that problem identification, problem analysis, and bringing results to fruition unfold through overlapping and iterative cycles. This recursive structure closely resembles design-based forms of inquiry, in which problem framing, analysis, and action co-evolve through sustained engagement with concrete situations. In this sense, such inquiry renders the shifting boundaries between disciplines and practices operative, moving them from abstraction into practice and enabling transdisciplinary knowledge to emerge through experimentation, learning-in-action, and reflexive judgement.

This conception resonates with Schön's (1983) epistemology of practice, which foregrounds *knowing-in-action* and *reflection-in-action* as rigorous forms of inquiry developed in indeterminate and conflicted situations. Schön argues that professional competence rests on tacit and situated forms of knowing that emerge through engagement with such situations—forms of knowledge systematically marginalised by discipline-bound academic traditions. Reflection-in-action, in this view, constitutes a mode of inquiry in its own right, through which practitioners actively frame problems, test interpretations, and recalibrate their actions in real time. From this perspective, design-based inquiry does not merely support transdisciplinary research but provides a key epistemic means through which it is enacted in practice.

The relevance of this argument becomes particularly evident in sustainability-oriented work, where complex problem contexts fundamentally challenge established modes of thinking and acting within the built environment disciplines. In this regard, Després et al. (2011) maintain that architecture and urban planning are transdisciplinary by nature, yet diagnose a persistent failure to address sustainability effectively due to technical reductionism and structural fragmentation. Despite the expansion of scientific knowledge on urban complexity, its influence on practice remains limited by enduring gaps between scientific, professional, and artistic forms of knowledge, sectoral divisions of responsibility, and rigid disciplinary traditions. They suggest that the resulting divide between knowledge and action does not reflect disciplinary incapacity, but rather the absence of transdisciplinary frameworks capable of mobilising design-based inquiry to engage sustainability as a complex, situated, and evolving societal challenge.

3.2 Contemporary directions in transdisciplinary housing research

Transdisciplinarity continues to be considered an overarching research orientation for addressing contemporary housing issues, particularly in relation to sustainability and climate change. While housing is widely recognised as a complex socio-technical phenomenon, knowledge production remains largely organised along disciplinary and sectoral lines. Sustainability, affordability, financing, governance, and social practices are frequently addressed parallel, limiting the capacity of research to inform coherent and context-sensitive action across design, policy, and practice.

Recent state-of-the-art reviews underscore enduring barriers to transdisciplinary integration. Drawing on a comprehensive literature review, Silva et al. (2024) show that, despite the growth of research on sustainable affordable housing, fragmentation across domains remains pronounced. Sustainability is predominantly operationalised through building-level performance measures, while affordability is treated mainly as an economic or regulatory concern, with limited integration between the two. Although social, financial and policy aspects are increasingly acknowledged, they remain weakly connected to design processes, construction practices, and long-term use. This fragmentation contrasts with earlier integrative, place-based approaches that linked problem framing and solution development within specific social and institutional contexts. Overall, the continued dominance of disciplinary silos suggests that housing complexity has not diminished but continues to be managed through specialisation, reinforcing the need for transdisciplinary approaches capable of integrating environmental, social, and institutional dimensions into actionable strategies.

This structural fragmentation—across disciplinary domains, analytical scales, and stages from design to long-term use—continues to limit the translation of knowledge into coherent, context-sensitive action. Lawrence (2025) locates the core problem in a persistent applicability gap between theory, research, and practice, reproduced through disciplinary and institutional structures. Contemporary studies continue to generate technical, policy, and economic knowledge in parallel streams, yet struggle to mobilise this knowledge effectively because inquiry remains bounded by predefined questions, protocols, and sectoral responsibilities. Lawrence's distinction between disciplinary research and transdisciplinary inquiry clarifies this limitation: housing challenges are not repeatable technical problems but situated, value-laden situations that require the integration of scientific knowledge, professional judgment, lived experience, and ethical reflection. From this perspective, the growing emphasis on classification frameworks and sustainability indicators represents progress in mapping the field, but also reveals the absence of sustained border work capable of reconnecting knowledge production with design, governance, and everyday practice.

Against this background, recent contributions increasingly shift attention from diagnosing fragmentation to exploring how transdisciplinarity might be operationalised in practice. Ozsoy and Mengüç (2024) adopt a pragmatic understanding of

transdisciplinarity oriented toward problem-solving and systemic transformation. Defined as coordinated, multi-actor knowledge integration aimed at changing complex socio-technical systems, their approach treats human behaviour as a central system variable. Although focused on energy transition and the climate crisis, their argument is highly relevant to housing research, where non-linear interactions between technology, behaviour, institutions, and governance render disciplinary and interdisciplinary approaches insufficient for both understanding and implementation. Their Transdisciplinary Approach and Design Thinking Methodology addresses this gap through integrated knowledge production, coordinated leadership, and iterative design processes, demonstrated through case studies spanning healthcare, campus-scale built environments, and industrial energy transition.

In the context of sustainable building renovation, Mjörnell (2020) similarly argues that such interventions cannot be treated as purely technical or energy-efficiency problems. Renovation decisions simultaneously affect environmental performance, affordability, social conditions, and cultural–historical values, and reductionist approaches risk unintended consequences such as tenant displacement or the erosion of heritage qualities. Through the Sustainable Integrated Renovation research environment, transdisciplinarity is operationalised via living labs embedded in real projects, multi-aspect renovation frameworks, and continuous dialogue among researchers, housing companies, authorities, industry actors, and tenants. Sustainability is thus treated as a negotiated, context-specific outcome rather than a predefined technical target.

A more explicitly epistemological engagement is offered by Özdamar (2021), who draws on Nicolescu's model of knowledge production to conceptualise housing as a lived, multi-level phenomenon shaped by globalisation, governance, markets, and everyday dwelling practices. Conventional disciplinary approaches are shown to abstract urban life and overlook ambiguity, contradiction, and tacit knowledge, while institutional constraints perpetuate the gap between theory and practice. Transdisciplinarity is adopted as a means to reconnect research with lived reality through in-situ knowledge production and engagement with real actors and contexts.

Finally, Sibilla and Kurul (2020) examine whether energy retrofit is conceptualised as a complex socio-technical system in the academic literature, and if so, whether this enables its complexity to be addressed through a transdisciplinary approach. Based on a qualitative, systems-oriented analysis of 136 peer-reviewed articles, they identify persistent disciplinary, scalar, and actor-based fragmentation. Their findings show that energy retrofit research remains largely reductionist and technically driven, with transdisciplinarity more often invoked rhetorically than operationalised, and with social and behavioural dimensions consistently under-integrated. As a result, energy retrofit is rarely treated as a genuinely socio-technical system, limiting its transformative role in low-carbon transition. The authors identify key gaps—including weak systemic conceptualisation, limited integration of social and technical knowledge, marginalisation of occupants, and a strong bias toward building-scale optimisation—reinforcing the need for transdisciplinary, multi-scalar, and transformation-oriented research in the built environment.

Collectively, these contributions indicate that while transdisciplinarity is widely recognised as necessary for addressing contemporary housing challenges, its realisation remains uneven. Much of the field continues to diagnose complexity without fully transforming the epistemic, institutional, and practical arrangements through which housing knowledge is produced and applied. The task ahead therefore lies not in further conceptualising transdisciplinarity, but in sustaining forms of boundary work, institutional embedding, and situated experimentation that enable integrative knowledge to translate into durable, context-sensitive transformation across housing systems.

4. FINAL REFLECTIONS

From a contemporary perspective, housing is best understood not merely as a technical, economic, or policy domain, but as a complex social condition shaped by cultural values, everyday practices, and contested priorities, including sustainability, social justice, and long-term collective wellbeing. In this sense, housing can be conceptualised through the notion of dwelling: the processes through which built environments—from the housing unit to the neighbourhood and the city—are produced, inhabited, and experienced over time. Housing thus emerges not as a discrete object of intervention, but as the outcome of interacting material structures, urban systems, institutional arrangements, and social and cultural practices of daily life.

Dwelling, in this sense, refers not only to inhabitation but to sustained attention to the conditions that shape everyday life. To dwell on housing is to examine how material forms, social relations, institutional arrangements, and normative orientations interact over time, and how housing interventions reconfigure these relations. This shift reframes housing as an evolving and contested condition, underscoring the need for modes of inquiry and practice capable of engaging complexity, trade-offs, and change.

At this point of reflexive engagement, dwelling and transdisciplinarity converge. Addressed transdisciplinarily, housing is not treated as a problem for isolated expertise, but as a situated societal condition requiring dialogue, learning, and reflexivity across domains of knowledge and practice. Like dwelling, transdisciplinary inquiry resists abstraction into discipline-specific issues, integrating scientific, professional, and experiential knowledge while linking analysis with action in context-sensitive ways. Transdisciplinarity thus shares with dwelling a sustained engagement with complexity rather than its reduction.

Running through this convergence is a key tension between separation and integration in both transdisciplinary research and affordable and sustainable housing. In transdisciplinary research, this tension manifests as disciplinary fragmentation, constraining the capacity to engage with complex societal problems. In housing, fragmentation is less a conceptual choice than an entrenched institutional condition, evident in the parallel treatment of technical, economic, environmental, and

social dimensions, and in the systematic separation of housing production, design, and governance from the everyday practices through which housing is lived and sustained.

Transdisciplinarity addresses an analogous problem of fragmentation at the level of knowledge production. Where disciplinary specialisation compartmentalises understanding, transdisciplinary inquiry responds not through synthesis or unification, but through structured interaction among heterogeneous forms of knowledge. It creates spaces for dialogue, joint problem framing, and reflexive learning. In this respect, transdisciplinarity parallels dwelling as a relational practice, holding together analysis and action, building and living, and expert knowledge and lived experience in order to engage housing as a systemic social condition.

A further tension shaping contemporary housing debates lies between locally lived housing conditions and the global processes that increasingly structure housing (Madrazo, 2017). While housing is always experienced locally—in homes, neighbourhoods, and everyday life—it is simultaneously shaped by global forces such as financialisation, climate change, demographic change, regulatory frameworks, and transnational policy agendas. These dynamics often remain analytically abstract, even as their consequences are materialised in concrete, lived settings.

The sustainability discourse links locally experienced housing conditions to planetary boundaries, social justice concerns, and long-term collective responsibilities, foregrounding how decisions at the scale of homes, neighbourhoods, and cities both contribute to global environmental impacts and are mediated by specific cultural, institutional, and spatial contexts. Within this framing, dwelling functions as an integrative concept that anchors sustainability concerns in lived experience, without reducing housing to either abstract systems or isolated places. Transdisciplinarity plays a parallel role in knowledge production by enabling dialogue across scales, actors, and forms of expertise, and by supporting the translation of global sustainability goals into context-sensitive, place-based housing practices. Viewed in relation to one another, these orientations enable housing to be engaged as both locally lived and globally embedded, while resisting fragmentation across domains, scales, and forms of knowledge.

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2.2

Transdisciplinary education in practice: The RE-DWELL learning and research environment

Leandro Madrazo

Building on the conceptual analysis of transdisciplinarity presented in the previous chapter, this chapter examines its educational implications within the RE-DWELL learning and research environment. It is structured in four parts. Part 1 establishes a theoretical backdrop, conceptualising transdisciplinary learning as an integrative, reflexive, and formative process that reconfigures relations between research, spatiality, and learner formation under conditions of complexity characterised by epistemic plurality, uncertainty, value conflict, and the interdependence of knowledge and action. Part 2 introduces the framework and organisation of the RE-DWELL learning and research environment, focusing on how learning, research, collaboration, and knowledge production were organised and interconnected across the programme. Part 3 provides an account of the evolving development and implementation of this environment, showing how courses, workshops, summer schools, secondments, and network activities were interwoven and mutually shaping across the programme. Finally, Part 4 offers a retrospective analytical examination of the RE-DWELL learning and research environment in relation to the theoretical backdrop, identifying key transdisciplinary features and reflecting on how these were enacted through practice.

INTRODUCTION

Transdisciplinarity is commonly understood as a reflexive, problem-oriented mode of knowledge production that responds to complexity, uncertainty, and the limits of disciplinary organisation, particularly in relation to societal problems that exceed the boundaries of academia. Problem fields such as affordable and sustainable housing exemplify these conditions: they are simultaneously technical, social, economic, political, and normative, and cannot be adequately understood or addressed through disciplinary expertise alone. In such contexts, transdisciplinary knowledge emerges through collaboration across academic fields and societal

actors, alongside ongoing reflection on problem framing, knowledge integration, and the orientation of action.

This reconfiguration of knowledge production carries significant educational implications. Where knowledge develops through integration, participation, and engagement with evolving real-world problems, learning cannot be organised around the transmission of predefined content alone. Instead, learning unfolds through sustained engagement with uncertainty, plurality, and negotiation across perspectives and forms of knowledge. Transdisciplinary learning involves both participation in collaborative problem-oriented practices that cross disciplinary boundaries and the cultivation of an explicit understanding of transdisciplinary ways of thinking, including their epistemic assumptions, methodological orientations, and reflexive commitments.

1. TRANSDISCIPLINARITY AND EDUCATION: A THEORETICAL FRAMEWORK

1.1 The educational foundations of transdisciplinarity

The 1970 OECD international seminar *Interdisciplinarity: Problems of Teaching and Research in Universities* (OECD, 1972) framed interdisciplinarity as both a research and an educational challenge arising from the growing complexity of science and education in an evolving society. Interdisciplinarity was approached not simply as collaboration among disciplines, but as a response to structural limitations in the organisation of knowledge, calling for new forms of coordination to support informed institutional and societal decision-making. Education was thereby positioned as a formative space in which emerging modes of knowledge integration could take shape.

Piaget (1972) grounded interdisciplinarity in the internal evolution of science, arguing that the increasing reliance on structural and causal models across multiple levels of conceptualisation renders strict disciplinary compartmentalisation epistemologically untenable. Interdisciplinarity, in this view, emerged as a prerequisite of scientific progress grounded in epistemological change, instead of a response to external demands. He distinguished between multidisciplinary, interdisciplinarity, and transdisciplinarity, defining the latter as a horizon in which reciprocal relations among disciplines are situated within an overarching system without fixed boundaries. While primarily epistemological, this account implicitly challenged educational structures organised around rigid disciplinary divisions by pointing toward forms of knowledge organisation aligned with the evolving structure of science.

The most explicit articulation of the educational and institutional implications of inter- and transdisciplinarity was offered by Jantsch (1972), who conceived science, education, and innovation as interdependent components of a broader societal system. From a systems perspective, he treated education and innovation as general instances of science understood as purposeful human activity, whose dynamic interactions increasingly shape societal development and its relationship with the environment. On this basis, Jantsch proposed a purpose-oriented reorganisation

of the university, in which education, research, and service are reconfigured as interdependent dimensions of a science–education–innovation framework. In this formulation, education is not a preparatory stage preceding research but an integral mechanism of societal self-renewal embedded within processes of knowledge creation and innovation.

These early articulations of interdisciplinarity and the emerging concept of transdisciplinarity entailed a redefinition of the conditions under which scientific knowledge is generated and sustained. By explicitly linking epistemological change to learning processes and academic organisation, the OECD seminar positioned education as a formative space in which new modes of knowledge integration could emerge.

1.2 Transdisciplinarity and the transformation of learning

The OECD seminar approached interdisciplinarity primarily through questions of research organisation, coordination between disciplines, and institutional design. While these concerns carried important educational implications, the seminar offered limited insight into how interdisciplinarity—and its more radical extension, transdisciplinarity—might transform learning itself, understood not merely as the transmission of knowledge but as a formative process shaping ways of thinking, knowing, and acting.

A more explicitly transformative understanding of learning is articulated programmatically in the *Charter of Transdisciplinarity*, co-signed by de Freitas, Morin, and Nicolescu (2002), which affirms that “transdisciplinary education revalues the role of intuition, imagination, sensibility and the body in the transmission of knowledge” (art. 11). For Nicolescu (2002), education must change because reality is complex and multidimensional, structured across multiple levels that cannot be grasped through isolated disciplines or linear modes of knowledge. In subsequent work, he further argues that transdisciplinary education enables learners “to establish links between persons, facts, images, representations, fields of knowledge and action, to discover the Eros of learning during our entire life and to built [sic] beings in permanent questioning and permanent integration” (Nicolescu, 2005, p. 15). From this perspective, transdisciplinary education responds to uncertainty, plurality, and complexity by operating between, across, and beyond disciplines in order to reconnect knowledge with meaning, values, and lived experience. Its aim is not the accumulation of fragmented knowledge, but the lifelong formation of individuals capable of integration, reflection, and responsibility.

Morin (1997, 2007) extends this orientation through his theory of complexity and his call for a reform of thought and education. Drawing on the notions of system, organisation, and emergence, his account emphasises the inseparability of parts and wholes, the coexistence of order and disorder, and the recursive relations through which knowledge both produces and is produced by the conditions of its own organisation. On this account, transdisciplinarity does not abolish disciplinary

distinctions but relates them within a systemic framework that preserves differentiation while enabling integration. Education—and the university in particular—is positioned as a key institutional site for cultivating the cognitive operators of complex thinking, including contextualisation, recursion, and dialogic reasoning.

Taking these arguments further, Augsburg (2014) shifts attention to the individual as the primary site where transdisciplinarity is enacted. Extending the ethical, epistemological, and educational premises articulated by Nicolescu and Morin—namely that transdisciplinarity is grounded in complexity, oriented toward the common good, and dependent on cultivated dispositions of openness, reflexivity, and responsibility—she conceptualises transdisciplinarity as a process of becoming, learned through culture and experience and sustained by the gradual development of relevant attitudes and competencies. This emphasis places learner formation—understood as the progressive development of skills, virtues, and dispositions—at the centre of transdisciplinary education.

If transdisciplinarity entails a reform of thought and the formation of the human subject, a further question concerns how these are translated into pedagogical and learning processes.

1.3 Transdisciplinary learning as a process and practice

Conceiving transdisciplinary learning as a transformative and integrative process shifts attention from epistemological and institutional reform to the concrete dynamics through which learning is enacted. Learning is thereby foregrounded as an active, reflexive, and relational process moving beyond models of knowledge transmission. While early debates on interdisciplinarity focused primarily on research organisation and institutional design, they left the question of how learning itself might be transformed under conditions of complexity and knowledge plurality largely open. In later theoretical and pedagogical accounts, transdisciplinary learning is therefore understood as a dynamic through which individuals and collectives bring heterogeneous forms of knowledge into relation and reshape their ways of thinking, knowing, and acting.

McGregor (2017) translates earlier epistemological and institutional arguments for transdisciplinarity into a pedagogical account of how such learning can be enabled in higher education. She conceptualises transdisciplinary pedagogy as the framework through which learning under conditions of complexity takes place. This pedagogy comprises three interrelated elements: transdisciplinary learning, distinguished from disciplinary, multidisciplinary, and interdisciplinary learning; a transdisciplinary learning cycle, capturing the iterative and collaborative dynamics through which learning develops through practice and transdisciplinary habits of mind, understood as dispositions that sustain learners' capacity for integration, reflexivity, and active involvement in uncertainty. Within this framework, transdisciplinary learning is defined not by the coordination of disciplinary content but by the co-creation of new knowledge through iterative interaction among disciplines,

societal sectors, and real-world contexts, bringing together academic and non-academic ways of knowing.

At the level of pedagogical practice, Clarke and Ashhurst (2018) examine how transdisciplinary pedagogy is realised in concrete teaching–learning situations. Focusing on the micro scale of the classroom or learning space, they conceptualise pedagogy as an adaptive practice shaped by sociomaterial conditions, understood as assemblages of people, spaces, times, technologies, and objects. They identify four key shifts associated with movement from traditional to transdisciplinary pedagogy: from disciplinary foundations to a problem focus; from unified epistemological frameworks to a plurality of worldviews; from compartmentalised knowledge to knowledge co-production as a social process; and from fixed uses of space and time to flexible and dynamic arrangements. These shifts present transdisciplinary learning as a collective, uncertain, and relational process that is produced through pedagogical practice, not through the coordination of disciplinary content or the delivery of predefined outcomes.

Pearce et al. (2018) further clarify transdisciplinary learning by distinguishing between learning *within* transdisciplinary research settings and learning *about* transdisciplinarity itself, including its assumptions, methods, and reflexive stance. Accordingly, learning involves movement between understanding how complex systems function, articulating normative goals, and showing pathways of transformation. Transdisciplinary learning thus integrates descriptive, normative, and action-oriented forms of knowing in response to complex real-world problems.

Across these accounts, transdisciplinary learning is framed not as an outcome but as an integrative and reflexive process through which knowing, valuing, and acting are continually reconfigured. Godemann (2008) complements this view by examining how such learning takes place socially through processes of knowledge integration and communication within collaborative research and learning contexts. Working within a problem-solving conception of transdisciplinarity aligned with sustainability-oriented research traditions, she conceptualises transdisciplinary inquiry as addressing complex problems originating outside academia through cooperation between researchers and practitioners. In this account, the quality of transdisciplinary research for sustainable development is measured by the degree of knowledge integration achieved, rendering learning and integration constitutive of research quality.

From a social psychological perspective, Godemann further conceptualises knowledge integration as a processual and recursive achievement that unfolds through interaction, dialogue, and negotiation. Key dimensions of this process include the exchange of shared and unshared information, the development of mutual understanding, the construction of a common knowledge base, and the emergence of shared frames of reference enabling coordinated action. Reflexivity is central to this dynamic: continuous reflection on assumptions, roles, goals, and interactions enables participants to question disciplinary frames, recognise epistemic differences, and adapt their perspectives. In this sense, transdisciplinary research con-

texts function simultaneously as sites of knowledge production and as learning environments.

Building on this focus on knowledge integration and reflexive communication, Baumber (2022) situates transdisciplinary learning explicitly within sustainability-oriented research and education, foregrounding transformative learning as a central outcome. After Mezirow (1991), transformative learning is understood as the critical revision of learners' assumptions and frames of reference through reflection and dialogue. Baumber argues that complex sustainability challenges require not only integrated knowledge but also shifts in how learners understand problems, values, and their own roles within socio-ecological systems. Transdisciplinary engagement thus operates as a socially embedded learning environment in which reflexivity supports both individual perspective transformation and collective capacity for sustainability-oriented action. These learning processes, however, do not unfold in abstraction but depend on the conditions, environments, and relations that enable engagement with uncertainty, critical reflection, and integration—bringing the question of learning spaces to the foreground.

1.4 Transdisciplinary learning spaces

Transdisciplinary education foregrounds learning spaces as plural and contested configurations that both arise from and enable learning across epistemological, institutional, and experiential boundaries. Because transdisciplinary learning involves the bringing into relation of heterogeneous forms of knowledge, values, and practices, it unfolds within spaces that exceed disciplinary, curricular, and organisational norms. Conceived in this way, learning spaces mirror transdisciplinary inquiry in their emphasis on boundary-crossing and ongoing interaction with uncertainty, creating conditions for forms of knowledge, practice, and agency that cannot be sustained within tightly bounded curricular or institutional settings.

From an educational perspective, Boys (2011) conceptualises learning space as a relational and contested configuration shaped by how learning is enacted, less as a fixed physical setting than as a simple division between formal and informal environments. Learning spaces are constituted through the interaction of social, pedagogical, institutional, and material practices of post-compulsory education—including teaching, research, assessment, and participation beyond the university. As such, they cannot be treated as neutral backdrops, but as configurations through which learning processes are enabled, constrained, and organised.

At this point, threshold concept theory offers a conceptual bridge between relational accounts of learning space and theories of learner formation. Threshold concepts support transdisciplinary learning by transforming how learners understand knowledge, uncertainty, and their own role across disciplinary boundaries. As described by Meyer and Land (2006), threshold concepts are core ideas within a field that function as conceptual gateways, reshaping how learners engage with and make sense of knowledge. Rather than simply adding information, they reorganise

understanding, enabling epistemic shifts that loosen discipline-specific assumptions about what counts as knowledge and how it is produced. Their focus on liminality—transitional phases in which learners have not yet integrated new ways of understanding—and on troublesome learning, where concepts disrupt familiar assumptions and resist easy comprehension, aligns closely with the uncertainty inherent in transdisciplinary inquiry. Seen in this light, confusion and disorientation are reframed as necessary and productive phases of learning, not as signs of failure.

These formative implications are taken up in Boddington and Boys' (2011) socio-spatial account of learning spaces as ongoing practices. In this view, learning spaces are only ever "completed" through embodied inhabitation and use, and their educational potential depends less on architectural or technological innovation than on the alignment between spatial arrangements, pedagogical practices, institutional governance, and underlying conceptions of learning. Where such alignment is absent, spatial innovation alone cannot sustain creative or transformative learning, highlighting the extent to which learning spaces shape not only learning practices, but learners themselves.

Barnett (2011) conceptualises learning spaces as ethically and ontologically charged settings that shape not only what learners do, but who they are able to become. Such spaces are simultaneously expansive and risky: they invite openness, creativity, and learner authorship while exposing learners to uncertainty, disorientation, and subtle forms of control. To capture these dynamics, Barnett proposes an ecology of learning spaces comprising interrelated material and physical dimensions, educational spaces constituted through curriculum and pedagogy, and the learner's interior (ontological) space. Although not formulated within a transdisciplinary framework, this ecology resonates strongly with earlier accounts concerned with uncertainty, formation, and coordination. In particular, Barnett's emphasis on the learner's interior space echoes Nicolescu's insistence on engaging the whole subject and provides a point of contact with Godemann's processual account of learning through reflexive engagement, dialogue, and knowledge integration.

At the level of pedagogical enactment, Mulcahy et al. (2015) shift attention from conceptual framing to practice, conceptualising learning spaces as fluid, ephemeral, and relational configurations, not fixed containers or causal agents of learning. From a sociomaterial perspective, learning spaces are produced through textual, temporal, pedagogical, and material practices, through which space and its uses are co-produced. Pedagogic change, in this view, is not generated by spatial design or policy interventions alone, but is realised as a relational achievement mobilising diverse social, discursive, and material resources. Goodyear and colleagues (2016) extend this perspective by framing learning spaces as configurations of possibility within networked places shaped by entanglements of physical locations, digital infrastructures, social relations, and artefacts. While such spaces enable openness and exploration, they also require forms of bounding—orientations and supports that ensure uncertainty remains pedagogically productive and does not become disorienting.

In their analysis of the learner's experience, Savin-Baden et al. (2008) emphasise the experiential and agential dimensions of learning, conceptualising it as taking place within mental and metaphorical zones in which assumptions about knowledge, pedagogy, and disciplinary identity are unsettled. Learning spaces thus function as zones of tension where interdisciplinary and transdisciplinary aspirations confront disciplinary norms, and where agency is enacted within "smooth curricular spaces" that are open, flexible, and contested, with learning and learners continually in motion. These spaces are inherently risky yet essential for critical reflection and self-formation. Extending this analysis, Savin-Baden (2011) argues that these formative dynamics also characterise research spaces, understood as dialogic, writing, collaborative, and solitary spaces in which inquiry develops through uncertainty, struggle, and reflexive engagement. In doing so, she foregrounds learning and research as interwoven practices enacted within shared spaces of inquiry that shape not only what is known, but how researchers come to understand themselves.

These accounts reveal learning spaces as fragile and contingent achievements whose pedagogical openness remains vulnerable in the absence of supportive institutional conditions. Addressing this fragility, Klein (2009) examines the conditions under which interdisciplinary and transdisciplinary spaces can be sustained. Institutional change is typically incremental and cumulative, requiring long-term planning, strategic focus, and the loosening of structural barriers related to governance, funding, and staffing. Central oversight can provide continuity beyond reliance on individual actors, whose personal commitment often sustains such initiatives in the absence of formal institutional support. Nevertheless, chronic financial precarity remains a persistent constraint, as many interdisciplinary initiatives depend on fragmented, short-term funding and lack stable institutional locations.

In sum, transdisciplinary learning spaces can be understood as relational, risky, and institutionally contingent configurations. Pedagogical openness and learner agency are necessary but insufficient conditions for their long-term viability, which depends on institutional arrangements capable of supporting uncertainty, reflexivity, and integration over time, and of aligning educational practice with organisational structures that recognise transdisciplinarity as a legitimate and enduring mode of learning.

1.5 Competences for transdisciplinary learning

In their account of transdisciplinary graduate education, Derry and Fischer (2005) argue that competence is better understood as the capacity to participate effectively in transdisciplinary practice under conditions of complexity, rather than as the acquisition of predefined knowledge or skills. Transdisciplinary learning is framed as a non-linear, practice-based process oriented toward engagement with ill-defined, socially significant problems that exceed disciplinary boundaries, and is enacted through design activity in which problem framing, inquiry, collaboration, and reflection-in-action are situated within evolving sociotechnical systems. Grad-

uate education is thus conceived as scaffolded participation in reflective transdisciplinary learning communities, where intelligence is distributed across people, disciplines, and tools.

Within this framework, Derry and Fischer articulate five interrelated competence domains—participation in reflective transdisciplinary communities; lifelong learning orientations and metacognitive capacities; the ability to understand, exploit, and design sociotechnical environments; the capacity to develop and sustain knowledge-building communities; and a committed focus on real-world problems and civic engagement. These competences are not treated as discrete outcomes but as mutually reinforcing capacities that emerge through participation in practice. Assessment is correspondingly framed as holistic and performance-based, grounded in coherent programme-level design and treating transdisciplinary competence as an emergent property of sociotechnical learning systems.

Approaching competences from the perspective of sustainability science, Wiek et al. (2011) frame education as preparation for addressing complex real-world problems characterised by uncertainty, urgency, and high societal stakes. They define an overarching sustainability research and problem-solving competence composed of five interdependent capacities: systems-thinking, anticipatory, normative, strategic, and interpersonal competence. Together, these enable learners to analyse complex systems across scales, envision and evaluate future trajectories, negotiate values and goals, design and implement transformative interventions, and collaborate with diverse stakeholders. While this framework is explicitly problem-driven and action-oriented, transdisciplinarity itself remains implicit, operating as a condition of sustainability research rather than as an explicit object of learning.

By contrast, Pearce et al. (2018) conceptualise transdisciplinary competences from a learning-centred and formative perspective grounded in transdisciplinary research and educational practice. Drawing on the pursuit of systems, target, and transformation knowledge, they articulate six interrelated competence fields: communicating values; reflecting on self and others; applying concepts in real-world contexts; collaboratively framing complex problems; researching in and with society; and imagining solutions while taking responsibility for their consequences. In contrast to frameworks oriented primarily toward problem-solving performance, this approach places particular emphasis on intrapersonal reflexivity, ethical awareness, and responsibility. Analytical capacities such as systems thinking or strategic reasoning are positioned as enabling means embedded within engagement with complexity. Transdisciplinarity is therefore approached explicitly as both a learning orientation and an object of reflection, with the individual learner positioned as a central locus of transformative change.

Across these approaches, a shared concern emerges on the preparation of learners to engage with complex, uncertain, and socially consequential problems, alongside a rejection of reductive, discipline-bound notions of expertise. They diverge, however, in where they locate the primary site of transformation. Derry and Fischer foreground learning communities and sociotechnical environments, understanding

competence as emerging through participation in transdisciplinary practice. Wiek et al. emphasise effective problem-solving capacities oriented toward sustainability research and action, with transdisciplinarity operating implicitly as a condition of practice. Pearce et al., in turn, place greater emphasis on reflexive self-formation, ethical responsibility, and the learner as the key agent of change.

1.6 Concluding reflections: Transdisciplinary education as an integrated educational project

Transdisciplinarity reshapes educational questions of learning, space, and formation, calling for an integrated understanding of how these dimensions are brought into relation within educational practice. Across the literature reviewed, transdisciplinary education does not emerge as a single pedagogical model or competence framework, but as a multi-dimensional educational project oriented toward enabling learning under conditions of complexity that exceed disciplinary boundaries. Its central concern lies in how learners integrate knowledge, values, and action in response to complex, uncertain, and value-laden societal problems.

One way of approaching transdisciplinary education is as education oriented toward the development of transdisciplinary capacities. Here, emphasis is placed on cultivating learners' ability to engage with ill-defined problems through integrative, reflexive, and collaborative orientations, including systems thinking, normative reasoning, problem framing, and responsibility. While problem-solving-oriented frameworks often articulate these capacities in relation to effective intervention and action, learning-centred approaches treat them less as discrete skills than as formative dispositions that evolve through participation in transdisciplinary practice.

A second line of interpretation understands transdisciplinary education as a pedagogical orientation or learning design. Here, attention shifts from predefined outcomes to the organisation of learning processes that privilege relationality, iteration, and co-creation across disciplinary, institutional, and societal boundaries. Learning is conceived as an integrative and exploratory process in which knowledge is produced through interaction, reflection, and engagement with uncertainty, beyond stable disciplinary transmission models. From this perspective, learning itself becomes a primary site of transformation.

A third perspective frames transdisciplinary education as a reconfiguration of educational spaces and institutions. In this view, transdisciplinarity challenges established curricular and organisational arrangements by creating learning spaces that are open, provisional, and inherently risky, enabling movement between learning and research, theory and practice, and academic and societal contexts. Such spaces function not merely as settings for learning, but as enabling conditions through which transdisciplinary capacities and dispositions can be sustained over time.

Finally, transdisciplinary education can be understood as a formative and ethical project concerned with the transformation of ways of thinking, knowing, and being. This perspective foregrounds the learner as a developing subject whose identities, values, and responsibilities are reshaped through sustained involvement with complexity and uncertainty. Educational aims thus extend beyond instrumental problem-solving toward reflexivity, ethical responsibility, and orientation toward the common good.

These four understandings of transdisciplinary education—as education for transdisciplinary capacities, as a pedagogical orientation, as a reconfiguration of learning spaces and institutions, and as a formative and ethical project—are mutually constitutive. Capacities are formed through pedagogical processes enacted within particular spatial and institutional conditions, and together these processes contribute to learner formation. Transdisciplinary education can therefore be understood as an integrated educational orientation in which epistemological change, pedagogical design, spatial organisation, and learner formation are aligned, positioning it as a transformative response to the challenges facing contemporary education.

2. RE-DWELL LEARNING AND RESEARCH ENVIRONMENT

The concepts and perspectives examined in the preceding sections provide a lens through which to understand the RE-DWELL learning and research environment. Instead of originating from a pre-established pedagogical framework, this environment emerged through ongoing experimentation, dialogue, and adaptation across network activities. Learning and research were configured through work across disciplines, institutions, and societal contexts; engagement with affordable and sustainable housing as a complex and value-laden problem field; and responsiveness to the evolving needs of ESRs navigating diverse epistemic, methodological, and professional trajectories. The sections that follow describe how this environment was organised, enacted, and evolved in practice.

2.1 An integrated learning and research environment

In RE-DWELL, learning and research were not organised as separate or sequential activities but were structurally and practically intertwined throughout the programme. Learning did not function as a preparatory stage preceding research, nor was research confined to individual academic production. Instead, learning emerged through active participation in research processes, while research itself operated as a primary site of learning.

This integration was realised through the parallel development of doctoral projects, structured courses, collaborative tasks, and secondments, supported by continuous feedback loops across these activities. Concepts and methods introduced through training were applied, tested, and reworked within doctoral research, while insights and challenges arising from research and practice-based engagements fed back into collective learning in workshops and summer schools.

Network-level activities—such as the co-production of a shared vocabulary, a case library, and participatory tools—further blurred the distinction between learning and research by functioning simultaneously as processes of knowledge production and learning. Engagement with non-academic actors through secondments and stakeholder-oriented activities reinforced this integration by situating research within real-world constraints and responsibilities. Across interconnected physical and digital spaces, inquiry, learning, collaboration, and researcher formation unfolded together through sustained engagement with the challenges of affordable and sustainable housing.

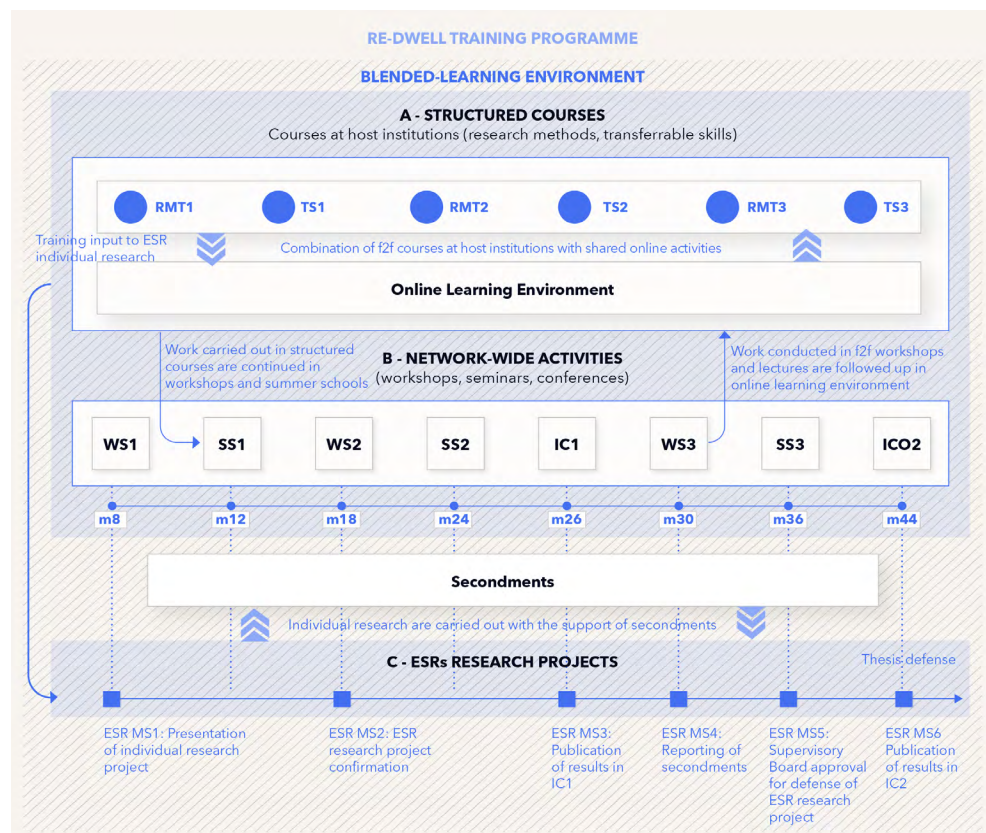


FIGURE 2.2.1: Overview of the RE-DWELL training programme, showing how structured courses, network-wide activities, and ESR research projects are integrated within a blended-learning environment and supported by secondments.

2.2 Structure of the learning and research environment

Over three years, the RE-DWELL learning and research environment unfolded through several interrelated lines of work (Figure 2.2.1):

- Structured courses providing foundational concepts in research methods, tools, and transferable skills (Research, Methods and Tools: RMT1, RMT2, RMT3; Transferable Skills: TS1, TS2, TS3).
- Network-wide activities, including workshops (Lisbon, Budapest, Zagreb), summer schools (Nicosia, Valencia, Reading), and conferences (Grenoble, Barcelona).
- Individual doctoral research projects carried out by early-stage researchers (ESRs).
- Secondments, functioning as practice-based learning settings through engagement with organisations involved in the provision of affordable and sustainable housing.

These elements were not configured as discrete components or arranged in a linear sequence, but operated as mutually constitutive sites of learning and inquiry. Courses, research projects, network activities, and secondments each operated as learning spaces in their own right, while simultaneously reshaping one another through ongoing interaction. Concepts, methods, and analytical frameworks introduced through training were tested, adapted, and critically examined within doctoral research and practice-based engagements, while insights arising from research challenges, stakeholder interactions, and contextual constraints fed back into collective learning processes at the network level.

A blended-learning model was intrinsic to the RE-DWELL environment (Figure 2.2.2). With doctoral candidates and supervisors distributed across ten universities, the programme required a configuration capable of sustaining collaboration despite geographical dispersion. This was addressed through a structured alternation between regular face-to-face meetings and continuous online interaction in the periods between them. Courses and network activities were therefore designed as integrated sequences of online and in-person sessions, typically embedded within workshops and summer schools. Online components supported preparatory work, collaborative tasks, and ongoing dialogue, while on-site sessions enabled intensive discussion, peer exchange, and collective reflection. Together, these strategies allowed learning processes to develop across multiple encounters and formats over time.¹

Digital platforms (e.g. Teams, SharePoint, Miro, and the project website hosting the shared vocabulary and case library) supported both asynchronous and synchronous collaboration. Physical learning spaces included classrooms, exhibition

¹ Across the projects preceding RE-DWELL, carried out from 2003 to 2016—Housing@21.EU, OIKODOMOS, and OIKONET—a comprehensive blended-learning approach to housing education was progressively developed and applied. The RE-DWELL model—with its shared vocabulary, case library, and integrated online and on-site activities—can therefore be understood as a distillation of this earlier work.

venues, housing sites, community settings, and the workplaces of partner organisations involved in secondments, such as construction companies, public administrations, and housing associations. Across these interconnected settings, learning extended across institutional, disciplinary, and spatial boundaries, supporting collaborative inquiry and sustained reflection.

Communication and dissemination activities constituted an additional component of the RE-DWELL learning and research environment, extending knowledge exchange beyond the network and supporting dialogue with wider academic, professional, and civic audiences. These activities included workshops engaging policymakers, practitioners, and community stakeholders around challenges of affordable and sustainable housing, as well as publications disseminated through

conference proceedings, peer-reviewed journals, and professional and practice-oriented media. At the conclusion of the project, ESRs produced individual impact and communication plans for their research outputs, supporting reflection on dissemination pathways, stakeholder engagement, and potential societal impact beyond academia.

Two international conferences—held in Grenoble (December 2022) and Barcelona (May 2024)—provided ESRs with opportunities to present papers co-authored with peers and supervisors. These events enabled participants to consolidate and critically compare research findings and experiences, apply knowledge developed through training activities, and situate their collective work in dialogue with the wider academic community.

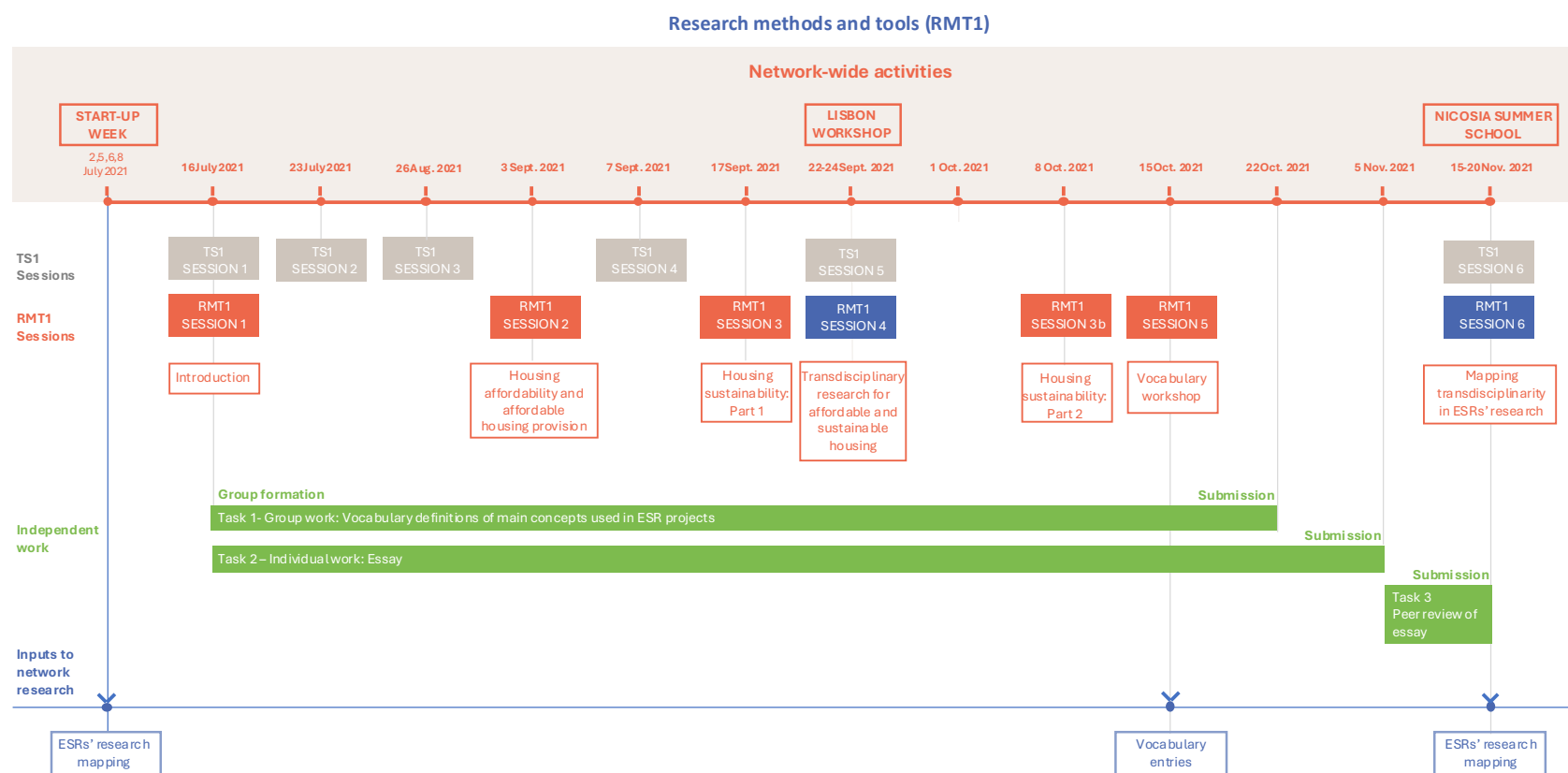


FIGURE 2.2.2: RMT1 course structure integrated with network activities.

2.3 Transdisciplinary integration of learning, research, and knowledge production

The learning and research environment developed within RE-DWELL enabled participants to engage simultaneously in transdisciplinary practices and modes of inquiry, to deepen their understanding of affordable and sustainable housing as a complex and contested problem field, and to contribute collaboratively to the production of new knowledge. These dimensions were not organised as parallel or separable lines of inquiry but were interwoven through shared activities, research processes, and practice-based engagements.

Learning about transdisciplinarity took place through participation in research settings characterised by uncertainty, epistemic plurality, and the need for integration, while learning about housing challenges was grounded in academic inquiry and continuously informed by engagement with real-world contexts. Knowledge was produced through dialogue and negotiation among ESRs, supervisors, and representatives of professional and civic organisations, and through interconnected individual research trajectories shaped by specific contexts of inquiry and sustained interaction with both academic and non-academic actors.

It is this simultaneous engagement with learning, inquiry, reflexivity, and collaborative knowledge co-production—directed toward a complex societal challenge—that characterises the RE-DWELL environment as transdisciplinary.

2.4 Network-level collaborative knowledge practices and learning trajectory

Activities carried out between course sessions and network events played a central role in connecting learning, research, and practice across the RE-DWELL programme. These activities enabled ESRs, supervisors, and partner organisations to collaborate over time, reflect on emerging insights, and integrate individual research trajectories with collective knowledge-building processes. In this way, they extended learning beyond formal teaching moments and discrete events, supporting sustained engagement and cumulative development.

Network-level collaborative practices included the co-development of a shared vocabulary of key concepts; the creation of a case library spanning the programme's research areas; structured exchanges between researchers and partner organisations following secondments; cross-disciplinary tasks designed to foster dialogue across research areas; the collective identification of emerging challenges; and the development and application of participatory tools for stakeholder engagement. These practices functioned simultaneously as mechanisms of knowledge production and as learning spaces in which assumptions, methods, and perspectives were articulated, negotiated, and refined.

Individual–collective dynamics of knowledge construction

The collaborative development of the shared vocabulary and case library exemplified the close intertwining of learning and knowledge production within the RE-DWELL environment. The shared vocabulary functioned as a collective space for negotiating meaning, in which concepts were rendered problematic, relational, and integrative, creating conditions for learning dynamics associated with threshold concept theory, such as conceptual reorganisation and shifts in understanding.

Complementing this process, the documentation and analysis of representative cases of affordable and sustainable housing across the programme's research areas—design, planning, building, community engagement, policy, and financing—reinforced the integration of learning and inquiry. Oriented toward real-world cases and precedents, this case-based work supported the development of contextually grounded knowledge through comparative analysis and cross-disciplinary dialogue, positioning cases not merely as illustrative examples but as active sites of reflexive and integrative learning.

Collective knowledge construction took place through two interrelated dynamics. Individual doctoral research projects formed the backbone of the programme's knowledge base, each grounded in specific disciplinary perspectives and empirical contexts. At the same time, collective knowledge repositories—such as the shared vocabulary and case library—integrated and systematised insights emerging from these projects. These repositories functioned not only as outputs, but as active sites of inquiry supporting comparison, synthesis, and reflexive learning across research areas.

Secondments further strengthened the relationship between individual and collective learning by situating research within non-academic and cross-sectoral environments. Engagement with professional and civic organisations exposed researchers to real-world constraints, competing values, and practical challenges, informing both individual research design and collective discussion. Network-wide activities—including workshops, summer schools, and conferences—provided key spaces for reflection, cross-fertilisation, and alignment among doctoral research, shared knowledge resources, and practice-based experience, while structured training activities supported the iterative development of research skills.

From interdisciplinary exchange to transdisciplinary practice

Over the course of the programme, these collaborative practices supported a gradual evolution in learning and inquiry. An initial phase focused on dialogue across disciplinary backgrounds and institutional roles, enabling the development of mutual understanding and a shared language around housing-related challenges. This was followed by a shift toward more explicitly transdisciplinary practice, with activities increasingly oriented toward collaborative problem framing and action-oriented inquiry.

This shift was reflected in the collective articulation of key challenges in affordable and sustainable housing, produced through the integration of insights from individual doctoral research projects. It was further consolidated through the collective development and application of a participatory toolkit, through which accumulated research and experiential knowledge was translated into practice-oriented resources for engagement with non-academic stakeholders in real-world housing contexts.

2.5 Learning outcomes, competence development, and evaluation

Learning outcomes associated with RE-DWELL's training and research activities were structured into three groups: outcomes related to the programme's research areas (Design, Planning and Building; Community Participation; Policy and Financing); outcomes linked to its core research themes (affordability, sustainability, transdisciplinarity); and outcomes informing the design of courses on research methods and tools and transferable skills. Together, these outcomes provided a shared framework for orientation and coherence across the programme.

At the same time, learning within RE-DWELL extended beyond what could be captured through predefined indicators alone. The integrative, non-linear, and evolving nature of transdisciplinary learning makes it difficult to assess progress using standardised benchmarks. Competence development took shape gradually through participation in research processes, collaboration with diverse academic and non-academic actors, and sustained engagement with complex, real-world problems, rather than through the attainment of discrete learning targets.

In this context, the effects of the learning and research environment are best understood over the medium to long term, as participants progress along their academic and professional trajectories. The transdisciplinary knowledge developed through the programme is therefore most clearly reflected in the doctoral theses themselves—in the framing of research questions, the integration of heterogeneous forms of knowledge, and the orientation toward societal relevance—as well as in the competences acquired by researchers, including reflexivity, cross-sectoral collaboration, and the capacity to engage productively with complexity beyond disciplinary boundaries. The quality, coherence, and contribution of the doctoral research projects thus provide a key lens through which the formative effects of the RE-DWELL transdisciplinary learning and research environment can be examined.

3. DEVELOPMENT AND IMPLEMENTATION OF THE ENVIRONMENT

The core components of the RE-DWELL learning and research environment—including learning processes, collaborative tools, learning outcomes, and communication and dissemination activities—were collaboratively developed during the first year of the project (2020–2021) and progressively elaborated and consolidated over the subsequent three years through the active participation of ESRs,

academic supervisors, and partner organisation representatives. The environment unfolded through a sequence of interconnected activities combining structured courses, workshops, summer schools, secondments, collaborative tool development, and dissemination-oriented engagements.

The sections that follow outline the sequence of network activities over a three-year period, beginning with the online kick-off sessions in July 2021 and continuing through workshops and summer schools hosted across different institutions until October 2023. These events combined research-focused training with a series of online round tables, invited expert contributions, site visits, exhibitions, and participatory formats involving academic, professional, policy, and civic actors.

3.1 Kick-off sessions – July 2021

The RE-DWELL learning and research environment was initiated through a four-day online kick-off programme designed to familiarise network members with one another and to launch collaboration on research and training activities. Owing to ongoing constraints resulting from the COVID-19 pandemic, all sessions were held online. Participants included ESRs, supervisors, co-supervisors, and representatives of partner organisations.

The programme was structured to enable exchange across disciplinary, institutional, and professional backgrounds and to establish shared reference points for subsequent collaboration. Activities included short self-presentations by ESRs, supervisors, and partner organisation representatives; team-based exploration of the programme's core research themes—affordability, sustainability, and transdisciplinarity; presentations of individual doctoral projects; and the introduction of collaborative working procedures and digital tools, including shared online platforms and the project website (Figure 2.2.3).

These activities enabled participants to become acquainted with one another's backgrounds, research interests, and motivations, while prompting reflection on how individual projects related to the programme's broader research framework. Mind-mapping exercises facilitated the identification of thematic connections across projects and encouraged participants to situate their work within a collective research context (Figure 2.2.4).

Feedback collected through an evaluation survey indicated that participants strengthened capacities for digital communication and reflexive engagement with their own and others' research. Respondents reported gaining a clearer understanding of the overall project structure and the value of interdisciplinary collaboration, identifying the diversity of disciplinary backgrounds as a key strength of the network. Suggestions for improvement included clearer agendas, improved time allocation for group work, and more explicit links between collaborative activities and future teamwork; these insights informed subsequent adjustments to network activities.

RE-DWELL Kick-off Sessions

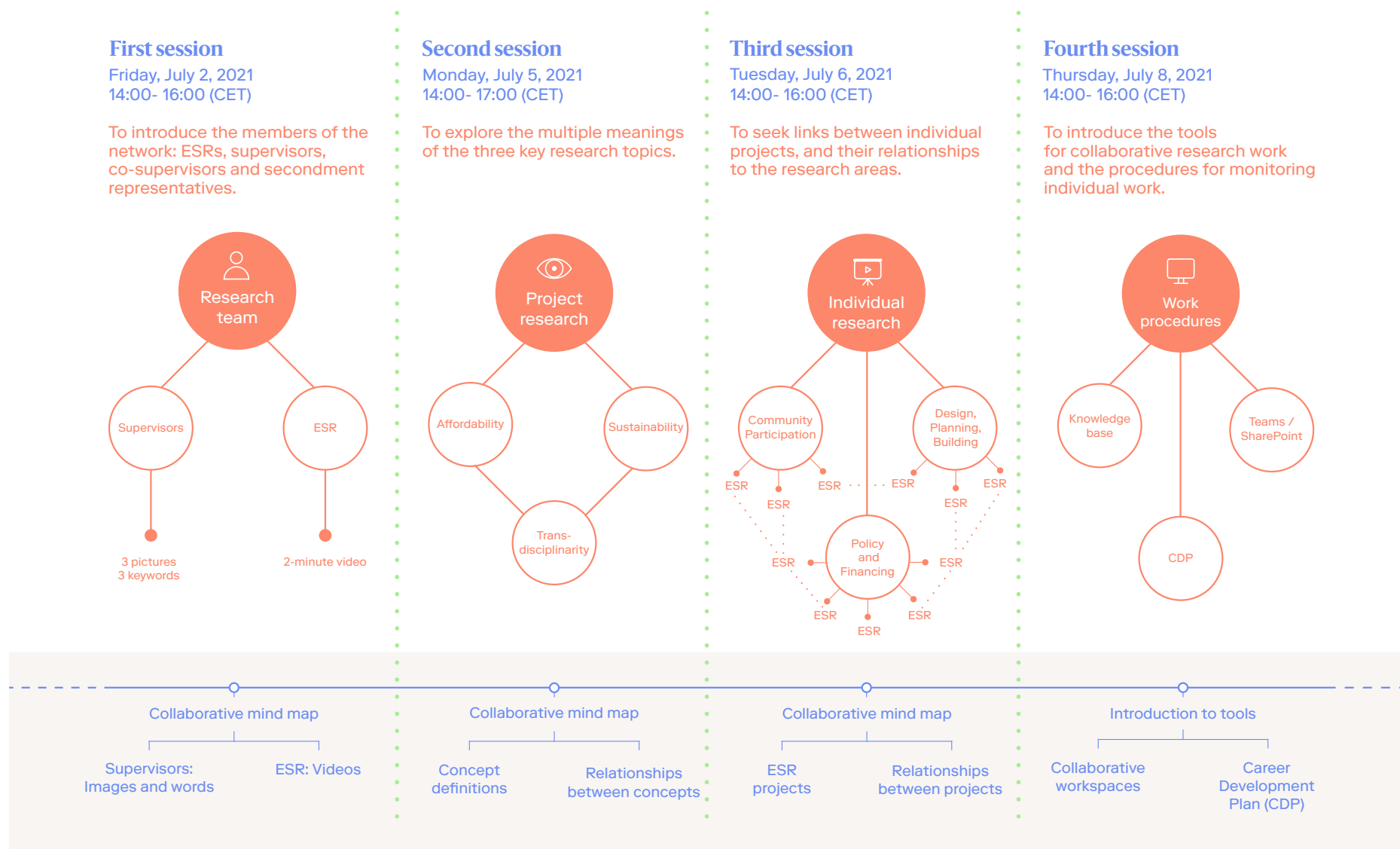
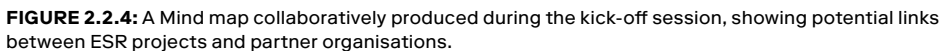


FIGURE 2.2.3: Activities carried out during the four-day kick-off programme.



3.2 Lisbon workshop – September 2021

The first in-person RE-DWELL network activity took place at ISCTE – Instituto Universitário de Lisboa. Organised during the first year of the programme, the workshop focused on *Design, Planning and Building*, addressing themes such as sustainable planning, industrialised construction, green building, retrofitting and urban regeneration, and housing design education. Its objectives were to support the development of the ESRs' doctoral research, advance training linked to the RMT1 and TS1 courses and strengthen interaction with non-academic stakeholders involved in affordable and sustainable housing.

Prior to the workshop, ESRs prepared written and visual abstracts of their research and produced A0 posters, which were exhibited and used as learning materials during the sessions (Figures 2.2.5 and 2.2.6). These preparatory tasks supported the articulation of research projects in formats accessible across disciplines and facilitated discussion and comparison. During the workshop, ESRs and supervisors worked in mixed teams (two ESRs and one supervisor or co-supervisor) (Figure 2.2.7) to discuss research projects using guiding questions—What? Why? How? and Who?—addressing research focus, relevance, methodology, and collaboration, followed by short presentations and collective feedback (Figures 2.2.8 and 2.2.9).

The programme combined academic contributions with inputs from partner organisations, including CASAIS and the Lisbon Municipality, and was complemented by site visits to BIPZIP neighbourhoods and a housing construction site. Evaluation feedback highlighted the workshop's role in enabling comparison across research perspectives, strengthening communication and reflexive skills, and identifying opportunities for collaboration across design-, community-, and policy-oriented approaches.

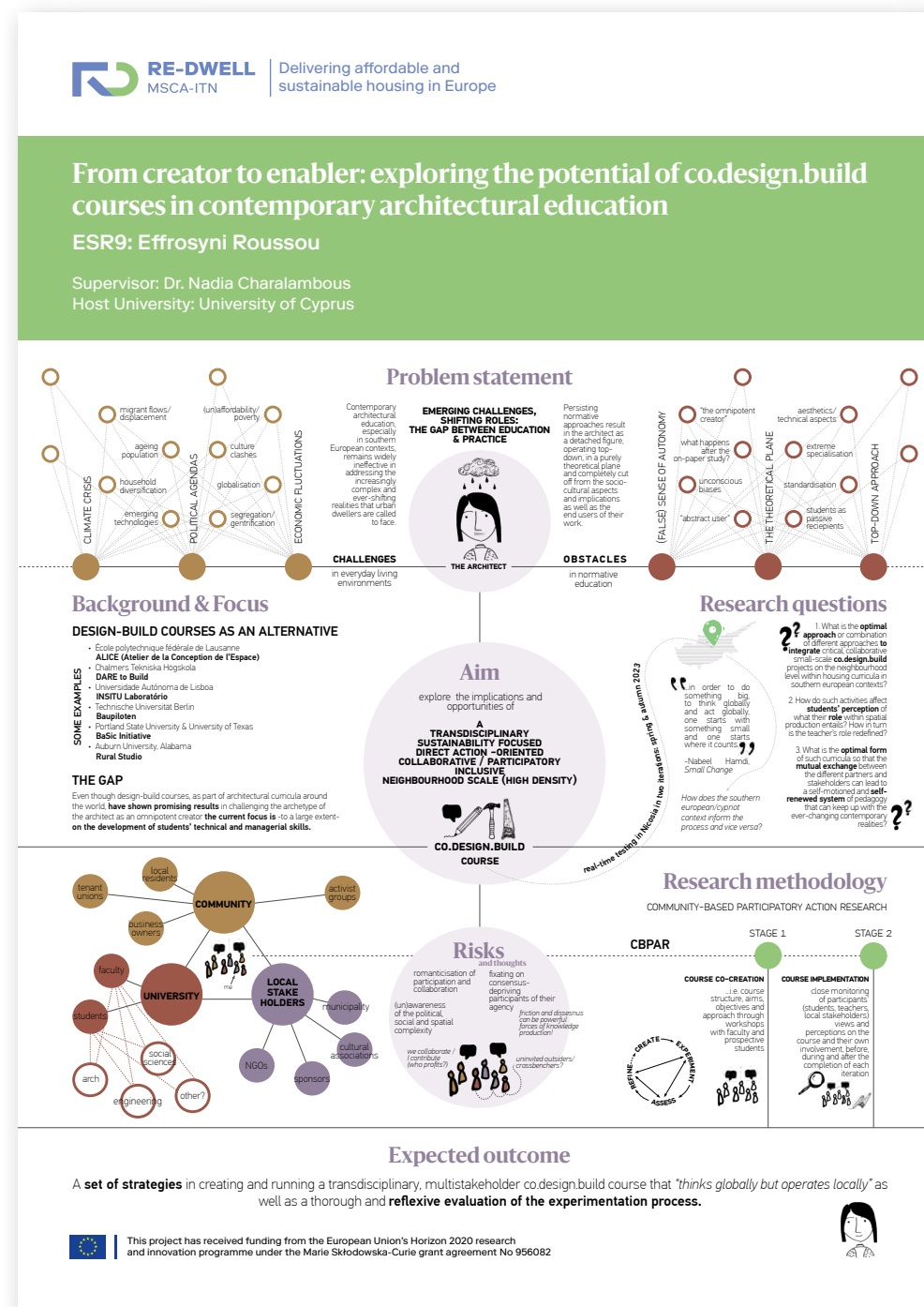
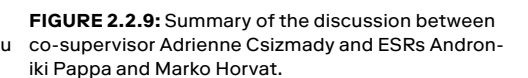
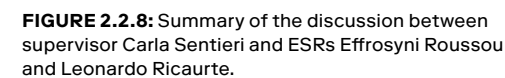


FIGURE 2.2.5: A0 poster summarising the research project, by Effrosyni Roussou.



3.3 Nicosia summer school – November 2021

The second network event was the summer school held at the University of Nicosia, which sought to strengthen connections between individual doctoral research projects and forthcoming secondments, while continuing to foster interdisciplinary and cross-sectoral exchange around the theme *Planning, Design and Retrofitting of Affordable and Sustainable Housing*. Activities were designed to support dialogue among ESRs, supervisors, and non-academic organisations on the challenges and opportunities of housing design and planning in relation to affordability and sustainability.

Activities were organised around peer-to-peer exchange, with researchers presenting their projects in pairs to identify thematic overlaps, potential collaborations, and links to planned secondments (Figure 2.2.10). This interactive format supported reflection on how secondments could contribute to individual doctoral trajectories while also revealing connections across research topics. As part of the RMT1 and TS1 courses, researchers engaged in collective reflection on the concepts of transdisciplinarity, affordability, and sustainability in relation to their disciplinary and methodological perspectives. These discussions were synthesised through shared visual mapping exercises (Figure 2.2.11).

The programme also included contributions from invited speakers from academia, professional practice, local municipalities, and the Cyprus Land Development Corporation, a project partner. These inputs were complemented by group discussions and a public round table. Site visits to regeneration projects in Nicosia and housing developments in Limassol provided concrete reference points for connecting research questions with real-world planning, design, and retrofitting challenges.

Feedback emphasised the value of the interactive formats, peer exchange, and site-based learning for understanding the multiple factors shaping affordable and sustainable housing. The Nicosia Summer School reinforced the role of planning and design processes within the RE-DWELL research framework and supported the integration of individual research projects, secondment preparation, and collective learning within a transdisciplinary context.



FIGURE 2.2.10: Sequential exchanges sharing and discussing experiences of secondments and their impact on research projects.

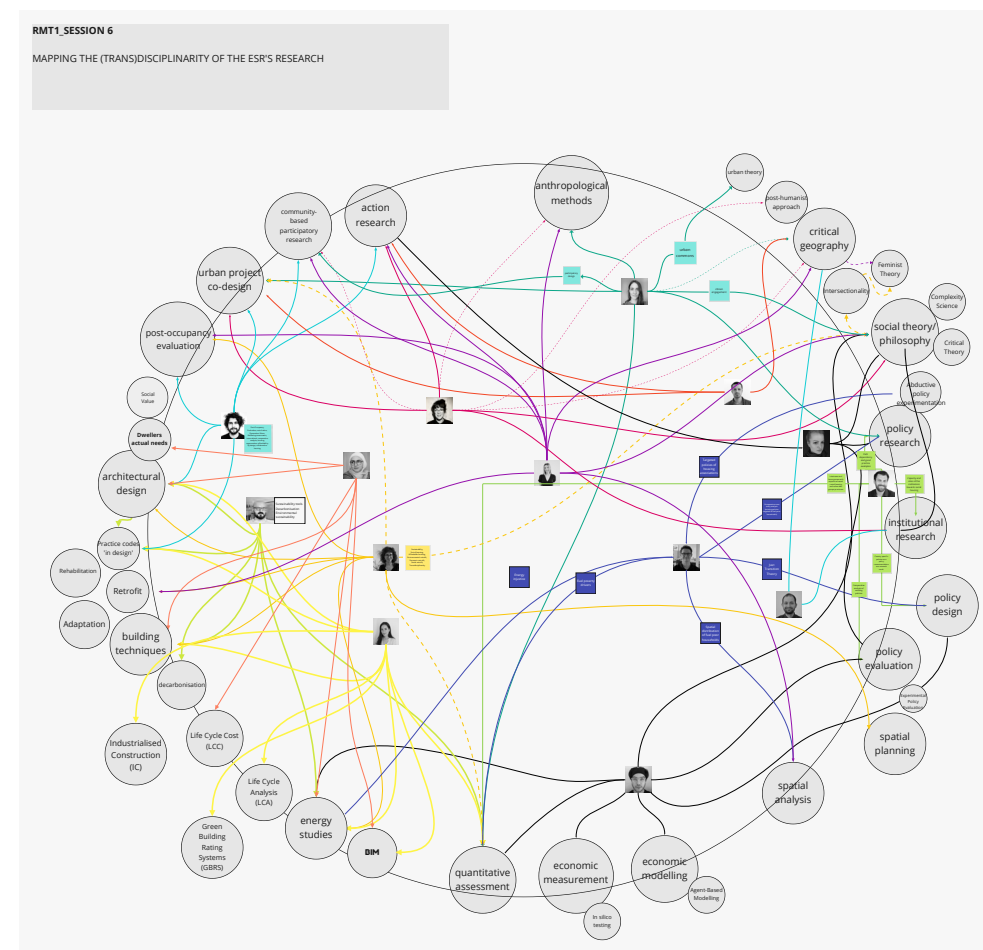


FIGURE 2.2.11: Collective map of ESR research projects. Source: Adriana Diaconu, UGA.

3.4 Budapest workshop – March 2022

The Budapest workshop, hosted at the Centre for Social Sciences, advanced collaborative work within the network by deepening collaborative work on community involvement in affordable and sustainable housing, approached primarily from a sociological perspective. The theme *Community Involvement in Affordable and Sustainable Housing* was explored through a focus on socio-spatial inequalities, the financialisation of housing, and green homes and communities, while further strengthening links between individual doctoral research, structured courses, and network-level knowledge production.

Preparatory tasks completed in advance were discussed collectively during the workshop, reinforcing the integration of online and in-person learning. A central activity involved further development of the shared vocabulary and case library, with ESRs clustering concepts, analysing relationships between them, and articulating their relevance across the three RE-DWELL research areas (Figure 2.2.12). These exercises supported systems thinking and collective reflection on conceptual interdependencies across research strands.

The workshop also hosted key training activities linked to ongoing courses. The first session of the RMT2 course on comparative methodologies enabled hands-on discussion of qualitative and quantitative approaches to housing research, while the TS2 session on entrepreneurship and professional development addressed entrepreneurial opportunities, career pathways, and indicators relevant to housing-related research and practice. Posters presenting ongoing doctoral projects were exhibited throughout the event, prompting discussion on research representation, communication, and audience.

Engagement with local stakeholders was a defining feature of the workshop. Activities included an open round table on community engagement, a documentary screening and discussion on housing inequalities, site visits and lectures on urban rehabilitation in Budapest's District VIII, and a participatory game session facilitated by the CoHousing Budapest Association (Figures 2.2.13 and 2.2.14). A game-based activity provided an experiential setting for exploring democratic decision-making, conflict management, and communication practices within community housing contexts.

Feedback underscored the value of experiential and practice-oriented formats—particularly the serious game—in supporting reflection on community dynamics, sustainability challenges, and collaborative processes.

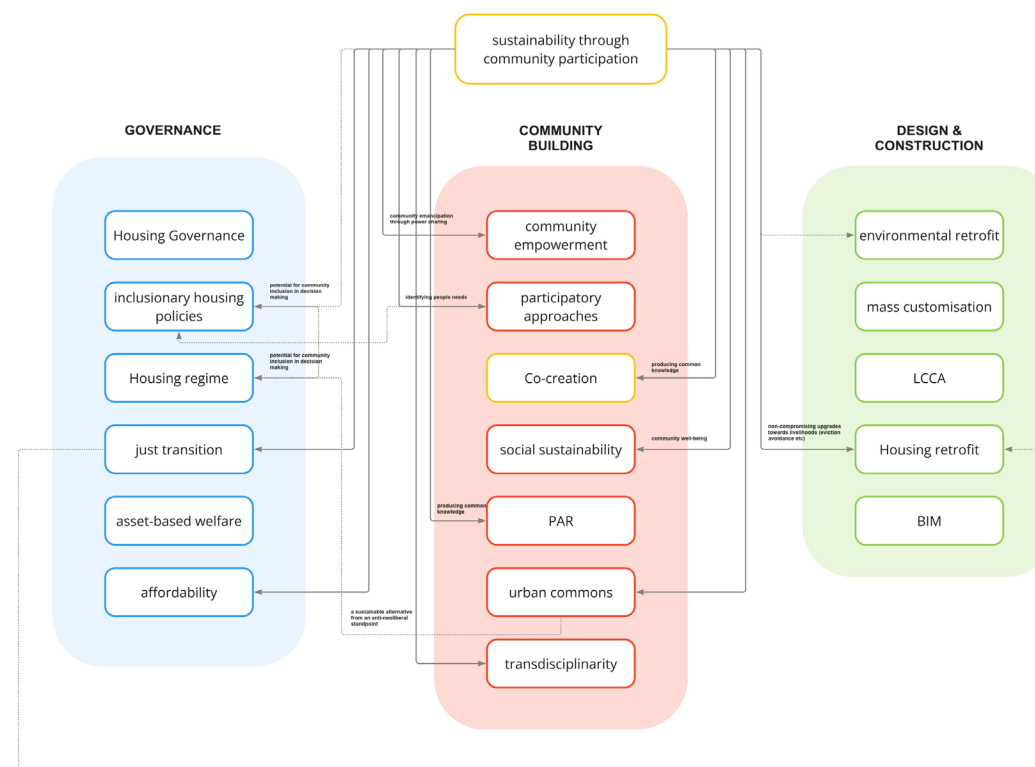


FIGURE 2.2.12: Clustering and interrelating concepts from the shared vocabulary, by Effrosyni Roussou.



FIGURES 2.2.13 and 2.2.14: Game-based learning session.

3.5 Valencia summer school- July 2022

The summer school hosted at the School of Architecture in Valencia addressed the theme *Inclusive co-design and community planning of affordable and sustainable housing*, providing a shared setting for ESRs, supervisors, and non-academic actors to exchange perspectives on housing design, community participation, and governance. The programme combined academic, professional, and policy-oriented contributions with training activities linked to the ongoing RMT2 and TS2 courses.

Peer exchange and collective reflection on doctoral research projects were structured through a scenario-based methodology, inspired by the approach developed for the RE-DWELL workshop at the International Social Housing Festival in Helsinki (June 2022). ESRs presented their ongoing work, followed by discussion and feedback from peers and supervisors. These exchanges were documented through shared visual mapping exercises, highlighting connections and points of convergence across research areas. Complementary team-based activities drew on the shared vocabulary and case library (Figure 2.2.15), supporting reflection on how key concepts and empirical cases intersected across individual research trajectories.

Learning extended beyond the university through site visits to the eco-neighbourhood La Pinada and cooperative housing projects in Valencia, which provided concrete reference points for discussions on inclusive co-design, community planning, and long-term affordability. A public exhibition at the School of Architecture showcased ongoing RE-DWELL research and broadened engagement within the host institution (Figure 2.2.16).

Evaluation feedback highlighted the value of interactive formats and face-to-face discussion for strengthening communication, systems-oriented thinking, and collaboration across research projects, reinforcing the role of the summer school within the evolving RE-DWELL learning and research environment.

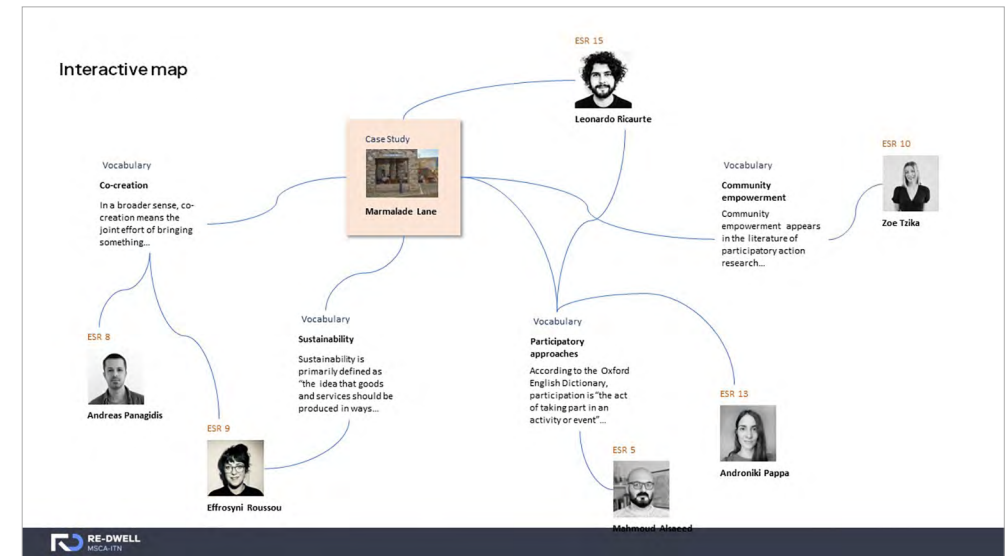


FIGURE 2.2.15: Team discussion centred on the *Marmalade Lane* case.



FIGURE 2.2.16: Poster exhibition at the Valencia School of Architecture. Source: Carla Sentieri.

3.6 Zagreb workshop – March 2023

The workshop at the University of Zagreb Faculty of Law – Institute for Social Policy marked a qualitative step forward in the network's collaborative work and in the operationalisation of the systems-oriented approach developed within the RE-DWELL programme. Bringing together outcomes from multiple strands of activity—including experiences from secondments, contributions to the shared vocabulary and case library, and challenges emerging from individual doctoral research projects—the workshop created a setting for integrative reflection.

ESRs examined the relationships between these diverse forms of knowledge and situated them in relation to the three research areas structuring the RE-DWELL framework (Figure 2.2.17). To support this exercise, five teams were formed, each composed of three ESRs representing the different research areas. Teams worked on their assignments in advance and presented their reflections during the workshop, enabling collective discussion and feedback (Figure 2.2.18).

The presentations revealed varied approaches to synthesis and differing degrees of engagement with transdisciplinary integration, reflecting both the diversity of doctoral research trajectories and the evolving nature of collaborative learning within the network. Evaluation feedback pointed to the value of these exchanges in surfacing alternative interpretations of transdisciplinary co-production and in stimulating constructive dialogue, while also pointing to the need for continued development and refinement of integrative practices.

As in earlier activities, learning extended beyond academic settings through site visits to housing developments in Zagreb. A visit to the Cultural Centre in Novi Jelkovec provided a concrete context for discussing the social dimensions of housing, particularly issues of community integration and diversity.

Building on these collective reflections, the workshop contributed to the ongoing development of a participatory toolkit intended to support the application of the RE-DWELL research framework in real-world contexts. This work was further advanced through subsequent collaborative meetings involving ESRs, supervisors, and partner organisations, held in Reading, Delft, and Barcelona (→ see 5.3).

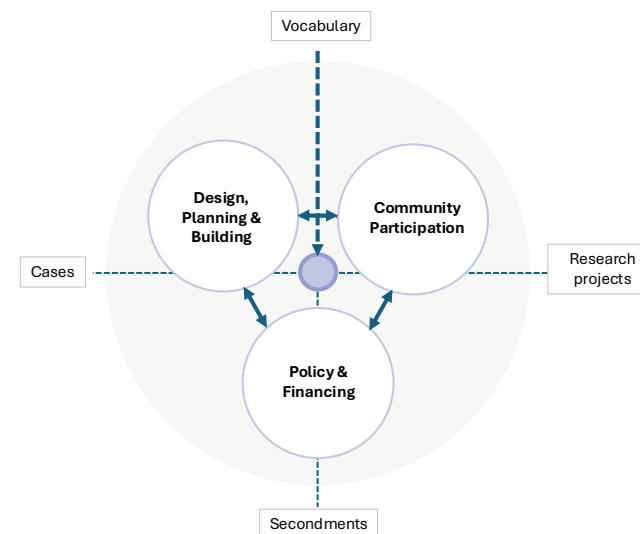


FIGURE 2.2.17: Structure of the assignment.

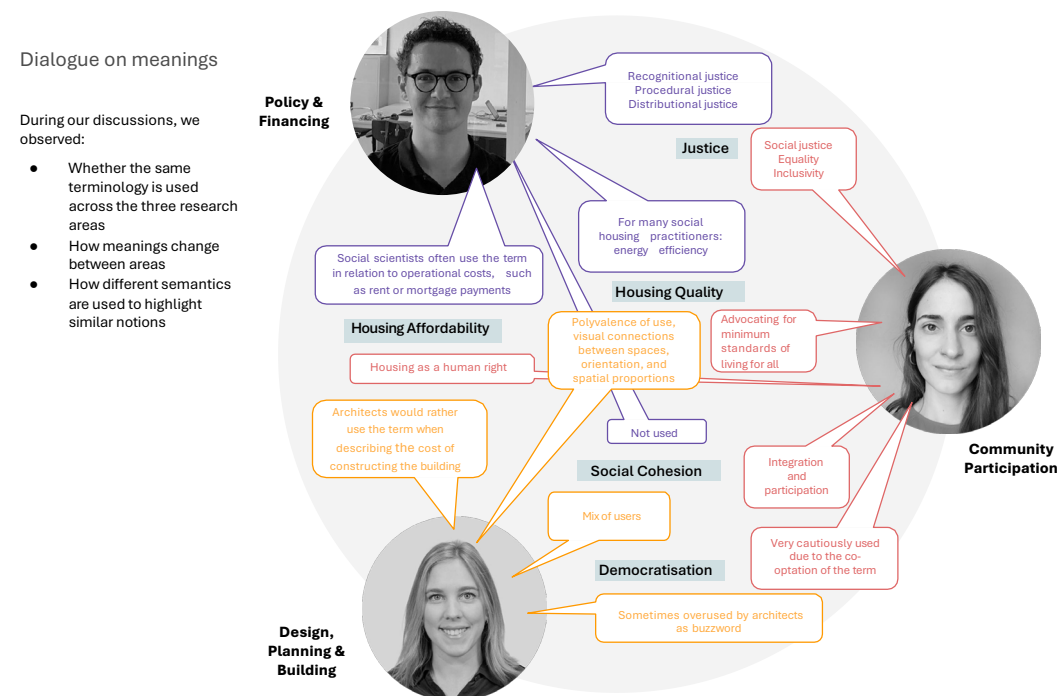


FIGURE 2.2.18: Summary of the dialogue between ESRs Tijn Croon, Carolina Martin, and Androniki Pappa.

3.7 Dialogue between ESRs and partner organisations – May 2023

Secondments played a central role in connecting research with practice within the RE-DWELL programme by enabling direct exchange between ESRs and professionals involved in the provision of affordable and sustainable housing. Through these engagements, researchers gained insight into organisational contexts and ongoing projects, while partner organisations engaged with academic perspectives that supported reflection on their own practices.

At the conclusion of their secondments, ESRs submitted reports to their supervisors and produced public summaries for the project website. These summaries documented experiences gained through engagement with a range of professional and civic organisations and contributed to the network's collective knowledge base.

In preparation for the Reading summer school in July 2023, an online interactive dialogue session was held on May 2023 involving ESRs and representatives of partner organisations. Ahead of the session, partner organisations completed a questionnaire outlining key challenges related to affordable and sustainable housing and their expectations regarding the network's outputs. During the session, ESRs posed targeted questions to secondment representatives based on these responses (Figure 2.2.19) (→ see 6.2).

The session supported structured reflection on secondment experiences and strengthened dialogue between academic and non-academic participants. ESRs further developed capacities for digital communication and for relating research findings to real-world challenges, while the exchange helped translate practical concerns into research-relevant questions. Insights generated through this dialogue informed subsequent collective activities and were carried forward into later stages of the programme.

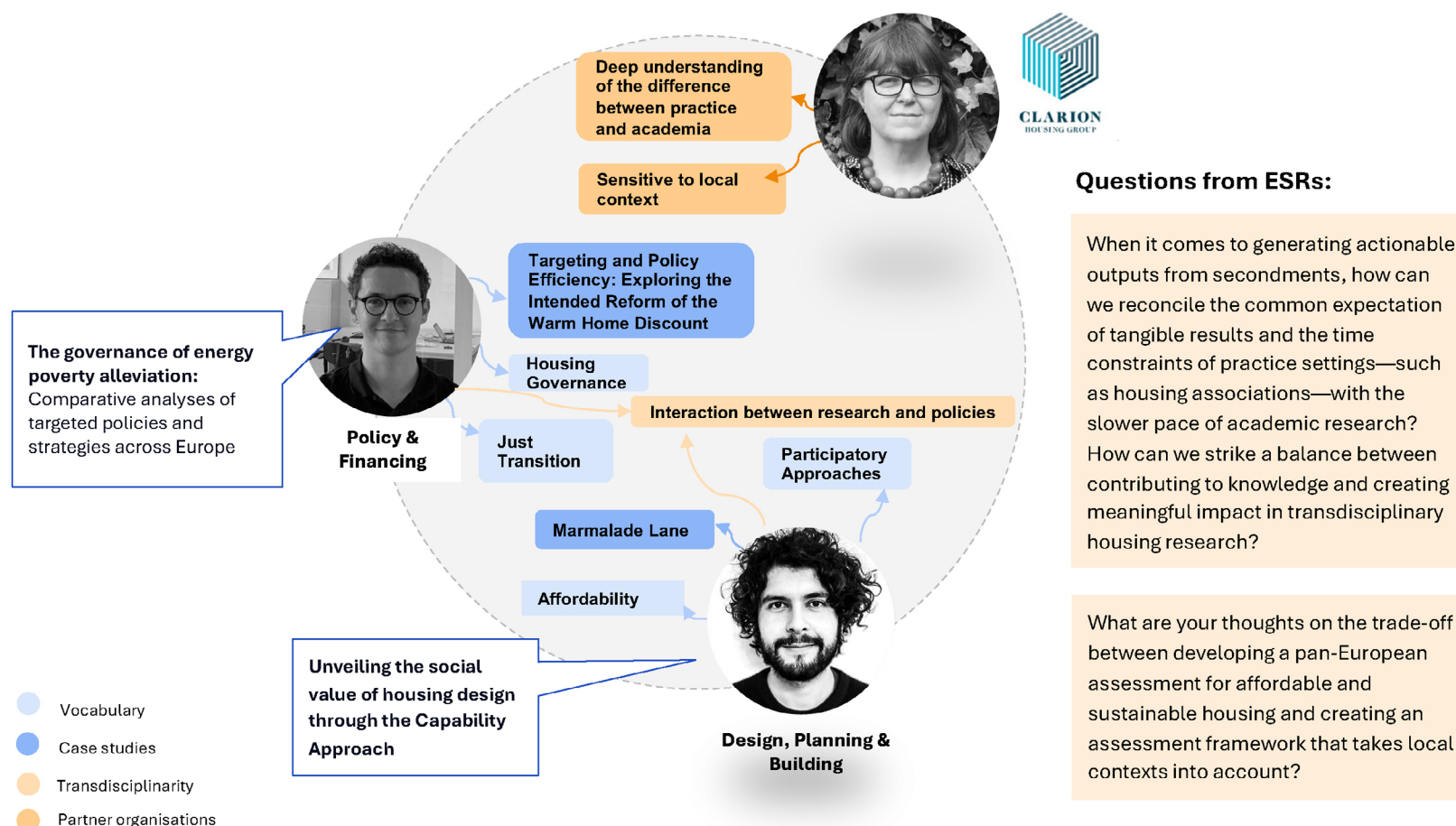


FIGURE 2.2.19: Questions prepared by ESRs Tijn Croon and Leonardo Ricaurte for Elanor Warwick (Clarion Housing), secondment representative.

3.8 Reading summer school – July 2023

The summer school at the University of Reading addressed the theme *Innovations in Affordable and Sustainable Housing* through a programme structured around five interrelated thematic strands: housing design and planning; transdisciplinary research approaches; social housing and finance; ethical dimensions of housing research; and sustainable strategies for neighbourhood regeneration, retrofitting, and adaptive reuse.

At Reading, activities related to the RMT3 and TS3 courses centred on communicating research findings beyond academia and on planning for research impact. RMT3 sessions addressed the transfer of research outcomes to community, professional, and policy contexts. TS3 activities complemented this focus by supporting the development of impact plans and strategies for engaging diverse audiences, with attention to framing, dissemination, and ethical considerations.

Workshops supported ESRs in refining research impact plans and communication strategies, drawing on secondment experiences and ongoing doctoral work (Figure 2.2.20). Sessions on post-occupancy evaluation introduced practice-based methods for assessing both technical performance and social value in housing, while group activities addressed challenges in transferring research results to non-academic contexts and engaging policymakers, practitioners, and civil society actors.

A central focus of the summer school was the further development of the RE-DWELL participatory tool for transdisciplinary research. Collaborative sessions and a serious game brought together insights from individual doctoral projects, supervisors, and partner organisations, supporting collective problem framing across the programme's three research areas (Figures 2.2.21 and 2.2.22).

Learning reached beyond the university through lectures and site-based engagements in Reading, including a site visit to a build-to-rent housing development in the city centre, as well as sessions in London with the Clarion Housing Association, a project partner, (Figure 2.2.23) and the architectural office Pollard Thomas Edwards (Figure 2.2.24). Evaluation feedback highlighted the relevance and quality of both academic and practice-based contributions, reinforcing the summer school's role as a key moment of synthesis and consolidation within the RE-DWELL learning and research environment.

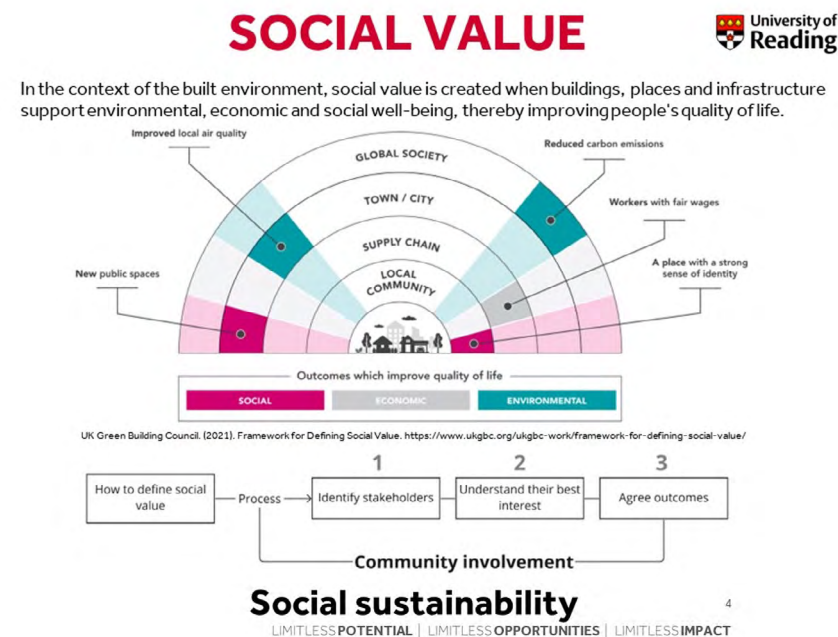


FIGURE 2.2.20: Presentation by Leonardo Ricaurte on assessing social value impact.



FIGURES 2.2.21 and 2.2.22: Participants during the game-based session.



FIGURE 2.2.23: Presentation at Clarion Housing by Elanor Warwick.



FIGURE 2.2.24: Presentation by Tom Dollard at Pollard Thomas Edwards Architects, London.

3.9 Delft meeting – October 2023

The Delft plenary meeting marked a key moment in the development and testing of the RE-DWELL participatory tool for transdisciplinary knowledge construction (Figures 2.2.25 and 2.2.26). Conceived as a serious game, the tool was designed to support structured dialogue, collective problem framing, and reflexive learning across disciplinary and sectoral perspectives. Building on earlier iterations, the session introduced two significant refinements: a shift from abstract research questions to clearly defined societal challenges, and the use of concrete real-world cases provided by partner organisations. ESRs identified key issues in affordable and sustainable housing by combining insights from their individual research with experience gained through real-world engagement and secondments. These issues were articulated as provisional challenges that capture complex tensions across actors, domains, scales, and governance arrangements (→ see 3.2 Challenges).

The upgraded version of the tool was applied to two partner-led case studies—one focused on large-scale housing retrofit (South Yorkshire Housing Association) and the other on policy instruments to address energy poverty (European Federation for Living). Mixed teams of ESRs, supervisors, and observers worked with a set of challenges and systems, target, and transformation knowledge cards, supported by a structured discussion guide, to examine the arrangements and linkages between these elements. The sessions fostered dialogue across disciplinary perspectives and between academic and non-academic actors, supporting shared problem framing.

Evaluation feedback highlighted the game's value in creating a shared language, supporting reflexive learning, and enabling participants to reframe complex housing challenges collaboratively. At the same time, it identified the need for clearer definitions, greater accessibility for non-academic stakeholders, and stronger contextualisation. Overall, the Delft meeting confirmed the toolbox's role as a participatory learning device that supports dialogue, mutual understanding, and

transdisciplinary knowledge co-production, while informing further refinement of the tool and its application in diverse contexts.

4. TRANSDISCIPLINARY FEATURES OF THE RE-DWELL LEARNING AND RESEARCH ENVIRONMENT

The RE-DWELL learning and research environment embodies some of the transdisciplinary principles and educational commitments outlined in Section 1. These were enacted through a situated and evolving learning–research setting, in which key theoretical orientations—concerning knowledge integration, reflexivity, learner formation, and engagement with real-world complexity—were progressively realised in practice.

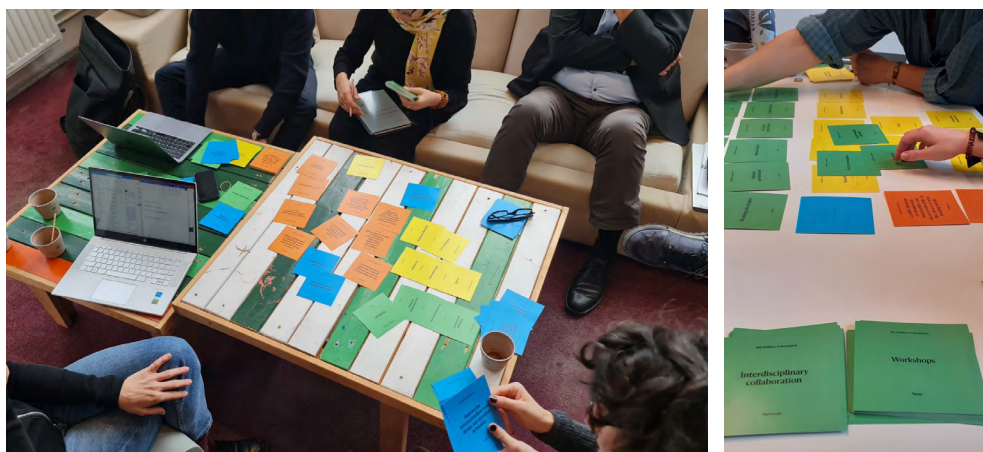
This enactment was characterised by uncertainty, experimentation, and ongoing negotiation, unfolding in a non-linear manner and marked by occasional moments of friction. Continuous adjustment was required between aspirational orientations toward transdisciplinary learning—such as problem-oriented inquiry, reflexivity, learner formation, and societal engagement—and the practical constraints of doctoral education embedded within established institutional, disciplinary, and evaluative frameworks. In this sense, RE-DWELL is best understood not as an application of transdisciplinary theory, but as an environment in which transdisciplinary commitments were tested, adapted, and reconfigured through use.

Three interrelated transdisciplinary features are particularly salient: a shared problem orientation, the integration of learning and research, and an emphasis on reflexive and formative learning processes.

At its core, RE-DWELL was organised around affordable and sustainable housing as a complex, real-world problem field. Housing served as a common object of inquiry whose technical, social, economic, political, and normative dimensions exceeded any single disciplinary perspective. This problem orientation provided a shared reference point for dialogue across disciplines and sectors, while allowing doctoral projects to remain situated within their respective epistemic traditions.

This orientation shaped both learning and research. Doctoral projects were embedded within disciplinary trajectories and within a collective effort to understand and respond to a societal challenge. Engagement with non-academic actors through secondments, stakeholder dialogue, and practice-based contexts anchored inquiry in real-world settings, aligning knowledge production with societal relevance alongside disciplinary contribution.

In line with transdisciplinary approaches that reject a strict separation between education and research, RE-DWELL treated learning and research as structurally intertwined. Learning did not precede research as preparation for later application; instead research functioned as a primary learning environment. Doctoral projects, network activities, structured courses, and secondments formed a continuous



FIGURES 2.2.25 and 2.2.26: Team discussions using the game cards.

learning–research ecology within which concepts, methods, and assumptions were repeatedly tested, reworked, and reflected upon. Learning thus emerged through participation in inquiry, positioning it as constitutive of knowledge production.

A defining transdisciplinary feature of RE-DWELL was its emphasis on knowledge integration as a social and reflexive process. Integration developed through sustained dialogue, comparison, negotiation, and shared work over time. Practices such as the collective development of a shared vocabulary, a case library, and participatory tools created settings in which heterogeneous forms of knowledge—academic, professional, experiential, and normative—could be articulated, related, and reconfigured. Integration thus took shape as a dynamic and provisional achievement grounded in interaction and reflexive engagement, rather than as a fixed or final outcome.

Reflexivity functioned as a constitutive condition of the RE-DWELL learning environment. It encompassed methodological reflection as well as attention to problem framing, positionality, values, and the assumptions shaping inquiry. Reflexive practices were embedded across activities, including peer-to-peer exchange, collective mapping exercises, secondment reflections, stakeholder dialogue, and evaluation processes. Through these practices, participants examined how disciplinary backgrounds, institutional roles, and normative commitments—such as orientations toward sustainability, equity, and societal responsibility—influenced research trajectories and knowledge claims, establishing reflexivity as a sustained orientation within the programme.

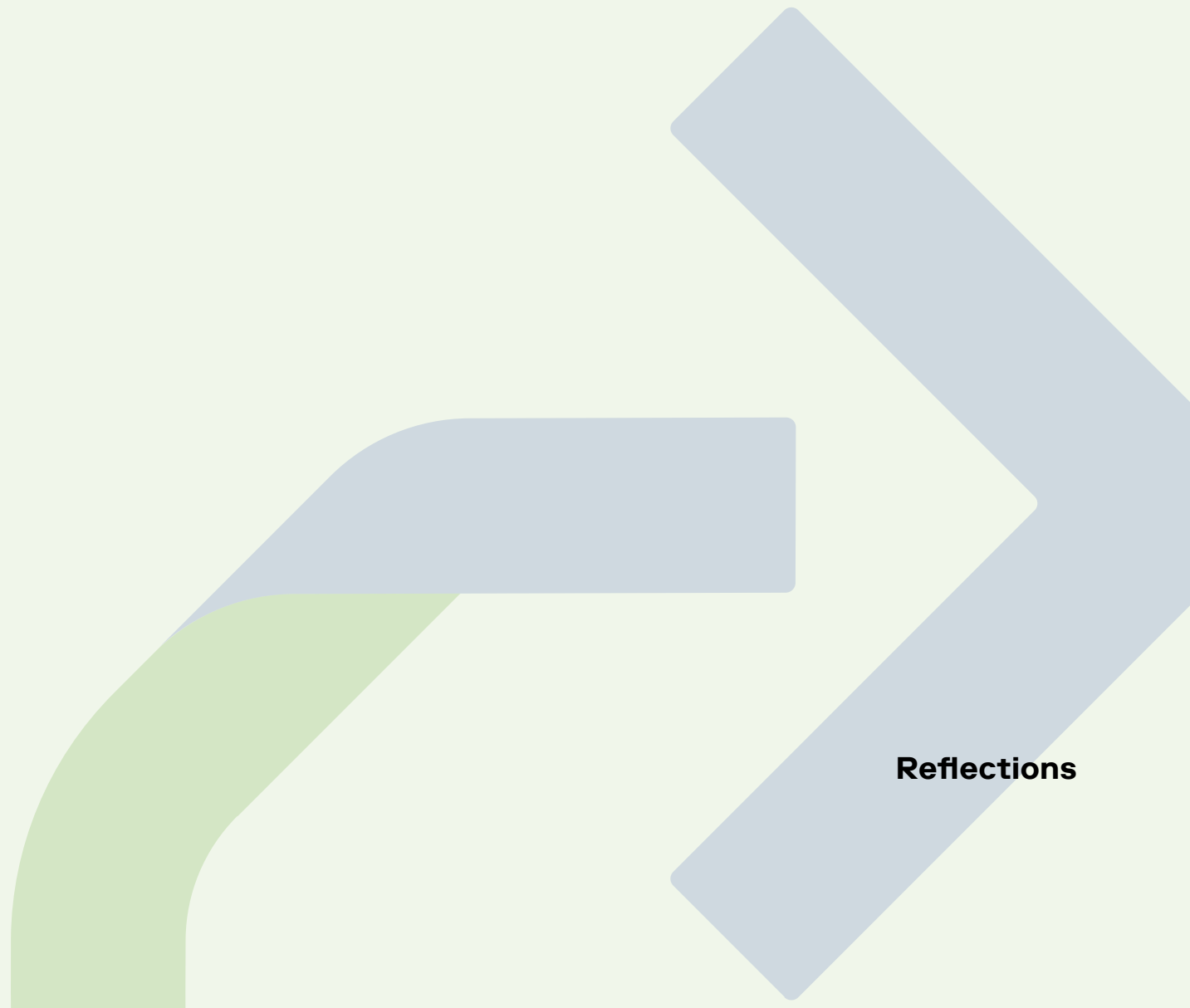
RE-DWELL also enacted a relational conception of learning spaces aligned with socio-spatial and sociomaterial perspectives. Learning unfolded across interconnected physical, digital, institutional, and experiential spaces, including workshops, summer schools, online platforms, secondment sites, exhibitions, housing projects, and community settings. These sites functioned as learning spaces whose pedagogical significance emerged through practice and use, rather than being determined by design alone. As provisional and evolving configurations, they entailed a degree of risk and required ongoing scaffolding to sustain productive engagement with uncertainty, ambiguity, and plural forms of knowledge.

Unlike competence-based frameworks that emphasise problem-solving performance, RE-DWELL aligned with learning-centred transdisciplinary approaches that foster learner formation. The environment supported the development of dispositions such as openness to plurality, ethical awareness, responsibility, and comfort with uncertainty—capacities that cannot be reduced to discrete or transferable skills. Through sustained engagement with complexity, cross-sector collaboration, and reflection on values and consequences, ESRs were positioned as developing subjects whose identities as researchers and professionals evolved alongside their projects. This emphasis highlights the ethical and formative dimensions of transdisciplinary doctoral education.

Finally, RE-DWELL exhibited a temporal dimension characteristic of transdisciplinary learning. Learning developed longitudinally through iterative cycles of exchange, reflection, application, and re-orientation rather than through isolated events or modular interventions. The programme supported a gradual shift from interdisciplinary dialogue toward more explicitly transdisciplinary practices, particularly evident in the progression from shared conceptual work to collaborative tool development and sustained stakeholder engagement. This trajectory underscores transdisciplinary learning as a cumulative, relational, and time-intensive process, dependent on continuity, institutional support, and the capacity to remain productively engaged with uncertainty.

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Reflections

The RE-DWELL research programme was initially framed around a schematic conceptual structure that positioned housing affordability, sustainability, and transdisciplinarity as interrelated dimensions of a single societal challenge. In the project proposal—progressively developed between 2018 and 2020—these concepts served as programmatic anchors: they provided a shared orientation for structuring collaborative interdisciplinary research across three interwoven thematic areas—Design, Planning and Building; Community Participation; and Policy and Financing—and for defining the scope and ambition of the individual doctoral projects. At this stage, the conceptual structure remained essentially prospective and synthetic, intended to facilitate cooperation and align training activities with collective inquiry rather than to provide a fully articulated methodology.

At the start of the project activities, researchers were confronted with this overarching conceptual framework—affordable and sustainable housing and transdisciplinarity—and had to grapple with it in order to chart their own paths within the conceptual landscape outlined in the project, identifying key concepts relevant to their specific research questions. These concepts progressively began to be articulated and shared through the development of a collective vocabulary, while individual research projects advanced in parallel. Training activities and network events also contributed to the discussion and refinement of these core notions, providing common reference points while allowing for disciplinary and empirical diversity.

Over the course of the project, the schematic conceptual structure articulated in the proposal was progressively enacted and operationalised through situated research and training practices. Deliverable 4.6, Towards a Transdisciplinary Environment for Affordable and Sustainable Housing, further examined affordable and sustainable housing as a wicked problem requiring a transdisciplinary approach, summarising the collective experiences of the network. Drawing on shared discussions, workshops, secondments, and sustained interaction with non-academic partners, it documents how key concepts—such as affordability, sustainability, and transdisciplinarity—were explored, interpreted, and mobilised across disciplines, sectors, and empirical contexts. The accumulated experience of implementing the learning and research environment was then retrospectively structured and systematised as the Transdisciplinary Environment for Affordable and Sustainable Housing (TEASH).

Chapter 2.1 was developed ex post as a reflexive step that could only be undertaken once the collective work of the project had reached sufficient maturity. By tracing the historical formation and theoretical evolution of housing affordability and sustainability, and by situating transdisciplinarity within broader debates on knowledge production and societal problem-solving, it systematically develops the interrelations among the three key concepts initially assumed in the project proposal and subsequently enacted through research practice. In doing so, Chapter 2.1 consolidates the RE-DWELL experience by extending the project's initial conceptual orientation into an analytical framework that supports critical inquiry and future research, and positions affordable and sustainable housing as a transdisciplinary field of scholarly debate.

While Chapter 2.1 maps and critically examines the conceptual landscape linking affordability, sustainability, and transdisciplinarity—thereby establishing affordable and sustainable housing as a transdisciplinary problem field—Chapter 2.2 shifts attention to the structural, organisational, pedagogical, and relational arrangements through which transdisciplinary capacities were developed within the RE-DWELL learning and research environment.

Chapter 2.2 examines the relationship between research and training by distinguishing two complementary forms of learning associated with transdisciplinarity. The first emerges through participation in transdisciplinary research itself: working across disciplinary boundaries, collaborating with non-academic stakeholders, and engaging with real-world problem contexts. This form of learning is situated and practice-based, arising from direct involvement in transdisciplinary inquiry. The second concerns learning about transdisciplinarity as a mode of inquiry and involves the intentional development of a reflexive understanding of the assumptions, values, and methodological orientations that shape transdisciplinary work. This reflective dimension helps researchers situate their projects within problem- and action-oriented research contexts and to understand how decisions shape both research processes and outcomes.

In this sense, Chapter 2.2 complements the conceptual analysis developed in Chapter 2.1 by examining the educational implications of transdisciplinarity within the RE-DWELL learning and research environment. While Chapter 2.1 clarifies why affordable and sustainable housing constitutes a transdisciplinary problem field, Chapter 2.2 analyses how transdisciplinary learning can be conceptualised, organised, and enacted under conditions of complexity, epistemic plurality, and value conflict. It combines a theoretical account of transdisciplinary learning with an ex post analytical examination of the RE-DWELL environment, showing how learning, research, collaboration, and knowledge production were deliberately interconnected and how transdisciplinary orientations were progressively realised through educational practice.

Read together, Chapters 2.1 and 2.2 articulate a coherent progression from conceptual framing to educational enactment, linking the problematisation of affordable and sustainable housing with the design of a learning and research environment capable of engaging with that challenge in practice.

3

Developing a shared framework: Disciplinary insights and collaborative knowledge building

A synthesis of RE-DWELL's collective knowledge into a comprehensive conceptual and analytical framework, including individual research projects, as well as the vocabulary, case library, and challenges repositories.

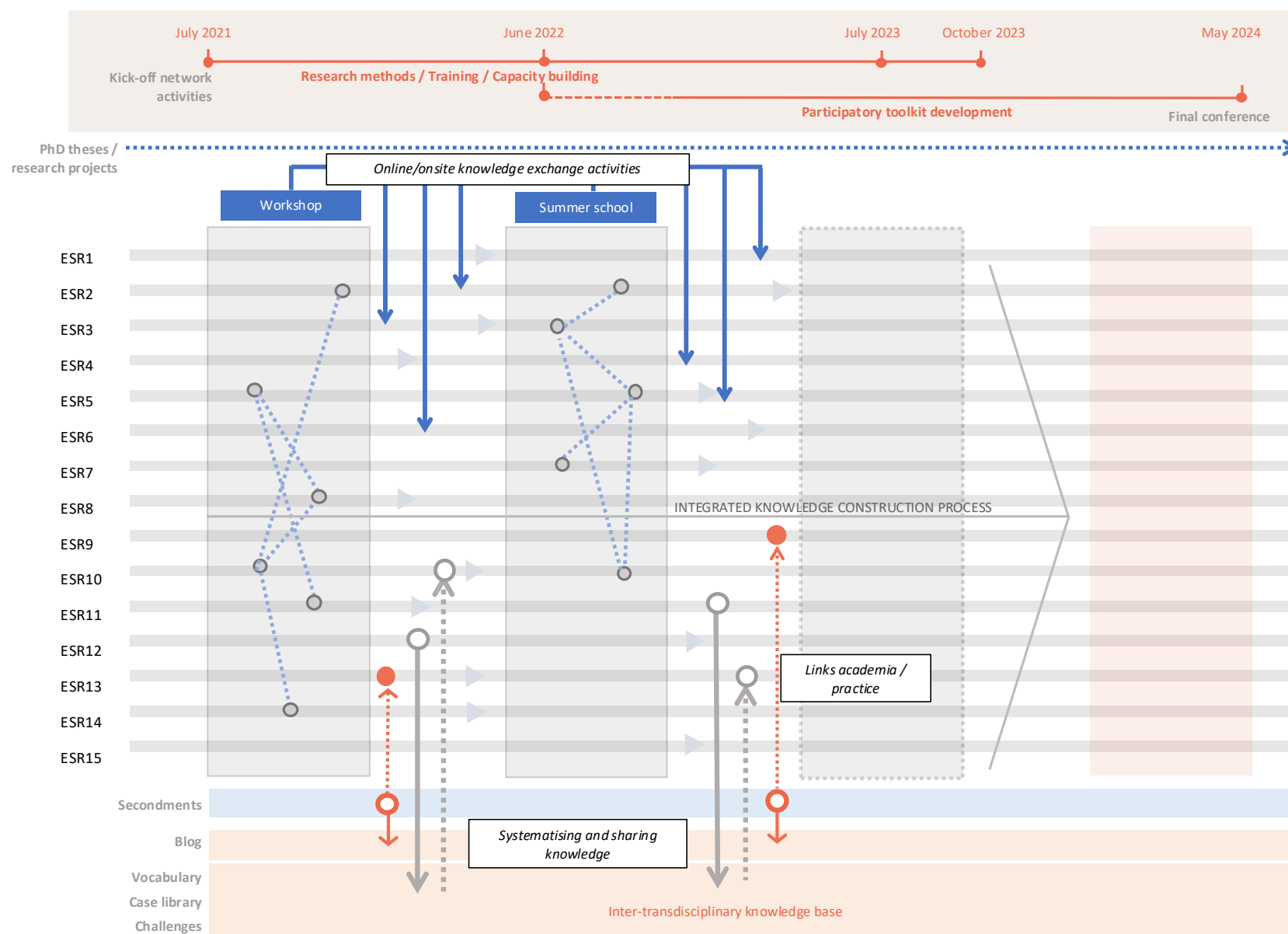
3.1

**Exploring housing challenges from
diverse disciplinary perspectives**
ESR research projects

3.2

Collaborative knowledge building
Vocabulary
Case library
Challenges

Collaborative knowledge construction process



The process implemented over the three-year project is structured around two main interrelated lines of action.

First, individual research trajectories pursued by each ESR form the backbone of the collective knowledge construction.

Second, collective knowledge repositories are created through the integration and systematisation of individual research efforts, resulting in shared outputs such as vocabulary and case library.

Individual and collective learning are further strengthened through secondments, which enable engagement with non-academic and cross-sectoral environments.

Network-wide activities—such as workshops, summer schools, and conferences—function as key spaces for knowledge exchange, enabling reflection, discussion, cross-fertilisation, and alignment among individual and collective research processes.

In parallel, structured training activities, delivered online and in conjunction with the workshops and summer schools, help ESRs to develop foundational knowledge and support the development of research skills.

The creation of a participatory toolkit, developed collaboratively by ESRs, supervisors, and partner organisations, translates accumulated research and experiential knowledge into practice-oriented tools to support engagement with non-academic stakeholders.

3.1

Exploring housing challenges from diverse disciplinary perspectives

An abridged overview of the fifteen ESRs' projects across the research areas of Design, Planning and Building, Community Participation, and Policy and Financing.

ESR research projects

Introduction

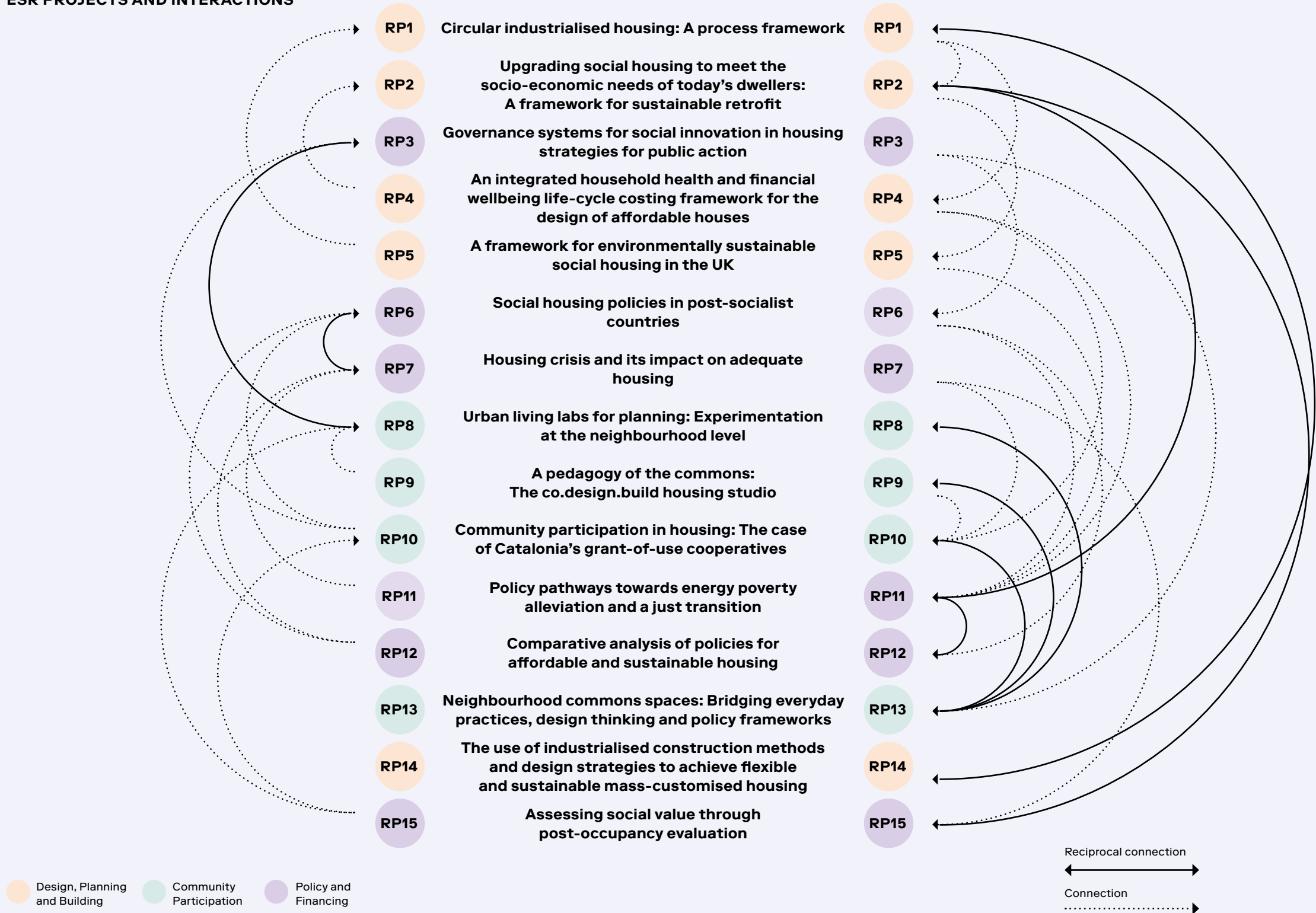
The RE-DWELL research projects form the foundation of the network's collective knowledge construction process. Each of the fifteen early-stage researchers (ESRs) pursues an individual doctoral research project focused on specific aspects of affordable and sustainable housing, contributing disciplinary depth and empirical insight to the network's shared research agenda.

Embedded within a transdisciplinary learning and research environment, these projects evolve through continuous interaction with peers, supervisors, and non-academic actors. Network-wide activities—such as workshops, summer schools, and conferences—provide key spaces for reflection, discussion, and cross-fertilisation, enabling individual research trajectories to be aligned and informed by collective learning processes. Secondments further extend this learning by situating research within professional and policy contexts and facilitating engagement with non-academic environments.

The research projects are progressively integrated into the collective knowledge construction process. Insights generated within individual projects feed into shared knowledge repositories, such as the vocabulary and case library, where they are articulated, compared, and related across research areas. In parallel, engagement with real-world contexts through secondments strengthens the links between academic research and practice, supporting reflexive learning across sectors.

Through this iterative interaction between individual inquiry and collective activities, the research projects contribute to the development of an evolving interdisciplinary and transdisciplinary knowledge base. They provide the empirical and analytical grounding for shared concepts, cases, and challenges, while also benefiting from the collective frameworks and dialogues that shape the network's approach to affordable and sustainable housing.

ESR PROJECTS AND INTERACTIONS



This section includes summaries of the ESRs' research projects, provided as edited extracts from Deliverables [4.1](#), [4.2](#), and [4.3](#).

RP1 Circular industrialised housing: A process framework

Annette Davis

The current lack of sustainable and affordable housing is a global issue which has reached a crisis point. The negative environmental impacts of the energy and materials consumed during the whole life cycle of housing is generally not considered, whilst in terms of affordability, there is a lack of social and affordable housing for growing urban populations. Furthermore, residential buildings account for an average of 75% of the European building stock, making the role of housing in the twin crises even more critical.

A key challenge in the building sector is resource inefficiency: construction accounts for nearly 40% of global energy-related CO₂ emissions, consumes half of the world's material extraction, and generates over a third of all waste in the EU through construction and demolition. Transitioning to a circular economy can improve both environmental sustainability and long term housing affordability.

Industrialised construction, which largely relies on off-site methods and incorporates digitalisation alongside continuous improvements in the design and delivery of building systems, offers a promising approach to facilitate the transition to a circular economy. Circular industrialised construction integrates design for disassembly to enable the future reuse of new buildings and their constituent parts, as well as the remanufacturing and reuse of existing building materials, components, or elements. However, these practices are rarely fully implemented in permanent housing, in contrast to temporary housing.

The research addresses the current lack of knowledge and guidance available to stakeholders from various fields in achieving circular housing through industrialised construction, with a particular emphasis on its application within social and affordable housing contexts. It aims to integrate technical, socio-economic, and governance aspects—often considered in isolation—in order to develop a holistic and comprehensive understanding of the challenges and opportunities involved. The study combines evidence from academic literature with original insights into best practices and lessons learned from professionals involved in delivering exemplary projects. This includes case studies from the Solar Decathlon Europe 2022 competition, interviews with industry practitioners and policymakers in the UK, the Netherlands, and Spain, as well as field observations conducted in several off-site construction factories.

RESEARCH QUESTIONS

1. What is circular industrialised housing?
2. How can we measure and compare the impacts of circular design using life cycle assessment?
3. Which critical processes encompass the construction, deconstruction and post-deconstruction activities for building parts or materials across the building life cycle?
4. Which key factors (barriers and enablers) affect circular industrialised housing, and how do these relate to the processes?
5. What are the key recommendations to guide practitioners implementing circular industrialised housing across the building processes?

EXPECTED OUTCOMES

The aim of the research project is to inform designers, off-site contractors, housing providers, and local-level policymakers about the best practices for implementing circular principles using industrialised construction to reduce carbon emissions and increase the longevity of housing. The expected results include:

- **A circular process framework** that outlines the key stages and interactions involved in delivering circular industrialised housing throughout the entire building life cycle.
- **Interdisciplinary guidelines** covering the ‘dos and don’ts’ of circular industrialised housing.

These outcomes are based on the findings from a systematic literature review, a life-cycle assessment study of a highly energy-efficient prefabricated house, observations of on-site disassembly/reassembly, and interviews with the Solar Decathlon 2022 university teams from nine countries across Europe and Asia, who had collaborated with industry partners. The framework and guidelines will be validated through surveys and interdisciplinary workshops with practitioners.

RELATED CONCEPTS

: BIM
 : CIRCULAR ECONOMY
 : DESIGN FOR DISASSEMBLY
 : INDUSTRIALISED CONSTRUCTION
 : LIFE-CYCLE ASSESSMENT
 : LIFE-CYCLE COSTING
 : MASS CUSTOMISATION

RELATED PROJECTS

RP2: Upgrading social housing to meet the socio-economic needs of today’s dwellers: A framework for sustainable retrofit

by Saskia Furman

Both projects develop holistic frameworks that engage multiple stakeholders and prioritise long-term sustainability in housing. RP1 focuses on circular industrialised housing, applying circular economy strategies to safeguard building materials and reduce negative environmental impacts, while RP2 examines sustainable retrofit for social housing, with an emphasis on resident engagement and social sustainability. A shared focus is placed on preserving existing building stock to minimise demolition to improve the environmental and social sustainability of housing. However, the projects adopt different approaches. RP1 takes a systems-level, top-down perspective, integrating industrialised construction and circular economy strategies, whereas RP2 follows a bottom-up approach, incorporating residents’ perspectives into retrofit decision-making. Qualitative methods, including interviews, inform the interdisciplinary frameworks developed in both studies, supporting sustainable housing transformation.

RP4: An integrated household health and financial wellbeing life-cycle costing framework for the design of affordable houses

by Aya Elghandour

RP1 and RP4 both adopt a life-cycle approach to sustainable and affordable housing, developing decision-making frameworks to assess long-term impacts. RP1 focuses on environmental sustainability by utilising life-cycle assessment to evaluate impacts over time, while RP4 integrates financial and health-related aspects into affordability evaluations through life-cycle costing. Both emphasise long-term perspectives—RP1 through a housing case study that investigates component lifespans, and RP4 by forecasting future operational

and maintenance expenses. Furthermore, both projects are grounded in qualitative research, incorporating interviews with practitioners. They each develop frameworks that consider the entire building life cycle, facilitating informed decision-making for sustainable housing solutions.

RP14: The use of industrialised construction methods and design strategies to achieve flexible and sustainable mass-customised housing

by Carolina Martín

The two projects explore the role of industrialised construction in delivering sustainable, affordable, and adaptable housing. RP1 focuses on circular industrialised housing, developing a process framework that incorporates principles such as design for disassembly, material reuse, and life-cycle assessment. RP14 investigates mass customisation in multi-family housing, examining how industrialised methods, product platforms, and component standardisation can enhance design flexibility, manufacturing efficiency, and long-term adaptability. A shared emphasis is placed on resource efficiency, particularly through the use of building layers and standardised components—key circular economy strategies aimed at extending material lifespans and minimising waste. Moreover, both projects contribute to holistic, interdisciplinary frameworks that could be applied in complementary ways.

RP2 Upgrading social housing to meet the socio-economic needs of today's dwellers: A framework for sustainable retrofit

Saskia Furman

European social housing peaked in the post-war period and was predominantly designed and constructed by institutional stakeholders—architects, planners, engineers, and policymakers—using top-down approaches. Deregulation of building standards, poor maintenance, and lack of investment has since led to widespread degradation. Poor insulation, low energy performance, thin walls, dampness, and mould all contribute to the urgent need to retrofit this ageing housing stock.

Evidence over the past few decades suggests that residents often lack both the autonomy and financial means to manage repairs and maintenance, while building owners tend to favour top-down decision-making. Yet this retrofit approach neglects inclusive stakeholder engagement, imposes living standards onto marginalised groups without considering their needs, and frequently results in inadequate retrofit outcomes.

Recent retrofit studies suggest that residents are experts in their own living environments and should be key stakeholders in retrofit design. Non-energy benefits—including comfort, health, wellbeing, and affordability—are often more important to social housing residents than energy efficiency alone. Despite this, current deep energy retrofit strategies prioritise three technical improvements:

1. Enhancing the building fabrics' thermal properties.
2. Improving system efficiency.
3. Integrating renewable energy.

The gap between predicted and actual energy performance after retrofit remains substantial—up to five times higher than the projections. Several elements explain these disparities, including user habits, installation deficiencies, modelling limitations, and both the rebound and prebound effects. Integrating residents' expertise alongside institutional stakeholder perspectives can lead to more holistic sustainable outcomes. These include enhancing energy performance, affordability, health, quality of life, and user empowerment while simultaneously closing the performance gap.

This research project examines how resident participation can improve social housing retrofit outcomes by using a mixed methods approach through:

1. **A systematic literature review** examining the shift in terminology and discourse from social housing to affordable housing in England.
2. **A semi-systematic review of resident participation** in social housing retrofit.

3. **Qualitative analysis of institutional stakeholder interviews** exploring retrofit decision-making processes.
4. **Focus group research investigating residents' values** in social housing retrofit.
5. **Case study analysis of exemplary social housing** retrofit projects across Europe.

Reflexivity, power relations, and outsider status are considered to socially position the research in relation to participating stakeholders.

Research questions

1. Could the participation of people living in social housing improve retrofit solutions more than end point performance targeted retrofit?
2. How can social housing retrofit be safeguarded for future tenants?
3. Is deep energy retrofit the best approach for holistic sustainability?
4. What do inhabitants consider as important in retrofit, that is not included in the energy retrofit process?

Expected outcomes

The project aims to contribute to the sustainable upgrading of existing social housing, aligning with the triple bottom line of sustainability by balancing social, environmental, and economic factors. The findings from literature reviews, case studies, stakeholder interviews and focus groups with institutional and resident stakeholders will inform the following outputs:

- **A framework** for inclusive and holistic social housing retrofit.
- **Guidance for institutional stakeholders** to embed resident engagement in retrofit decision-making processes..

RELATED CONCEPTS

: ENERGY RETROFIT
 : ECO-SOCIAL POLICY
 : ENVIRONMENTALLY SUSTAINABLE SOCIAL HOUSING
 : HOUSING RETROFIT
 : INDOOR THERMAL COMFORT
 : PARTICIPATORY APPROACHES
 : PERFORMANCE GAP IN RETROFIT
 : PREBOUND EFFECT
 : SOCIAL HOUSING
 : SOCIAL VALUE
 : TECHNO-OPTIMISM
 : THERMAL INSULATION AND AIRTIGHTNESS

RELATED PROJECTS

RP5: A framework for environmentally sustainable social housing in the UK

by Mahmoud Alsaeed

RP2 and RP5 both target fundamental challenges in sustainable social housing but take different, yet complementary approaches. RP5 develops frameworks for environmental sustainability standards and simplified regulatory practices, while RP2 challenges top-down retrofit approaches by integrating residents' expertise into the process. Both projects identify critical barriers in current systems—RP2 reveals how performance gaps make actual energy consumption five times higher than predicted, undermining techno-centric retrofit effectiveness, while RP5 documents the lethargic progress toward sustainability targets due to fragmented regulations. They also share methodological similarities, using stakeholder interviews and case studies to develop practical frameworks. The key synergy lies in their potential integration: RP5's simplified environmental standards could be implemented through RP2's resident-centred approach, creating an innovative pathway that combines technical rigour with user experience to achieve meaningful sustainability in social housing.

RP11: Policy pathways towards energy poverty alleviation and a just transition

by Tijn Croon

RP2 complements RP11 by focusing on the implementation side of energy poverty alleviation. While RP11 examines governance frameworks and policy approaches to energy poverty, RP2 investigates how resident participation

can improve social housing retrofit outcomes. Both projects acknowledge that technical energy improvements alone are insufficient: RP11 through the justice framework and RP2 through documenting performance gaps. Performance gaps directly impact RP11's concern with energy poverty alleviation. By developing a framework for socially inclusive retrofit, RP2 provides practical mechanisms to implement the just transition that RP11 seeks to govern, potentially closing performance gaps and more effectively alleviating energy poverty through resident-centred approaches.

RP15: Assessing social value through post-occupancy evaluation

by Leonardo Ricaurte

Both RP2 and RP15 focus on resident participation in housing improvements. While RP15 examines social value measurement through post-occupancy evaluation, RP2 investigates resident participation in retrofit decision-making processes. Both projects recognise that sustainable housing outcomes require meaningful resident involvement. RP2 examines how resident expertise can close the gap between predicted and actual energy performance, and RP15 proposes capability-based evaluation methods to assess and increase social value by determining how housing design enables residents to flourish. Both projects move beyond purely technical measures to centre human experience in housing improvements. Together, these research projects could create a continuous improvement cycle: RP2's framework enhances initial retrofit decisions through resident engagement, while RP15's capability-based post-occupancy evaluation measures actual social outcomes, creating the learning loops that can inform future retrofit approaches.

RP3 Governance systems for social innovation in housing: Risks, opportunities, and new strategies for public action

Lucia Chaloin

Amid growing challenges related to housing affordability and fragmented governance, innovative governance models are emerging as vital tools for fostering more inclusive and sustainable housing solutions. Moving beyond conventional top-down approaches, these models bring together diverse actors—including public institutions, social movements, and local communities—to co-produce housing strategies that enhance affordability and build long-term resilience in both housing systems and communities.

By examining governance frameworks across various European contexts, this research underscores the potential of collaborative approaches to effectively address contemporary housing crises. Focusing on cohousing initiatives in Bologna and Lisbon, the study explores how governance structures can support community-led housing solutions and ensure their long-term viability. These initiatives challenge traditional housing governance by emphasising collective agency, democratic decision-making, and hybrid public–community partnerships. In doing so, they not only improve affordability but also foster social cohesion, advance sustainable urban development, and introduce innovative policy frameworks that empower residents.

The research adopts a comparative case study approach, employing qualitative methods such as semi-structured interviews, participatory observation, and policy analysis to investigate the interactions between institutional actors and grassroots initiatives. By analysing these dynamics, the study aims to deepen understanding of how governance innovations can sustain alternative housing models, while identifying key risks, opportunities, and strategic pathways for public intervention. Addressing these challenges calls for a transdisciplinary approach that integrates urban governance, housing policy, and social innovation to develop more adaptive and inclusive housing systems.

RESEARCH QUESTIONS

1. How do governance models shape the development and sustainability of cohousing initiatives?
2. Which key institutional, social, and regulatory factors enable or constrain the implementation of cohousing projects in Bologna and Lisbon?
3. In what ways can cohousing governance models inform and transform public action in housing, shifting from traditional social housing policies to more adaptive and participatory approaches?

EXPECTED OUTCOMES

The study aims to generate valuable insights into the role of governance in cohousing initiatives, contributing to both academic research and practical policy development. The expected outcomes include:

- **Comparative analysis of governance models:** A detailed examination of how governance structures in Bologna and Lisbon shape cohousing projects, highlighting key differences and commonalities.
- **Framework for public-community collaboration:** Identification of strategies that foster effective partnerships between public institutions, grassroots organisations, and housing cooperatives.
- **Transdisciplinary methodological contributions:** Application of qualitative methods, including participatory action research, case study analysis, and governance mapping, to advance research and practice on innovation and housing.

RELATED CONCEPTS

: COMMUNITY EMPOWERMENT
 : COLLABORATIVE GOVERNANCE
 : COLLABORATIVE HOUSING
 : COLLABORATIVE PLANNING
 : HOMELESSNESS
 : HOUSING GOUVERNANCE
 : HOUSING POLICY
 : HOUSING RETROFIT
 : PARTICIPATORY APPROACHES
 : PUBLIC-CIVIC PARTNERSHIP
 : SOCIAL INNOVATION
 : SOCIAL SUSTAINABILITY

RELATED PROJECTS

RP6: Social housing policies in post-socialist countries

by Marko Horvat

RP3 and RP6 examine the transformation of housing governance models, highlighting the evolving role of public institutions in ensuring housing affordability and social inclusion. While RP3 focuses on governance innovations in cohousing projects in Southern Europe, RP6 analyses the modernisation of social housing policies in post-socialist contexts. RP6 pays particular attention to vulnerable groups, including the homeless, similar to RP3, which focuses on the inclusion of vulnerable residents in cohousing initiatives. A key intersection lies in their comparative approach to governance structures, exploring how different policy frameworks influence housing outcomes. By examining institutional shifts and governance practices, both studies invite broader debates on the role of the state and alternative housing models in contemporary urban development while informing policy development.

RP8: Urban living labs for planning: Experimentation at the neighbourhood level

by Andreas Panagidis

These two projects, RP3 and RP8, explore participatory approaches to innovating housing governance, emphasising the role of citizens in shaping their living environments. While RP3 examines cohousing initiatives as a form of collaborative governance, RP8 focuses on urban living labs as experimental spaces for co-creating sustainable housing solutions. A shared emphasis on bottom-up processes, participatory action research, and public-community partnerships

connects the two studies, offering insights into how collective housing initiatives can inform broader urban governance practices. Both projects seek to facilitate actionable strategies, contributing to both theory and practice. RP3 aims to generate insights into the role of governance in cohousing initiatives, informing academic research and practical policy development, while RP8 focuses on the dynamics of neighbourhood planning and governance, providing practical guidance for urban development.

RP13: Neighbourhood commons spaces: Bridging everyday practices, design thinking and policy frameworks

by Androniki Pappa

Both research projects explore how local governance strategies can support community-driven housing initiatives, with Lisbon serving as a case study in each. RP13 focuses on citizen participation in urban regeneration processes, while RP3 examines cohousing governance models that integrate both public and community actors. Together, these studies highlight the role of participatory governance in shaping urban development and housing policy, emphasising the value of sustained collaboration between residents, local authorities, and non-profit organisations. They also address regulatory challenges and investigate governance innovations that support alternative housing and urban models, advocating for policy frameworks that recognise, enable, and sustain community-led spaces.

RP4 Integrating life-cycle costing in designing affordable dwellings to promote the health and financial wellbeing of households

Aya Elghandour

Life-cycle costing (LCC) is a valuable tool for assessing the long-term costs of building and maintaining housing. However, housing providers often use it primarily as a cost-reduction tool, with limited attention to the health and financial wellbeing of residents in affordable housing. Typically, LCC aims to minimise expenses by meeting only the minimum quality standards, which can negatively affect residents' living conditions. When providers invest in higher-quality housing, they face increased upfront costs and slower returns, as rent levels are often regulated or constrained, resulting in lower rental income.

In the UK, market dynamics significantly influence affordability, often resulting in residents of affordable housing having to endure poor living conditions, such as excessive cold and mould. These issues harm residents' health and place additional strain on the National Health Service (NHS). However, design-stage decisions can help mitigate these negative impacts, reducing both the burden on residents and the demands on public health resources.

This research explores how integrating LCC into the design phase can prioritise health and financial wellbeing. The goal is to develop an LCC and performance taxonomy for affordable dwelling features impacting health and financial wellbeing. Currently, no unified taxonomy combines LCC with performance evaluation while considering all dwelling parameters that affect residents' quality of life.

The development of this taxonomy will be based on two key research strands:

- 1. A thematic analysis of qualitative data** from 36 semi-structured interviews with professionals in architecture, affordable housing provision, and public health.
- 2. Data from three UK case study dwellings** located in Sheffield, York, and Glasgow.

By integrating residents' health and financial wellbeing into affordability considerations, this research challenges traditional cost-driven models and promotes a more comprehensive approach to housing affordability. Additionally, it will examine the challenges faced by various stakeholders in delivering long-term, healthy, and affordable housing in the UK. The study will clarify the roles and responsibilities of key stakeholders whose decisions impact residents' quality of life, highlight systemic barriers, and provide a foundation for future solutions.

RESEARCH QUESTIONS

1. What are the key factors that define affordability in residential dwellings?
2. What are the essential characteristics that contribute to a healthy residential dwelling environment in the UK?
3. How can LCC be used to integrate household health and financial wellbeing during the design stages of affordable housing?
4. What components and structure should an LCC and performance taxonomy for affordable dwelling features impacting health and financial wellbeing include?

EXPECTED OUTCOMES

The main expected outcome is a novel LCC and performance taxonomy tailored to the British context, with potential adaptability to other European countries. Its features include:

- **Integration of LCC with performance evaluation:** The taxonomy will combine LCC with performance assessment, considering all dwelling parameters that impact residents' health and financial wellbeing. This contribution addresses the current lack of emphasis on end-users' health and financial wellbeing during the design stages of dwellings. Although developed for the UK, it can be adapted for use in other European contexts.
- **Decision-making tool for housing providers and architects:** The taxonomy will serve as a valuable resource for architects and affordable housing providers, enabling informed choices that balance cost-effectiveness with long-term health benefits and financial wellbeing for residents.

RELATED CONCEPTS

: COMMUNITY EMPOWERMENT
 : ENERGY POVERTY
 : FINANCIAL WELLBEING
 : HOUSING AFFORDABILITY
 : HOUSING QUALITY
 : HOUSING RETROFIT
 : INDOOR THERMAL COMFORT
 : LIFE-CYCLE COSTING
 : MEASURING HOUSING AFFORDABILITY

RELATED PROJECTS

RP2: Upgrading social housing to meet the socio-economic needs of today's dwellers: A framework for sustainable retrofit

by Saskia Furman

RP2 focuses on upgrading social housing through retrofitting to address the evolving socio-economic needs of today's residents. By prioritising health and financial wellbeing in affordable dwellings—whether through design, construction, or retrofitting—RP4 complements this effort by incorporating life-cycle costing to mitigate energy poverty, a critical policy and financing issue. Neglecting energy-efficient construction or delaying retrofitting can result in substandard housing, pushing residents into energy poverty and increasing financial burdens on stakeholders. Both projects recognise the importance of resident involvement in housing renovation. RP2 investigates how resident participation can improve retrofit solutions, and RP4 emphasises community engagement in decision-making related to housing design and resource management. Additionally, RP4 highlights the need for a balanced approach that prioritises not only energy efficiency but also proper ventilation—an essential factor in the UK, where dampness and mould can severely impact residents' health. Both projects advocate for policies and frameworks that address these pressing issues to ensure that energy-efficient, healthy, and affordable housing is accessible to all.

RP10: Community participation in housing: The case of Catalonia's grant-of-use cooperatives

by Zoe Tzika

In the context of community-led housing, RP10 explores how collaborative housing models, such as grant-of-use cooperative housing, promote both affordability and sustainability. By involving communities in housing provision,

residents are empowered to participate in decision-making, particularly in areas like housing design and resource management. RP4 contributes to this discussion by highlighting the importance of long-term thinking in decisions regarding materials, heating systems, and energy use—critical factors that impact residents' health and financial wellbeing. Raising awareness of these considerations can enable community members to make informed choices that not only improve living conditions but also address climate change challenges. Furthermore, knowledge co-creation and collaborative workshops can foster mutual learning, helping communities strike a balance between environmental sustainability with economic and health priorities.

RP11: Policy pathways towards energy poverty alleviation and a just transition

by Tijn Croon

RP4 examines how life-cycle costing can help reduce energy poverty, particularly in the context of rising energy prices and inefficient housing. While RP11 focuses on policy frameworks and multilevel governance in countries like the UK, France, and the Netherlands, RP4 takes a design-centred approach to address the issue. By considering the whole life costing, RP4 seeks to improve energy efficiency and long-term affordability for low-income households, thereby alleviating the financial strain caused by fluctuating energy prices. Both projects align with the principles of a just transition, ensuring that vulnerable populations are not disproportionately affected by the shift to low-carbon energy systems. Additionally, they support the broader goals of European policies such as the European Green Deal, which prioritises affordable, energy-efficient housing as a key strategy for combating energy poverty.

RP5 A framework for environmentally sustainable social housing in the UK

Mahmoud Alsaeed

In the UK, social housing makes up 18% of the total housing stock, comprising approximately 4.4 million homes. This sector accounts for 6.6% of the country's energy consumption and 4.4% of its carbon emissions. Integrating environmental sustainability into social housing presents numerous challenges, including rapidly changing regulatory frameworks, fragmented practices, and persistent misconceptions about what sustainability entails and how it can be implemented. This research project examines the intersection of environmental sustainability and social housing across the design, construction, and operation stages.

To address these challenges, the UK government has introduced a series of strategic initiatives. These include amendments to the National Planning Policy Framework which toughen sustainable building regulations and support the nationwide target of achieving net-zero emissions by 2050. Additional measures include mechanisms for developers to encourage a transition towards a more sustainable and decarbonised housing sector. However, studies by scholars and government agencies point to slow progress in the practical implementation of these measures, raising concerns about the feasibility of meeting national net-zero targets within the social housing sector.

This research project aims to develop a novel and streamlined framework to address the fragmentation, misconceptions, and complexities involved in achieving environmental sustainability within the social housing sector. It examines the current unsustainable practices, which are hindered by the complexity and fragmentation of existing policies, widespread misconceptions about environmental sustainability, and the lack of clear pathways toward a sustainable housing future.

The study encompasses a review of relevant conceptual frameworks, an analysis of three case studies in England covering 114 social housing units, and 31 semi-structured interviews with key stakeholders. These projects reflect a variety of social housing models—including privately developed, council, and housing association schemes—and span various types such as shared ownership and social rent. They also represent diverse geographical settings, from high-density urban areas to medium-density and rural settings. Interview participants include representatives from housing associations, architects, sustainability consultants, and academic researchers.

RESEARCH QUESTIONS

1. What methods should be used to create a framework that enables an environmentally sustainable social housing sector?
2. How are housing and sustainability currently perceived and structured within the UK social housing sector?
3. How can we define and measure the environmental sustainability of social housing?
4. Which practices are currently used in the UK to develop environmentally sustainable social housing?
5. Which tools and processes enable straightforward and effective practices for delivering environmentally sustainable social housing?

EXPECTED OUTCOMES

The result of this study is a theoretically informed, practice-orientated framework that provides a coherent foundation for understanding perceptions, practices and regulatory structures surrounding social housing. It is designed to support policymakers, practitioners, and researchers in advancing sustainable social housing in the UK. Beyond its practical applications, the framework aims to inform national policy reform and inspire further research toward implementing more efficient and effective practices, regulations, and standards. While it includes specific policy recommendations, its broader impact will rely on collaboration with both policymakers and industry stakeholders. Ultimately, the framework contributes to ongoing efforts to standardise sustainable housing practices.

RELATED CONCEPTS

: BUILDING DECARBONISATION
 : ENERGY POVERTY
 : ENVIRONMENTALLY SUSTAINABLE SOCIAL HOUSING
 : FRAMEWORK
 : HOUSING GOVERNANCE
 : LIFE-CYCLE ASSESSMENT
 : PARTICIPATORY APPROACHES
 : SOCIAL HOUSING
 : SUSTAINABILITY BUILT ENVIRONMENT

RELATED PROJECTS

RP1: Circular industrialised housing: A process framework

by Annette Davis

Both RP1 and RP5 aim to provide practical guidance for practitioners and policymakers, addressing sustainability challenges through design, planning, and construction. RP5 takes a broad approach to environmentally sustainable social housing in the UK, encouraging more sustainable practices among stakeholders. In contrast, RP1 focuses on bridging the knowledge gap around implementing circular housing at the building scale, with a focus on industrialised construction and design for disassembly. RP5 leads to a practice-oriented framework addressing both practical and theoretical challenges in sustainable social housing, while RP1 develops a circular process framework and interdisciplinary guidelines for housing providers, designers, contractors, and policymakers. The insights from RP1 can enhance RP5 by integrating innovative practices and policy implications, thus strengthening its impact.

RP11: Policy pathways towards energy poverty alleviation and a just transition

by Tijn Croon

The two projects engage with housing policy and governance from different angles. RP5 focuses on design and construction, while RP11 examines policy and financial frameworks. RP5 aims to develop a framework that informs sustainable building regulations and housing policies in the UK by addressing gaps in stakeholder perceptions and the complexities of sustainability. In contrast, RP11 concentrates on governance structures and the role of indicators in policy design, particularly for energy poverty interventions. RP5 provides guidance for navigating housing sustainability regulations, while RP11 develops a multilevel governance framework that outlines the roles and responsibilities

of various actors in energy poverty alleviation across Europe. The projects are complementary—RP5 can benefit from RP11's insights into governance, energy justice, and stakeholder engagement, while RP11's focus on energy poverty could enhance RP5's emphasis on inclusivity and equity in housing policy and practice.

RP6 Social housing policies in post-socialist countries

Marko Horvat

New global trends are reshaping the European housing market, with rapid urbanisation driving new and increased demands for residential development. In the absence of adequate policies and regulations, housing markets have become increasingly speculative and unstable, disproportionately affecting vulnerable groups. While many Western European countries have implemented housing policies, some post-socialist nations continue to struggle to establish frameworks that ensure affordability and sustainability for both rental and homeownership markets.

Croatia, Slovakia and Slovenia have undergone significant economic, social, and political transformations since the fall of socialism. The transition to a market economy led to the liberalisation of housing markets and extensive privatisation, fostering a strong homeownership culture. As a result, social and public rental housing became residual tenures, shaped by familism, intergenerational solidarity, and the financialisation of housing. Since the early 1990s, these former socialist countries have taken diverse approaches to institutionalising social housing policies based on evolving needs and priorities.

This research examines the development of housing policies in the three countries, comparing their responses since the fall of communism. The study focuses on affordability and sustainability at both national and capital city levels, with particular attention to vulnerable groups, including the homeless. The theoretical framework is based on historical institutionalism (path dependency), while the research follows a transdisciplinary social constructivist approach. The comparative analysis employs a qualitative 'most similar systems' design, drawing on literature and policy reviews, database analysis, and semi-structured interviews with key experts and stakeholders at national and local levels.

RESEARCH QUESTIONS

1. How did housing provision differ between Croatia, Slovakia, and Slovenia following market liberalisation and financialisation, and what impact did these differences have on the social and public rental sectors? How did these trends compare between their capital cities?
2. What has been the impact of policies aimed at expanding the social rental housing sector, and how do these measures compare across the three countries? How effective has each country been in delivering social rental housing?
3. What policy recommendations could improve housing affordability and sustainability within each national housing regime?

EXPECTED OUTCOMES

This research uses an extensive literature review, policy analysis, and semi-structured interviews to examine case studies from each of the three countries. Based on these findings, two main outcomes are identified:

- **Development of a framework** that enables a meaningful comparison of affordable housing provision systems at the national and local (capital city) levels, using path dependency as a theoretical approach.
- **Practical recommendations for the countries involved**, based on the comparative analysis, aimed at improving institutional, political, legislative, and administrative relationships to enhance affordable housing provision.

RELATED CONCEPTS

: ASSET-BASED WELFARE
 : ECOSOCIAL POLICY
 : FINANCIALISATION
 : HOMELESSNESS
 : HOUSING ALLOWANCE
 : HOUSING GOVERNANCE
 : HOUSING POLICY
 : PATH DEPENDENCE
 : PRECARIAT

RELATED PROJECTS

RP7: Housing crisis and its impact on adequate housing

by Anna Martin

The key connection between RP6 and RP7 lies in the fundamental principle of housing as a human right. Both studies address policy failures in ensuring adequate housing, emphasising that housing should be accessible to all. While RP6 conducts a comparative analysis of housing policies in peer countries, RP7 focuses on linking affordable and adequate housing to international and EU-level policymaking. Furthermore, it examines various factors contributing to the housing crisis, including income, employment, household composition, health status, economic conditions, government policies, and social inequalities—many of which are also central to RP6's analysis of housing policies across different national contexts. Methodologically, both projects align: RP6 compares housing policies at national and local levels, while RP7 investigates conflicting paradigms between Croatia and Hungary to identify causal relationships in housing policy.

RP11: Policy pathways towards energy poverty alleviation and a just transition

by Tijn Croon

Policy and regulation play a crucial role in ensuring housing affordability, forming a key intersection between RP6 and RP11. Both projects share a common focus on vulnerable groups and the impact of policy interventions. RP6 examines the evolution of housing policies in former socialist countries, analysing their approaches and developments since the fall of communism. In contrast, RP11 explores housing affordability through the lens of energy efficiency and energy poverty, investigating how policymakers can support vulnerable households through policy design, energy poverty indicators, and fiscal responses.

to energy crises. Methodologically, both projects adopt a transdisciplinary approach and employ comparative assessments.

RP12: Comparative analysis of policies for affordable and sustainable housing

by Alex Fernández

The key link between both projects is the focus on financial measures affecting housing affordability from both supply and demand perspectives. RP6 and RP12 use similar indicators, such as taxation policies and subsidies, to analyse changes in housing affordability. Although RP12's research emphasises energy performance improvements through home renovation, both studies may reach overlapping conclusions regarding the effectiveness of financial incentives, the impact of policy measures on vulnerable groups, and the role of renovations in enhancing long-term affordability and sustainability.

RP7 Housing crisis and its impact on adequate housing

Anna Martin

Housing insecurity is frequently understood as a consequence of economic forces such as market volatility, affordability constraints, and employment instability. While these factors are significant, they do not fully account for the complexity of the challenge. Access to stable, adequate housing is also shaped by deeper social and political forces: government policy, systemic inequality, and structural barriers. This research explores these intersecting dimensions through three key areas of inquiry:

- **Housing as a commodity: A comparative study of Croatia and Hungary**
Both countries face rising inequality and growing housing precarity, especially among the middle class. The research analyses how market dynamics, policy shifts, and political contexts have contributed to the emergence of a housing precariat—offering insights into broader regional trends.
- **Housing precarity and social mobility: Clashing vulnerabilities**
Affordability challenges now affect not only traditionally marginalised groups but also the downwardly mobile middle class. This study investigates how liberalised labour markets and weakened welfare systems have increased housing insecurity. It rethinks the concept of the 'precariat' in a risk society, highlighting growing competition for limited housing resources and the increasing risks of eviction and homelessness.
- **Trauma-informed design in housing**
This research investigates the impact of the built environment on mental, emotional, and physical wellbeing. Integrating academic scholarship with practical expertise, it underscores the importance of designing supportive spaces for vulnerable populations and advocates for the integration of these principles into housing policies across all levels of governance.

RESEARCH QUESTIONS

1. How have subsidies, funding mechanisms, and strategies for providing affordable housing to low- and middle-income families evolved in Hungary and Croatia over the past two decades?
2. What new forms of housing precarity have emerged in recent years?
3. How can housing policies better prioritise the welfare needs of vulnerable groups?
4. How can trauma-informed design principles be integrated into supportive housing to enhance residents' mental health and wellbeing?

EXPECTED OUTCOMES

This research aims to provide a critical and descriptive analysis of housing policies, identifying transferable good practices and policy measures. It will also develop a new typology of the housing precariat, examining how labour market positions influence housing conditions. Additionally, the study seeks to establish a strong conceptual foundation supporting further empirical research on the benefits of psychologically informed design in housing. These insights will contribute to future studies on the intersection of housing and wellbeing.

RELATED CONCEPTS

- : CRITICAL UTOPIAN ACTION RESEARCH
- : DELIBERATIVE DEMOCRACY
- : ENERGY-COMMUNITIES
- : HOUSING REGIME
- : PRECARIAT
- : TRAUMA INFORMED DESIGN

RELATED PROJECTS

RP6: Social housing policies in post-socialist countries

by Marko Horvat

Both RP6 and RP7 explore the intersection of housing policies, socio-economic vulnerabilities, and systemic inequalities from different regional perspectives. RP6 examines post-socialist housing policies in Croatia, Slovakia, and Slovenia, analysing how market liberalisation and financialisation have reshaped social housing. RP7, meanwhile, investigates housing precarity in Croatia and Hungary, emphasising economic instability, social inequalities, and the rise of a housing precariat. A shared theme is the lasting impact of housing policy legacies on contemporary challenges. RP6 traces the shift from strong state-led housing programmes to privatised, speculative markets—a trajectory mirrored in RP7's findings on market-driven policies deepening social inequalities and displacing lower-income populations. RP7's analysis of housing precarity could complement RP6's comparative policy evaluation by highlighting how different post-socialist states have addressed housing insecurity. Similarly, RP6's focus on public rental housing reforms could inform RP7's policy recommendations on strengthening affordable housing, particularly for those at risk of eviction and homelessness. Both studies underscore the role of historical institutionalism in housing policy analysis, demonstrating how governance models and privatisation trajectories shape contemporary housing affordability.

RP10: Community participation in housing: The case of Catalonia's grant-of-use cooperatives

by Zoe Tzika

RP7 and RP10 critically examine housing commodification and explore alternative models that challenge market-driven housing provision. A key shared theme is the reconceptualisation of housing as a social and political process. RP7 highlights how housing precarity stems from structural and political factors—government policies, social inequalities, and financial speculation. RP10 reinforces this view by demonstrating how cooperative housing empowers

residents to reclaim agency over their living conditions. RP10's insights into community-led housing could inform RP7's discussion on housing precarity, particularly by presenting cooperative models as potential solutions for ensuring long-term affordability and fostering collective governance. Likewise, RP7's analysis of the housing precariat and social mobility could benefit from RP10's exploration of how cooperative models foster economic stability, social cohesion, and participatory governance.

RP15: Assessing social value through post-occupancy evaluation

by Leonardo Ricaurte

The two projects examine the long-term impacts of housing on residents' wellbeing, social inclusion, and economic stability. RP7 focuses on housing precarity, financialisation, and trauma-informed design, while RP15 explores how post-occupancy evaluation measures the social value of housing interventions. A key shared theme is recognising housing as more than a material asset—it is a fundamental determinant of wellbeing. RP7 highlights how housing insecurity affects mental health, employment, and social mobility, while RP15 underscores the need to evaluate housing policies based on their broader impact on residents' quality of life. Integrating RP15's methodology into RP7's policy recommendations could ensure that housing interventions are assessed not only for economic efficiency but also for their long-term social impact. Similarly, RP7's argument that housing precarity deepens social inequalities could benefit from RP15's capability-based POE approach, which examines how housing design and management contribute to residents' agency, stability, and wellbeing.

RP8 Urban living labs for planning: Experimentation at the neighbourhood level

Andreas Panagidis

Research on urban development is gaining momentum, with increasing emphasis on the social and governance dimensions of residential environments and neighbourhood planning. Scholars and policymakers are increasingly exploring how institutional frameworks, community-led initiatives, and participatory decision-making processes shape the accessibility, affordability, and sustainability of living spaces. This shift reflects a broader recognition of the need for innovative governance models that foster collaboration between public authorities, private entities, and local communities to create inclusive and resilient urban areas. Within this field, two interconnected areas offer significant potential for advancing knowledge and understanding:

- **The co-creation of social and green infrastructure**, understood as an interconnected system of relationships, resources, and initiatives that enhance community wellbeing, promote environmental sustainability, and support inclusive urban development. This involves active collaboration between state and non-state actors to ensure equitable access to essential services, public spaces, and resilient ecological networks.
- **The need for innovation in urban governance at the neighbourhood or residential block level**, requiring new approaches that embrace urban experimentation and participatory decision-making. By exploring collaborative governance models, policymakers and practitioners can develop more adaptive and inclusive planning strategies that empower local communities, foster self-organisation, and facilitate the co-production of sustainable urban solutions.

Using the urban living lab (ULL) methodology, this project investigates two areas in Nicosia to explore opportunities for collaboration between municipalities, citizens, and other actors in sustainable neighbourhood development. It adopts a conceptual framework that integrates social sustainability, collaborative governance, urban experimentation, and the urban commons. The ultimate goal is to strengthen citizen engagement and inform new planning frameworks and platforms that support cooperation in the design and management of affordable, sustainable neighbourhoods.

RESEARCH QUESTIONS

1. Which ULL methods and scales of co-governance are most effective in facilitating experimentation in neighbourhood planning?
2. How can social and green infrastructure resources help connect the household scale within the broader neighbourhood context?

3. What shared objectives can participants identify to initiate self-organisation for the co-production of social infrastructure?
4. What organisational structures best support collaboration between local government officials and citizens in co-producing affordable and sustainable living environments?

EXPECTED OUTCOMES

This research aims to generate practical insights into the dynamics of neighbourhood planning and governance, offering valuable contributions to both theory and practice. The key expected outcomes include:

- **Identification of key challenges and contextual factors** that influence housing and neighbourhood infrastructure, as perceived by both citizens and local authorities.
- **Mobilisation of community self-organisation** and leveraging of local authority support to enhance citizen engagement in co-production initiatives.
- **Exploration of innovative collaborative governance models** that facilitate cooperation between citizens and local governments in addressing real urban challenges.
- **Application of participatory action research methodologies** through the ULL approach to test and refine strategies for sustainable neighbourhood development

RELATED CONCEPTS

: CO-CREATION
 : COLLABORATIVE GOVERNANCE
 : COLLABORATIVE PLANNING
 : NEW MUNICIPALISM
 : PARTICIPATORY APPROACHES
 : SOCIAL INNOVATION
 : SOCIAL SUSTAINABILITY
 : URBAN COMMONS
 : URBAN INFORMALITY

RELATED PROJECTS

RP3 Governance systems for social innovation in housing: Risks, opportunities and new strategies for public action

by Lucia Chaloin

RP3 and RP8 are closely related as both projects explore new governance configurations, mechanisms, and frameworks that support affordable and sustainable housing. RP3 focuses on innovative housing solutions for vulnerable groups—such as youth and migrants—within public housing contexts in Portugal and Italy. Meanwhile, RP8 examines governance at the neighbourhood level, specifically how urban experimentation and collaborative governance can be leveraged in Cyprus. Both projects emphasise the integration of state and non-state actors into governance structures and are situated within Southern European contexts. Given these shared themes, their outcomes can offer valuable insights for a comparative analysis of innovative housing and social infrastructure solutions, particularly regarding their local-level impact on housing governance systems in the region.

RP13: Neighbourhood commons spaces: Bridging everyday practices, design thinking and policy frameworks

by Androniki Pappa

Both RP13 and RP8 investigate the transformation of neighbourhood public spaces into urban commons, with a shared focus on how commoning practices contribute to social sustainability. RP13 examines how citizen-led initiatives reclaim and redefine public spaces through self-organisation, placemaking, and urban activism. Meanwhile, RP8 explores how municipalities, citizens, and other urban development actors can co-create governance structures that facilitate participatory planning, ensuring that social and green infrastructure bridges household-level needs with collective urban spaces. While RP13 emphasises

the role of spatial design and planning policies in fostering commoning practices, RP8 focuses on power dynamics, mechanisms for public participation, and the interplay between formal and informal governance at the local level. Urban living labs could serve as platforms to experiment different models of governance and management for neighbourhood commons spaces, fostering greater community ownership and ensuring their long-term sustainability. Together, these projects offer a holistic perspective on how urban commons can promote social sustainability in housing environments by integrating governance innovation, participatory urbanism, and spatial design.

RP9 A pedagogy of the commons: The co.design.build housing studio

Effrosyni Roussou

In the face of complex global socio-political and environmental challenges—worsened by persistent systemic failures—access to equitable, affordable and sustainable neighbourhoods has become increasingly difficult, particularly in regions with limited welfare policies. Urban development and housing production are shaped not only by these structural constraints but also by the professionals who design and plan them. Architects, in particular, play a key role in shaping the built environment, yet they have been criticised for detachment from urgent social and ethical concerns and for reinforcing systems historically linked to capitalism and modernity.

Architectural pedagogy, especially the design studio, has significantly influenced how architects practice. Scholars argue that normative studios are often isolated from real-world social and environmental contexts, fostering self-indulgence, competitiveness, and an inflated sense of the architect's authority.

In response, experimental teaching practices have emerged to open architectural education to politically engaged, transdisciplinary learning. Participatory design and co-creation methods encourage a rethinking of how architectural knowledge is produced and who is involved, while design-build projects reconnect architects with material processes, increase accountability to communities, and highlight architecture's place within broader real-world networks. Together, these approaches challenge the architect's centralised role and the rigid boundaries of the discipline.

However, despite their growing adoption and popularisation—albeit in a limited, localised manner—these alternative models continue to struggle against the dominant discourses shaping architectural education. As a result, prospective spatial practitioners are often left without the necessary skills to navigate contemporary socio-spatial challenges.

This research project builds upon ongoing initiatives that explore alternative approaches to architectural education, further re-contextualising them within the broader anti-hegemonic discourse of the commons. It aims to critically challenge:

- **The knowledge production:** How architectural knowledge is created, by whom, and the ways it is exchanged and transmitted.
- **The hegemonic relations, culture, norms, and values:** The forces shaping the architect's identity and role in socio-spatial production, both inside and beyond the classroom.
- **The discipline of architecture:** Its boundaries, and the formal and informal rules that define what is recognised as architecture.

This study combines participatory action research and autoethnography at the University of Cyprus, focusing on the crisis-affected European South. The co.design.build studio serves as an educational framework tested through multiple iterations to assess its impact on students and, secondarily, on local communities. The project contributes to the ongoing reimagining of undergraduate architectural education beyond the conventional housing design studio, preparing future spatial practitioners to navigate complex, uncertain realities. By engaging hands-on with socio-spatial issues and collaborating with local actors, it reconceptualises academic institutions as spaces of commoning and key participants in spatial production, advocating a critical, commons-oriented approach to transdisciplinary learning.

RESEARCH QUESTIONS

1. What are the foundational principles and pedagogical impacts of an effective and engaging design studio that combines critical co-creation methodologies with a design-build learning environment (co.design.build)?
2. How can a co.design.build studio challenge the norms perpetuated by normative architectural education while actively advocating for equitable, affordable, and sustainable neighbourhoods, particularly within the European South?
3. How can the co.design.build studio learning process be transformed into a commoning process involving students, faculty, and local stakeholders?

EXPECTED OUTCOMES

This research project aims to develop a commons-based pedagogical framework for an engaging, impactful, live housing studio, aspiring to be established as an important actor within local spatial production processes especially in the contexts of crises of the European South. The expected outcomes include:

- **A matrix of best practices** that synthesises relevant examples of co-creation and co-production processes, as well as design-build practices, drawn from both educational and professional contexts across the Global North and Global South.
- **An analysis of shared contextual factors in crisis-affected regions**, highlighting the socio-cultural and political dynamics that influence multi-stakeholder engagement in architectural education.
- **A refined pedagogical model**, developed through participatory action research, incorporating iterative feedback from students and demonstrating the effectiveness of co.design.build methodologies in transforming architectural education.

RELATED CONCEPTS

: CO-CREATION
 : COLLABORATIVE PLANNING
 : COMMUNITY EMPOWERMENT
 : DESIGN ACTIVISM
 : DIRECT ACTION
 : PARTICIPATORY APPROACHES
 : SOCIAL SUSTAINABILITY
 : SPATIAL AGENCY
 : SUSTAINABILITY
 : URBAN COMMONS
 : URBAN INFORMALITY

RELATED PROJECTS

RP8: Urban living labs for planning: Experimentation at the neighbourhood level

by Andreas Panagidis

Beyond their methodological approaches and operational contexts, RP8 and RP9 projects share a commitment to examining the European South as a crisis-affected region, where systemic failures significantly shape governance and neighbourhood planning processes. They emphasise citizen and community engagement, democratic decision-making, and cross-sector collaboration. While RP9 explores pedagogical approach to train future professionals in supporting these processes, RP8 investigates the boundaries and potential of collaborative governance. Their shared use of participatory action research establishes a conceptual link, reinforcing the value of applied, community-driven practices in fostering inclusive and sustainable urban development. RP9's co-design-build studio could partner with ULLs to provide students with real-world experience in collaborative design and construction projects that address local needs and promote community ownership.

RP10: Community participation in housing: The case of Catalonia's grant-of-use cooperatives

by Zoe Tzika

RP9 and RP10 share a common focus on community empowerment and participatory processes. While RP10 explores how community-led housing models enable residents to shape their built environment and adopt alternative ways of living, RP9 rethinks architectural education to foster greater accountability among architects toward users and communities by equipping future spatial

practitioners with the skills needed to support such initiatives. Both projects also examine the impact of systemic failures on socio-spatial processes. Their emphasis on transdisciplinary collaboration and learning underscores the importance of bridging the gap between education and practice. RP9's co-design-build studio could explore the cooperative model as a means of empowering communities to participate in the creation and management of their own housing.

RP13: Neighbourhood commons spaces: Bridging everyday practices, design thinking and policy frameworks

by Androniki Pappa

RP9 and RP13 complement each other through their shared focus on the commons. RP9 explores the reconceptualisation of live pedagogy as a pedagogy of the commons, highlighting the role of academic institutions in fostering commoning practices. RP13, on the other hand, investigates neighbourhood commons spaces as spatial practices, analysing their potential and limitations. Their complementarity is reinforced by a conceptual feedback loop: insights from theorising commons as spatial practices can inform pedagogical approaches, while a commons-oriented architectural pedagogy can equip future practitioners with the knowledge, skills, and critical awareness needed to effectively support commons-based initiatives. RP9's co-design-build studio could focus on creating neighbourhood commons as part of its housing projects, teaching students how to design and build spaces that foster community interaction and promote the principles of the urban commons.

RP10 Community participation in housing: The case of Catalonia's grant-of-use cooperatives

Zoe Tzika

Collaborative housing models have gained renewed relevance as alternatives to conventional state- or market-driven housing provision, in a context marked by the intensification of housing financialisation, commodification, and social inequality. As housing is increasingly treated as a financial asset rather than upheld as a fundamental right, these initiatives challenge dominant modes of housing provision by foregrounding collective ownership, democratic governance, and long-term affordability. This doctoral research examines housing not only as a physical product but also as a participatory and relational practice, shaped through collective decision-making, care, and everyday dwelling, as well as through the social, spatial, and organisational outcomes that emerge over time.

The research focuses on the grant-of-use cooperative housing model in Catalonia, which has expanded significantly since the 2008 economic crisis within a specific socio-political and institutional context. Characterised by non-speculative tenure, collective property, and strong links between citizen initiatives, support organisations, and public administrations, the model encompasses a growing diversity of projects in terms of scale, social composition, governance arrangements, and architectural typologies. Beyond securing affordable and stable housing, these cooperatives seek to reconfigure social relations, redistribute care practices, promote environmental responsibility, and generate forms of collective life that extend beyond the private dwelling.

To analyse these processes and their outcomes, the research adopts the Capability Approach as its main analytical framework, examining housing as a socio-spatial practice that can expand or constrain individual and collective capabilities. This perspective foregrounds human diversity, unequal resources, and differing capacities to participate, while highlighting the role of institutional, social, and spatial conditions in shaping participatory outcomes. Participation is thus approached as a situated and evolving practice embedded in governance structures, everyday routines, and architectural configurations.

Methodologically, the thesis combines qualitative and comparative methods. It develops a taxonomy of grant-of-use cooperative housing in Catalonia to trace the model's evolution and diversification. The research is complemented by in-depth case studies of five projects, analysed through semi-structured interviews, focus groups, site visits, document analysis, and participant observation. By integrating multiple data sources, the research provides a nuanced account of how participation unfolds in practice, its socio-spatial and organisational outcomes, and the tensions and limitations that cooperatives encounter.

The findings contribute to housing studies and participatory planning by demonstrating how cooperative housing operates as a distinct alternative mode of housing provision. It can function as a form of community infrastructure that supports collective agency, care, and adaptability, while also revealing constraints that shape inclusivity and scalability. The thesis argues that realising the model's transformative potential depends on supportive institutional frameworks, sustained professional facilitation, and an understanding of participation as an ongoing, relational process rather than a fixed outcome.

RESEARCH QUESTIONS

1. In what ways does Catalonia's grant-of-use cooperative housing model offer an alternative to conventional housing, and what are the different outcomes for the communities involved?
2. What defines Catalonia's grant-of-use cooperative housing model, and how has it emerged and diversified over time?
3. How do participatory processes and collective agency shape the development, governance, and outcomes of grant-of-use cooperative housing in Catalonia?
4. What are the situated and multidimensional outcomes of cooperative housing in Catalonia, and how do they reflect a broader transformation in the way housing is conceived, developed, and inhabited?

EXPECTED OUTCOMES

The outcomes span theoretical contributions, empirical insights, practical implications, and methodological contributions in the field of housing:

- **Overview of grant-of-use cooperative housing in Catalonia:** A comprehensive panorama of the evolution, diversification, and current landscape of grant-of-use cooperative housing in Catalonia, offering insights into its growth, governance arrangements, and socio-spatial impacts.
- **Understanding cooperative housing's transformative potential:** Analysis of how grant-of-use cooperative housing challenges conventional housing provision and contributes to alternative forms of dwelling, social cohesion, and collective agency.
- **Pathways for support:** Identification of key enabling factors and barriers, providing guidance for housing practitioners, policymakers, and local authorities seeking to strengthen community-led housing initiatives and develop supportive policy frameworks.
- **Supporting community participation and governance:** Insights into how diverse communities engage in cooperative housing, and how participation can be sustained through collective decision-making practices, long-term engagement mechanisms, and partnerships with local actors.

- **Methodological contribution:** Advancement of the Capability Approach as an analytical framework for examining how cooperative housing initiatives enable communities to articulate diverse housing aspirations, exercise agency in housing production, and convert resources and institutional conditions into achieved housing outcomes.

RELATED CONCEPTS

: CAPABILITY APPROACH
 : CO-CREATION
 : COMMUNITY EMPOWERMENT
 : COMMUNITY-LED HOUSING
 : COLLABORATIVE GOVERNANCE
 : COLLABORATIVE HOUSING
 : COLLABORATIVE PLANNING
 : DELIBERATIVE DEMOCRACY
 : GRANT-OF-USE COOPERATIVE HOUSING
 : HOUSING-RETROFIT
 : PARTICIPATORY APPROACHES
 : SOCIAL INNOVATION
 : SOCIAL SUSTAINABILITY
 : URBAN COMMONS
 : URBAN INFORMALITY

RELATED PROJECTS

RP3: Governance systems for social innovation in housing: Risks, opportunities and new strategies for public action

by Lucia Chaloin

Both RP10 and RP3 share an interest in participatory approaches to housing governance. RP10 focuses on community participation through the grant-of-use cooperative model in Catalonia, highlighting self-managed housing solutions and collective agency. In contrast, RP3 examines community consultation as a means to make civic participation more meaningful, inclusive, and engaging. While RP3 explores the role of social innovation in housing governance and public action, RP10 emphasises grant-of-use cooperative housing as an alternative to conventional systems. Both studies investigate innovative governance models that provide affordable, sustainable, and community-driven housing solutions. Additionally, they highlight the need for governance frameworks that integrate public institutions with bottom-up initiatives, acknowledging the limitations of traditional social housing. Their findings contribute to discussions on public-community collaboration, examining how institutional actors, social movements, and local networks reshape housing governance and policy.

RP8: Urban living labs for planning: Experimentation at the neighbourhood level

by Andreas Panagidis

RP10 and RP8 contribute to the growing field of collaborative planning, housing, and urban governance by emphasising community participation, co-creation, and experimentation. Both studies share a common interest in understanding how community-led initiatives shape urban development—RP10 through cooperative housing models and RP8 by mobilising citizen engagement and partnerships with local authorities via urban living labs. They also highlight the importance of innovative methodological approaches, employing participatory action research, the Capability Approach, and experimental urban governance frameworks to assess the impact of collective decision-making on housing and neighbourhood planning. By linking cooperative housing models with urban experimentation and collaborative governance, these studies contribute to a deeper understanding of how citizen-led initiatives drive inclusive and community-driven urban development. RP10's examination of cooperative housing could serve as a case study for RP8, illustrating how citizen engagement and co-production support sustainable urban development at the neighbourhood level.

RP13: Neighbourhood commons spaces: Bridging everyday practices, design thinking and policy frameworks

by Androniki Pappa

These research projects examine community-driven urban development by exploring how collective initiatives shape and sustain inclusive and participatory neighbourhoods. RP13 focuses on neighbourhood commons spaces as sites of self-organisation and social infrastructure, while RP10 analyses cooperative housing as an alternative to conventional models. Both emphasise the interplay between spatial and social dimensions, illustrating how bottom-up initiatives challenge market-driven urban development and reshape governance structures. A shared focus on community participation, democratic governance, and long-term sustainability links the two studies. They explore how collaboration between citizens, local governments, and urban actors supports these initiatives while addressing risks such as privatisation and regulatory barriers. Advocating for policy frameworks that safeguard and enhance community-led spaces, both projects contribute to discussions on public-community collaboration, social sustainability, alternative dwelling practices, and resilient urban environments. RP10's findings on housing cooperatives could strengthen RP13's analytical framework by conceptualising neighbourhood commons as spatial practices. This theoretical integration would deepen the understanding of how cooperative housing operates within the broader urban commons paradigm.

RP11 Policy pathways towards energy poverty alleviation and a just transition

Tijn Croon

Energy price volatility is expected to remain high due to geopolitical uncertainty and the ongoing transition to low-carbon energy generation. However, price spikes affect society unevenly, disproportionately impacting low-income households, those with limited savings, and residents of less energy-efficient homes. Energy poverty, defined as the inability to secure adequate domestic energy services, poses severe challenges to welfare. Consequently, tackling energy poverty has become a key priority in policymaking and research, particularly within the context of the European Green Deal.

This project aims to explore how European policymakers can effectively support vulnerable households at risk of energy poverty, ensuring that the shift to low-carbon housing is perceived as a 'just transition'. It contributes to broader theoretical debates on the role of energy poverty within the welfare state, examining how policymakers balance effectiveness and efficiency when designing interventions such as subsidies for retrofitting, targeted financial aid, regulatory reforms, and social housing initiatives. Using policy analysis, empirical investigations, and comparative case studies, the research examines the role of energy poverty indicators in policy design, the impact of fiscal responses to energy crises, and the capacity of social housing providers to mitigate energy poverty through targeted interventions.

Employing both quantitative and qualitative research methods, the study adopts a transdisciplinary approach that includes collaboration with non-academic stakeholders. It examines how housing, social, and environmental policies interact across different levels of governance to shape welfare outcomes. Ultimately, the project aims to strengthen public accountability and promote access to affordable, energy-efficient housing for all.

RESEARCH QUESTIONS

1. To what extent do residualist approaches to energy poverty alleviation hinder structural solutions?
2. How can energy poverty gap indices improve the identification of vulnerable households and inform policy design?
3. How does income elasticity affect energy spending among low-income households?
4. How do social housing professionals across different welfare contexts perceive and implement targeted energy poverty interventions for tenants?
5. What are the effects of local energy poverty interventions—such as energy coaching and retrofitting—on household-level welfare outcomes?
6. What trade-offs are incorporated into the design of household energy relief policies during periods of energy price volatility?

EXPECTED OUTCOMES

The research seeks to improve the effectiveness of energy poverty policies by identifying practical alleviation strategies, examining the drivers of energy consumption, assessing policy alignment with moral and social justice principles, and evaluating governance structures shaping interventions. Its impact will be maximised through peer-reviewed publications, whitepapers co-developed with Housing Europe and the European Federation for Living, and presentations at conferences, knowledge institutions, and government offices. Ultimately, these efforts aim to inform policy reforms that enhance energy affordability, promote sustainable housing solutions, and foster more equitable welfare outcomes across Europe.

RELATED CONCEPTS

- : ECOSOCIAL POLICY
- : ENERGY POVERTY
- : HOUSING GOVERNANCE
- : HOUSING POLICY
- : JUST TRANSITION
- : PREBOUND EFFECT
- : PRECARIAT
- : TARGETED UNIVERSALISM

RELATED PROJECTS

RP2: Upgrading social housing to meet the socio-economic needs of today's dwellers: A framework for sustainable retrofit

by Saskia Furman

RP11 and RP2 both address the challenge of sustainable housing provision within the context of a just transition. RP2 emphasises the importance of resident participation in retrofit decision-making, arguing that inclusive stakeholder engagement leads to more holistic, socially sustainable outcomes. Both projects acknowledge the limitations of top-down approaches and explore policy trade-offs. Methodologically, they share qualitative approaches, including interviews, focus groups, and case studies. While RP11 discusses public accountability and strategic reforms, RP2 develops a framework for embedding resident participation in retrofit processes. RP11 could benefit from RP2's insights on participatory decision-making to enhance the procedural justice of energy poverty interventions, ensuring that policies are not only effective but also perceived as fair and inclusive.

RP7: Housing crisis and its impact on adequate housing

by Anna Martin

Both projects examine housing as a site of social and economic vulnerability, analysing the intersection of policy, welfare, and structural inequalities. They adopt comparative analysis and qualitative methodologies, incorporating transdisciplinary perspectives to engage academic and policy audiences. While RP7 investigates the broader housing crisis, focusing on economic disparities, the housing precariat, and trauma-informed design, RP11 contributes to the policy debate on energy justice and the equitable distribution of transition costs and benefits. Integrating RP7's insights on trauma-informed design into policy interventions could enhance the wellbeing of vulnerable households,

particularly those experiencing energy poverty, where stress and instability are known to exacerbate mental health issues.

RP12: Aspects of housing policies and their importance for affordability and sustainability

by Alex Fernández

Both RP11 and RP12 explore how financial and policy instruments shape housing affordability and sustainability. RP12 examines financial mechanisms, ESG frameworks, and fiscal incentives influencing social housing renovation, while RP11 focuses on governance structures, policy design indicators, and impact evaluations. Both studies analyse the distributional effects of housing policies and the tensions between affordability and sustainability, employing a mix of quantitative and qualitative methods. RP11 can draw from RP12's insights on the long-term distributional impact of short-term alleviation policies, considering how interventions such as subsidising private landlords for renovations may effectively reduce energy poverty in the short term but risk exacerbating inequality by channelling public funds to asset owners, making regulatory standards a potentially more equitable alternative.

RP12 Comparative analysis of policies for affordable and sustainable housing

Alex Fernández

The global transition toward low-emission economies has prompted European countries to implement a range of energy transition policies aimed at improving the energy efficiency of their housing stocks. These policies typically include subsidies for retrofitting and insulation, mandatory energy performance standards, tax credits for energy-efficient upgrades, green mortgages, and low-interest loans for renovations. Designed to reduce emissions and promote sustainability, such measures are intended to stimulate energy-efficient building renovations. However, their impact on housing affordability remains ambiguous, particularly amid growing inequalities in housing markets that continue to face persistent affordability challenges. This research focuses on energy transition policies, with a particular emphasis on their distributional effects across different household groups, examining who benefits most and who may be disadvantaged.

The study is divided into three distinct research lines, each addressing a specific aspect of the intersection between sustainability initiatives and housing affordability:

- **Taxes and subsidies for housing renovation:** Various taxation and subsidy scenarios are evaluated to assess their financial viability and distributional impacts on Dutch households. The focus lies on how these policy instruments affect the costs associated with energy-efficient home renovations.
- **Relations between house prices and consumption:** The effects of housing renovations on household consumption are examined with attention to variables such as age, tenure status, and housing quality. The analysis considers how energy efficiency improvements and changes in property values influence spending beyond housing.
- **Environmental, social, and governance (ESG) finance in social housing:** The tension between ESG finance and social housing decarbonisation is examined through a comparison of five European countries. The focus is on how ESG investment criteria either align with or contradict efforts to reduce emissions and ensure financial sustainability in the social housing sector.

In conclusion, this research aims to provide a comprehensive understanding of the complex relationship between energy efficiency initiatives and housing affordability. By examining the economic, social, and environmental dimensions, it seeks to inform the development of more equitable and effective strategies that promote both sustainable and affordable housing.

RESEARCH QUESTIONS

1. How will the energy transition impact homeowners' costs across various policy scenarios?
2. In what ways do house prices influence household consumption patterns across age groups, tenure types, and varying energy efficiency standards?
3. How does the implementation of ESG legislation affect financing mechanisms for decarbonising social rental housing?

EXPECTED OUTCOMES

By combining theoretical analysis with empirical research, this study aims to generate both conceptual insights and actionable strategies for policymakers, housing providers, and financial institutions. The anticipated contributions include:

- **Analytical frameworks:** Developing models to assess the financial and distributional impacts of housing renovation policies, considering various fiscal scenarios and household characteristics. These frameworks will help better understand the economic implications of energy-efficient renovations.
- **Policy Recommendations:** Providing evidence-based guidance for designing and implementing housing policies that balance sustainability objectives with housing affordability, ensuring that both goals are effectively integrated.
- **Comparative Insights:** Conducting cross-country analyses to explore how different housing markets respond to sustainability initiatives, with the aim of developing more targeted and effective policy interventions tailored to the unique challenges of each context.

RELATED CONCEPTS

: GREEN LAND VALUE TAX
 : HOUSING POLICY
 : HOUSING RETROFIT
 : VIABILITY

RELATED PROJECTS

RP6: Social housing policies in post-socialist countries

by Marko Horvat

RP6 and RP12 both explore housing policies in Europe, with a focus on affordability, sustainability, and the impact on vulnerable groups. RP6 analyses the evolution of housing policies in three post-socialist countries—Croatia, Slovakia, and Slovenia—, highlighting the challenges related to affordability and market instability following their transition to market economies. In contrast, RP12 examines the effects of energy efficiency policies on housing affordability, particularly in the context of energy renovations and their broader market impacts. Both studies employ comparative analysis across different countries, utilising qualitative methods such as policy reviews and expert interviews. Ultimately, both aim to develop housing policy by balancing sustainability and affordability, with a focus on creating more equitable housing systems.

RP7: Housing crisis and its impact on adequate housing

by Anna Martin

The two projects explore the complex relationship between housing policies, affordability, and social inequalities in Europe. RP7 delves into the social and political aspects of housing insecurity, highlighting how government policies and economic instability exacerbate housing precarity, especially for marginalised groups and the middle class. RP12 focuses on the effects of energy transition policies on housing affordability, exploring their distributional impacts across various household groups and their interaction with broader social and economic issues. Both emphasise the importance of developing inclusive and sustainable housing solutions that tackle both social and environmental challenges, advocating for policies that foster equity and resilience in housing systems.

RP11: Policy pathways towards energy poverty alleviation and a just transition

by Tijn Croon

Both projects address the intersection of energy transition policies, housing affordability, and social equity within the European context. RP11 focuses on tackling energy poverty, particularly how vulnerable groups such as low-income households are disproportionately affected by high energy prices and inefficient housing, while exploring policy interventions like subsidies and social housing to ensure a just transition to low-carbon housing. RP12 investigates the impact of energy-efficient housing policies on affordability, examining how different strategies like taxes and subsidies affect housing costs across various household groups and market dynamics. Together, these studies highlight the importance of designing policies that balance energy efficiency with affordability, ensuring that the shift to sustainable housing is equitable and accessible to all.

RP13 Neighbourhood commons spaces: Bridging everyday practices, design thinking and policy frameworks

Androniki Pappa

In recent decades, European cities have witnessed a decline in the function of 'the public', particularly concerning services and spaces. Privatisation and commodification have led to the deterioration of essential resources and rights, reducing their quality and accessibility and exacerbating social and physical exclusion, particularly for the most disadvantaged groups and neighbourhoods. In response, a growing number of active citizens are taking initiatives to provide themselves and their local communities with affordable and non-market access to goods and services, giving rise to urban commons initiatives. Through self-organisation, individuals assume temporary or permanent responsibility for their living environments, often through social and cultural initiatives conceptualised as neighbourhood commons spaces (NCSs). These range from urban farming projects and community-managed cultural and social centres to housing cooperatives and 'neighbour days', all contributing to the regeneration of vacant plots, parks sidewalks and underutilised buildings.

Rooted in principles of inclusion and solidarity, these collective actions depend on the voluntary commitment of engaged citizens, fostering social bonds and a sense of belonging. More broadly, they enable people to exercise their right to the city by actively shaping their built and social environment in sustainable, context-sensitive ways. In this regard, citizen participation in NCSs presents potential pathways for inclusive urbanism, particularly in disadvantaged contexts. This hypothesis is linked to two key research challenges that explore the role of NCSs in relation to:

- **Design-oriented practices:** While urban commons have been extensively studied from political and geographical perspectives, there is limited research on the role of space in shaping and sustaining the everyday practices of commoning within NCSs. From an urban design and planning perspective, further exploration is needed to understand NCSs as spatial practices—encompassing dialectical relationships between material and social dimensions—and to examine their implications for participatory design processes.
- **Emancipatory policies in urban regeneration:** The absence of formal frameworks and guidelines to protect NCS from market-driven pressures and urban threats presents a significant challenge. Often emerging from grassroots initiatives, NCSs frequently clash with existing planning regulations, leaving them vulnerable to displacement or co-optation by speculative interests. This contradiction is particularly striking at a time when international directives—such as the United Nations' Urban Agenda and the 2030 Agenda for Sustainable Development—advocate for local participatory policies that prioritise citizen involvement in decision-making processes that affect their neighbourhoods and daily lives.

Ultimately, this research examines NCSs as both spatial and political practices, emphasising their role in participatory urbanism. While widely studied from political and geographical perspectives, their spatial dimensions and influence on design processes remain underexplored. Additionally, the absence of formal frameworks leaves NCSs vulnerable to displacement, despite international policies promoting citizen participation. By bridging everyday experiences, participatory design, and progressive policies, this study highlights the potential of NCSs in fostering inclusive urbanism, particularly in crisis-affected and disadvantaged contexts.

RESEARCH QUESTIONS

1. What are the implications of theorising NCSs as spatial practices?
 - a. How can NCSs be defined?
 - b. What factors enable or hinder their existence and sustainability, and how do these factors manifest spatially?
2. How can the spatiality of NCSs influence design-thinking?
 - a. What are the spatial and programmatic typologies of NCSs?
 - b. What design principles can be derived from NCSs ?
 - c. How can a roadmap for designing NCSs be developed ?
3. Can NCS be institutionally supported to ensure long-term sustainability?
 - a. If so, in what form?
 - b. Conversely, how can NCSs inform and shape policy frameworks?

EXPECTED OUTCOMES

By integrating theoretical analysis with practical application, this research aims to generate both conceptual insights and actionable strategies for communities, design professionals, and policymakers to support the transformation of neighbourhood public spaces into NCS that are managed by and for local residents.

The three key contributions expected from the research are:

- **An analytical framework for defining NCSs as spatial practices** that is grounded in theoretical foundations and informed by international case studies of on-the-ground initiatives.
- **A design process that supports the creation of NCSs** by providing practical methodologies to guide their development and implementation.
- **Empirical validation of the BIP/ZIP programme in Lisbon**, a municipal policy promoting bottom-up interventions in priority neighbourhoods, which will assess its effectiveness in facilitating and sustaining NCSs.

RELATED CONCEPTS

: COLLABORATIVE GOVERNANCE
 : DIRECT ACTION
 : NEW MUNICIPALISM
 : PARTICIPATORY APPROACHES
 : PLACEMAKING
 : PUBLIC-CIVIC PARTNERSHIP
 : SOCIAL SUSTAINABILITY
 : SPATIAL AGENCY
 : THIRD PLACE
 : URBAN COMMONS
 : URBAN INFORMALITY

RELATED PROJECTS

RP8: Urban living labs for planning: Experimentation at the neighbourhood level

by Andreas Panagidis

RP8 and RP13 both explore neighbourhood-level initiatives that promote social sustainability through collaborative approaches. While RP13 examines neighbourhood commons spaces as the physical and social manifestations of community engagement, RP8 investigates urban living labs as methodological frameworks for facilitating such engagement. Both projects share a fundamental interest in how communities shape their environments and how social infrastructure develops at the neighbourhood scale. RP8's focus on experimental planning methods and organisational structures complements RP13's research on the emergence and sustainability of NCS. Both studies examine the interplay between physical spaces and social processes, as well as strategies for fostering collaboration between municipalities, citizens, and urban actors. RP8's insights into social infrastructure resources could enhance the understanding of how neighbourhood commons function as community interaction hubs. Conversely, RP13's research on the spatial aspects of commons could inform the physical implementation of living labs, strengthening their role as participatory urbanism tools.

RP9: A pedagogy of the commons: The co.design.build housing studio

by Effrosyni Roussou

While RP13 examines commons spaces from a practice-oriented perspective, RP9 focuses on educating future professionals about commons-based approaches. This complementary relationship is valuable for both understand-

ing the practical implementation of commons initiatives and training professionals to support them effectively. RP9 challenges traditional architectural education by promoting participatory design and co-creation methods, aligning with RP13's interest in how design professionals can better support community-led initiatives. Exploring academic institutions as commoning spaces provides valuable insights into how institutional support for neighbourhood commons can be structured. Both projects bridge theory and practice in commons-based approaches but from different angles: RP13 examines existing practices and develops frameworks, while RP9 focuses on pedagogies that prepare future professionals to engage with commons initiatives effectively. Potentially, the research of RP13 could inform the curriculum of the co.design build studio by providing case studies and best practices for designing and building housing projects that incorporate neighbourhood commons and promote community interaction.

RP10: Community participation in housing: The case of Catalonia's grant-of-use cooperatives

by Zoe Tzika

Both RP10 and RP13 focus on how communities create alternatives to market-driven development by means of self-organisation and democratic governance. RP10's analysis of housing cooperatives fostering sustainable lifestyles, mutual support, and communal living aligns with RP13's investigation of how neighbourhood common spaces empower communities to shape their environments in sustainable, context-sensitive ways. Both studies share an interest in public-community collaborations, strategies to protect these initiatives from market pressures, and the broader policy implications of commons-based models. Additionally, the mixed-methods approach of RP10, which examines both the physical and social dimensions of cooperative housing, parallels RP13's focus on the dialectical relationship between material and social dynamics in commons spaces, reinforcing their shared emphasis on participatory urbanism. Ultimately, the diversity of governance models explored in housing cooperatives and neighbourhood commons spaces, respectively, offers a mutually enriching learning environment and expands both research fields with new tools and approaches.

RP14 The use of industrialised construction methods and design strategies to achieve flexible and sustainable mass-customised housing

Carolina Martín

Mass customisation (MC) is an evolving production method that integrates personalised design with the cost efficiency of large-scale manufacturing. It aligns with the principles of adaptable housing, where dwellings are designed to evolve over time, giving residents greater control over their living spaces. Industrialised construction (IC) enhances MC by optimising processes, standardising components, and achieving economies of scale.

The current housing stock is often unable to accommodate the diverse and changing needs of households. Integrating MC in multifamily housing could create more adaptable, affordable, and sustainable living environments. However, this remains largely unexplored due to challenges such as limited component standardisation, slow digital integration, and fragmented industry practices. A central issue for enabling MC in multifamily housing is the development of a product platform that connects building components with varying degrees of customisation. The position of the decoupling point—the stage in the value chain where production shifts from standardised to customised elements—determines the degree of flexibility that can be offered to residents and influences the overall manufacturing strategy.

This project explores the application of MC in multifamily housing through the lens of product platforms, focusing on design strategies, IC methods, key challenges, and best practices. A comparative case study of multifamily projects nominated for the EU Mies Award will evaluate design flexibility, manufacturing efficiency, and construction resilience. Four selected European projects, each exemplifying a different degree of customisation, will undergo an in-depth analysis to assess their kit-of-parts systems and adaptability. The research will apply a multi-criteria decision analysis to develop strategies for integrating MC into a multifamily housing project at Grupo CASAIS. Stakeholder workshops will be conducted to evaluate the feasibility, implementation challenges, and potential for broader application of these strategies.

RESEARCH QUESTIONS

1. What design, production, and assembly factors are critical to implement mass customisation in affordable and sustainable multifamily housing?
2. How can industrialised construction systems support customisable design strategies at different scales or components of a building, particularly in relation to interior spaces?
3. How can a holistic framework evaluate design flexibility, manufacturing

efficiency, and construction resilience in multifamily housing through an integrated, multidisciplinary analysis?

4. How can the level of interior layout customisation in multifamily housing be assessed and enhanced using a product platform, while maintaining affordability and sustainability?

EXPECTED OUTCOMES

By integrating design strategies, IC methods, and a multidisciplinary assessment framework, the study will provide insights into the feasibility and benefits of MC in affordable and sustainable housing. The findings will support decision-making processes, promote adaptable housing solutions, and enhance collaboration among key actors in the construction industry, including:

- **Framework development:** A set of indicators to guide the implementation of MC in housing internal layouts, tailored for various stakeholders in the construction sector.
- **Assessment methodology:** A combined approach incorporating a classification of building components and design strategies at different building layers, alongside their degrees of customisation. This methodology will be applied to EU Mies Award projects to identify trends from past decades.
- **Case study analysis:** A comparative evaluation of four multifamily housing projects with varying degrees of customisation, assessing their design flexibility, manufacturing efficiency, and construction resilience. This will include an analysis of four distinct IC systems, highlighting bottlenecks, design processes, and technological enablers.
- **Implementation strategies:** Development of targeted improvement strategies for integrating MC in a multifamily housing project at CASAIS. These strategies will be tested and refined through stakeholder workshops.

RELATED CONCEPTS

- : CO-CREATION
- : DESIGN FOR DISASSEMBLY
- : FLEXIBILITY
- : LIFE-CYCLE ASSESSMENT
- : MASS CUSTOMISATION
- : OPEN BUILDING
- : PARTICIPATORY APPROACHES
- : PRODUCT PLATFORM

RELATED PROJECTS

RP1: Circular industrialised housing: A process framework

by Annette Davis

Both RP1 and RP15 projects explore innovative solutions using industrialised construction to improve sustainability, affordability, and flexibility of housing. While RP15 investigates mass customisation in multifamily housing, focusing on product platforms that balance component variety with user needs, RP1 examines circular housing through industrialised construction and design for disassembly to minimise waste and embodied carbon. Both emphasise building lifespan analysis, component and connection standardisation, and stakeholder collaboration to address industry fragmentation. Mass customisation seeks to create housing that is adaptable to various needs, maintaining efficiency through flexible yet standardised components. In contrast, design for disassembly extends a building's life by facilitating easy breakdown, reuse, and material recovery. By combining mass customisation with circular construction practices, housing resilience can be improved through reduced waste, lower embodied carbon, and enhanced long-term adaptability. The product platform approach in mass customisation also supports standardisation for disassembly, making housing solutions more versatile over time.

RP15 Assessing social value through post-occupancy evaluation

Leonardo Ricaurte

This research project aims to contribute to the growing field of social value measurement in the built environment. By focusing on housing—its design and its influence within the neighbourhood—the project critically examines the conceptualisation of social value in the built environment, particularly in the context of the UK's Public Services (Social Value) Act. It addresses existing theoretical gaps and proposes a complementary study underpinned in Amartya Sen's Capability Approach, emphasising the role of housing as a conversion factor that enables residents to lead lives they value and can flourish in. To this end, the study explores the spatial dimension of housing and its capacity to enhance living standards. This aspect is particularly relevant in the context of the housing-led regeneration, renovation, and retrofitting of the existing housing stock in Europe.

For newly built and renovated housing to be truly sustainable, the social dimension of sustainability must be fully integrated into planning, decision-making and outcome evaluation. Achieving this requires the active involvement of communities and residents. Thus, a holistic approach to assessing social value should be people-centred, focusing on the extent to which residents' capabilities are expanded. This includes taking into account factors such as agency, control and choice, which are pivotal in shaping individual life trajectories.

To achieve these aims, a case study methodology is employed, with a particular focus on large social housing providers. The case studies offer insights into how social value is defined, procured, and measured, as well as the impact of current organisational practices on residents' lives. A transdisciplinary approach is adopted to ensure that the various roles, processes, and tensions that influence decision-making in the housing sector are all included. Consequently, semi-structured interviews with residents of housing estates are conducted, along with engagement with practitioners and staff from housing associations.

A capability-based post-occupancy evaluation (POE) is introduced as the primary method for analysing the relationship between spatial design, housing management, and wellbeing. This approach enables a more comprehensive understanding of the social value generated by housing providers, architects, and local authorities. It is particularly valuable in developing intangible and often overlooked long-term outcomes.

The findings of this research are relevant to a broad audience, including policy-makers and practitioners working in social value and housing. In addition, housing providers, architects and designers will gain deeper insights into how design and management decisions affect the quality of life of their tenants.

RESEARCH QUESTIONS

1. What national measures can be implemented to promote the utilisation of POE?
2. Should the integration of POE be mandated in national policies or guidelines?
3. Should POE be a prerequisite for government funding of new housing developments?

EXPECTED OUTCOMES

The following expected outcomes provide a framework for assessing social value in housing and enhancing policy and practice:

- **Conceptual framework development:** Establish the Capability Approach as a robust framework for evaluating social value in the built environment, with housing as a critical conversion factor shaping residents' opportunities and wellbeing.
- **Methodological innovation:** Develop a participatory methodology to assess social value with residents, emphasising the long-term effects of housing design and management on quality of life.
- **Post-occupancy evaluation advancement:** Refine POE as a transdisciplinary method to assess social value and create learning loops for housing practitioners, policymakers, and designers.
- **Design and management insights:** Systematically identify, categorise, and analyse housing block-scale design features that most significantly influence residents' quality of life.

RELATED CONCEPTS

- : AFFORDABILITY
- : CAPABILITY APPROACH
- : COLLABORATIVE GOVERNANCE
- : COMMUNITY-LED HOUSING
- : DELIBERATIVE DEMOCRACY
- : HOUSING RETROFIT
- : POST-OCCUPANCY EVALUATION
- : PARTICIPATORY APPROACHES
- : SOCIAL VALUE
- : THIRD PLACE

RELATED PROJECTS

RP2: Upgrading social housing to meet the socio-economic needs of today's dwellers: A framework for sustainable retrofit

by Saskia Furman

Both RP15 and RP2 examine the challenges of balancing top-down decision-making with resident-driven approaches in social housing. RP15 assesses social value through post-occupancy evaluation (POE) to ensure housing interventions enhance residents' wellbeing, while RP2 investigates how resident participation improves the effectiveness of retrofit projects. Both underscore the importance of integrating tenants' lived experiences into decision-making to achieve truly sustainable housing outcomes. RP2's focus on resident involvement in retrofitting aligns with RP15's capability-based POE approach, reinforcing the need for resident-centred regeneration efforts. By recognising tenants as experts in their own living environments, both studies offer valuable insights for housing providers seeking to balance regeneration, retrofitting, and affordability while prioritising social sustainability and meaningful resident engagement.

RP8: Urban living labs for planning: Experimentation at the neighbourhood level

by Andreas Panagidis

RP15 and RP8 contribute to the discourse on community-led governance, social sustainability, and innovative methods for assessing housing outcomes. While RP15 employs POE to evaluate long-term social value of housing, RP8 explores urban living labs (ULLs) as experimental frameworks for fostering collaborative governance at the neighbourhood level. Both highlight the significance of stakeholder engagement in shaping housing policies and urban planning.

RP8's examinations of co-creation between municipalities, citizens, and urban actors complements RP15's emphasis on participatory housing management. By exploring POE and ULLs, these studies demonstrate how long-term assessment tools and experimental governance models support sustainable, community-led placemaking. RP15's capability-based POE could serve as a useful evaluation method for RP8, offering insights into how collaborative governance in housing affects residents' wellbeing and agency.

RP10: Community participation in housing: The case of Catalonia's grant-of-use cooperatives

by Zoe Tzika

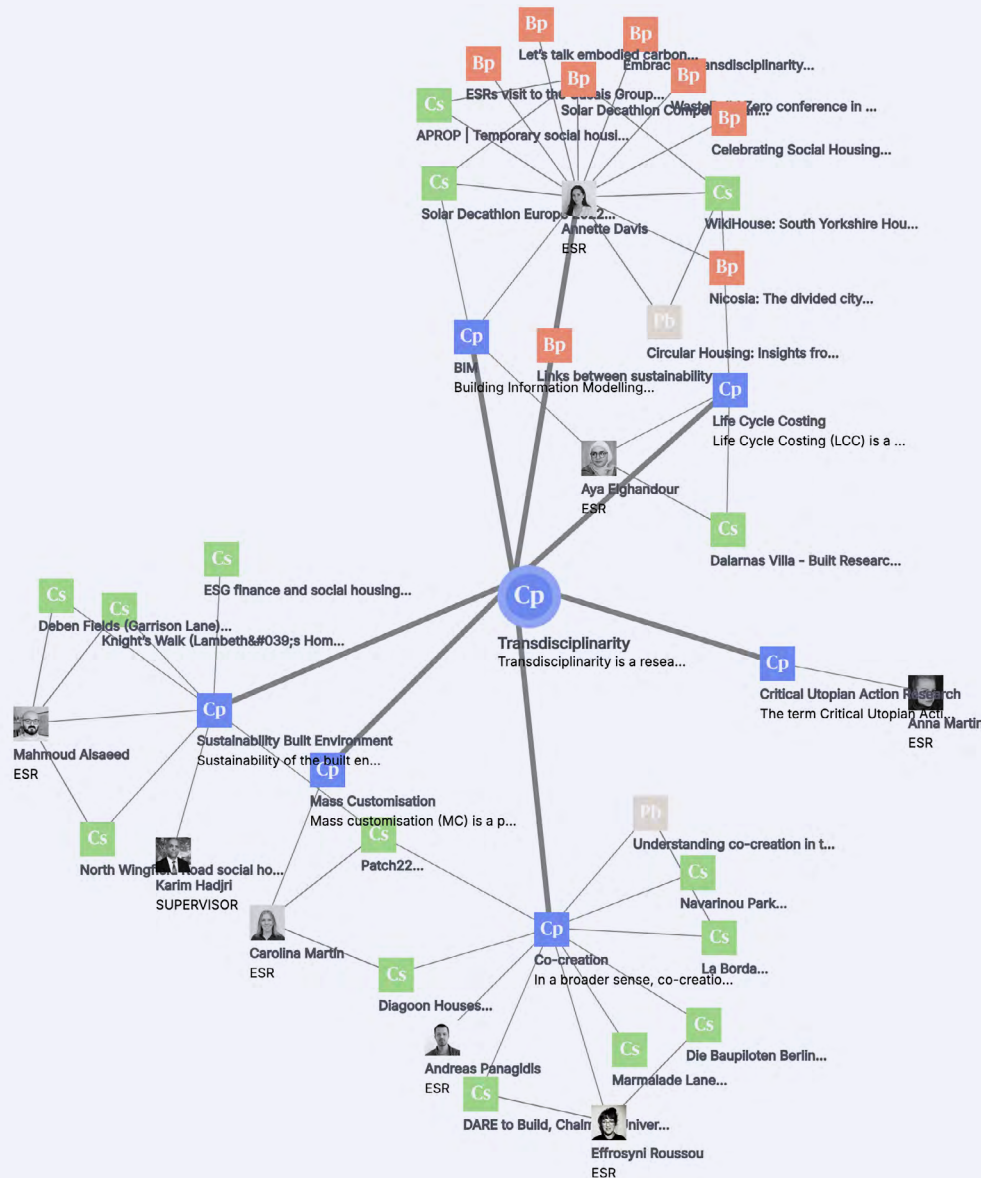
RP15 and RP10 share a theoretical foundation in the Capability Approach, viewing housing as a means to expand individuals' opportunities and freedoms in order to lead fulfilling lives. While RP15 applies this perspective to social housing providers through POE, RP10 examines how cooperative housing models empower residents through communal living and self-management. Both studies emphasise the need for inclusive governance frameworks that incorporate residents' aspirations into housing decision-making. Additionally, RP10's analysis of partnerships between housing cooperatives and public institutions aligns with RP15's focus on local community-based organisations in articulating tenants' needs within large housing providers. By bridging social value assessment with collaborative housing models, these studies contribute to the broader discourse on resident-led governance, sustainable housing practices, and multi-stakeholder collaboration in developing alternative housing solutions. RP10's insights on co-production and shared governance could further enrich RP15's methodological approach to evaluating social value in housing estates.

3.2

Collaborative knowledge building

Selected content from the concepts, cases, and challenges repositories, which together form the core of RE-DWELL's transdisciplinary knowledge framework.

Vocabulary



Concept-centred network map illustrating collaborative knowledge construction in RE-DWELL, with *Transdisciplinarity* as a key node linking ESRs, case studies, blog entries, and related conceptual themes.

Introduction

The RE-DWELL vocabulary constitutes a key instrument for the systematic collection, organisation, and sharing of knowledge across the network, supporting the integration of diverse disciplinary perspectives and expertise in addressing the complex challenges of affordable and sustainable housing. Developed progressively over the network's three-year lifespan, it is the result of researchers distilling key concepts from their individual research projects and articulating them within a coherent and shared conceptual framework.

In an interdisciplinary knowledge-construction environment—where researchers from architecture, urban planning, economics, social sciences, and sustainable management collaborate—the absence of a shared terminology can hinder effective communication and collaboration. The RE-DWELL vocabulary supports ESRs in engaging with differing perspectives, priorities, and methods across disciplinary boundaries.

More than a communication tool, the vocabulary serves as a learning and research resource. It synthesises research findings into clearly defined, transferable concepts and helps researchers articulate their broader relevance. By making disciplinary assumptions explicit and offering shared reference points, it fosters mutual understanding, encourages engagement with unfamiliar ideas, and strengthens collaboration on housing-related challenges.

Beyond knowledge sharing, the vocabulary plays a critical role in transdisciplinary knowledge production. By using the vocabulary to organise, connect, and reinterpret concepts around shared problems, values, and objectives, participants engaged in transdisciplinary dialogue—including academics, professionals, and other stakeholders—can reveal underlying relationships and support deeper analytical and reflective engagement beyond academic research.

VOCABULARY

A

: Affordability
: Asset-based Welfare

B

: BIM
: Building Decarbonisation

C

: Capability Approach
: Circular Economy
: Co-creation
: Collaborative Governance
: Collaborative Housing
: Collaborative Planning
: Community Empowerment
: Community-led Housing
: Critical Utopian Action Research

D

: Deliberative Democracy
: Design Activism
: Design for Disassembly
: Direct Action

E

: Ecosocial Policy
: Energy Communities
: Energy Poverty
: Energy Retrofit
: Environmentally Sustainable Social Housing

F

: Financial Wellbeing
: Financialisation
: Flexibility
: Framework

G

: Grant-of-use Cooperative Housing
: Green Land Value Tax

H

: Homelessness
: Housing Affordability
: Housing Allowance
: Housing Governance
: Housing Policy
: Housing Quality
: Housing Regime
: Housing Retrofit

I

: Indoor Thermal Comfort
: Industrialised Construction

J

: Just Transition

L

: Life-Cycle Assessment
: Life-Cycle Costing

M

: Mass Customisation
: Measuring Housing Affordability

N

: New Municipalism

O

: Open Building

P

: Participatory Approaches
: Path Dependence
: Performance Gap in Retrofit
: Placemaking
: Post-occupancy Evaluation
: Prebound Effect
: Precariat
: Product Platform
: Public-civic Partnership

S

: Social Housing
: Social Infrastructure
: Social Innovation
: Social Sustainability
: Social Value
: Spatial Agency
: Sustainability
: Sustainability Built Environment

T

: Targeted Universalism
: Techno-optimism
: Thermal Insulation & Airtightness
: Third place
: Transdisciplinarity
: Trauma Informed Design

U

: Urban Commons
: Urban Informality

V

: Viability

W

: Window Guidance

Using the RE-DWELL Vocabulary as a tool for interdisciplinary knowledge production in housing research

Lucia Chaloin, Andreas Panagidis, Androniki Pappa, Effrosyni Roussou and Zoe Tzika

To elicit the knowledge embedded within the vocabulary, a structured approach to organising concepts is essential. According to Tassoul and Buijs (2007, p. 17)¹, clustering is “about expanding knowledge, about connecting ideas, and connecting ideas to problem statements (*how* does it solve our problem?), functionalities (*why* and *how* is it of interest?), and values and consequences. It is about making connections and building a shared understanding, in other words about ‘making sense’ of a seemingly random collection of independent ideas or suggestions”. These authors distinguish four types of clustering: object, morphological, functional, and gestalt. In the following exercise, we apply three—object, gestalt and functional—to explore the concepts embedded in the interdisciplinary RE-DWELL vocabulary on affordable and sustainable housing, organised into five clusters:

Cluster 1 is based on object clustering, a process of organising ideas according to observable characteristics, often before fully understanding their deeper relevance. It serves as a preliminary step to prompt reflection and reveal deeper connections between concepts. In this case, the cluster pathway begins by grouping key concepts from the vocabulary into six domains: financing and economics; policy and governance; community and social issues; design, planning and construction; research and evaluation, and finally, environmental and resource management. Together, these provide a structured overview of affordable and sustainable housing.

Cluster 2 adopts an inductive, synthesis-driven approach based on the gestalt clustering technique, a creative strategy for organising ideas that emphasises integration over separation. Unlike object clustering, which groups distinct elements based on similarity, gestalt clustering seeks to fuse concepts into a cohesive whole where the resulting insight is greater than the sum of its parts. The process starts with a core concept—the capability approach—and builds outward by assembling related terms in an interconnected collage-like structure. This way, relationships grounded in meaning, lived experience, and metaphor are prioritised over formal categorisation.

Cluster 3 uses functional clustering, a method that organises solutions not by shared characteristics but by the specific strategies and purposes they employ to address a central problem. This cluster begins by distinguishing terms according to their methodological roles (processes and methods) and their intended goals (intentions and outcomes). This distinction enables a problem-oriented analysis that foregrounds

collaborative methods as key tools for challenging dominant, profit-driven housing models. In this context, the vocabulary is not merely descriptive—it becomes a practical guide for advancing alternative, purpose-driven housing strategies that prioritise social and community values.

Cluster 4 also employs functional clustering, building on this pragmatic perspective through the example of Rural Studio. This architectural education programme exemplifies how ethical challenges and social engagement can be integrated into design processes, effectively bridging the gap between academic ideals and real-world constraints. Key vocabulary concepts are used to analyse the project and explore how theoretical ideas are put into practice.

Cluster 5 extends the enquiry into applied contexts by addressing the challenge of repurposing vacant buildings into affordable housing. It frames this issue as a multifaceted problem, weaving together various vocabulary entries that highlight the interconnected legal, economic, and social considerations involved. While not strictly following a single clustering method, this cluster incorporates both object-based and functional elements by grouping relevant terms around a shared practical objective.

In essence, this collaborative exercise demonstrates how different clustering techniques can reveal diverse dimensions of meaning within the RE-DWELL vocabulary, providing a structured approach for its use in research, teaching, and practice.

CLUSTER 1: THE TRANSDISCIPLINARY NATURE OF AFFORDABLE AND SUSTAINABLE HOUSING

Object clustering is a method of organising concepts based on observable, surface-level characteristics, without initially prioritising deeper relational connections. Although this method may seem intuitive or preliminary, it serves as a critical reflective step: uncovering underlying assumptions, identifying potential gaps, and supporting more deliberate idea development.

Instead of strictly following the project's initial three research areas—Design, Planning and Building; Community Participation; and Policy and Financing—or assuming that the vocabulary naturally reveals its own inherent structure, object clustering helps establish a shared framework for understanding how the social, economic, environmental, and political dimensions of housing intersect. This framework consists of six subclusters and serves as a foundation for the more relational and synthesis-driven analyses introduced in the subsequent clusters.

Financing and economics

The first subcluster of terms focuses on housing affordability and its challenges from multiple perspectives. It includes core concepts such as **AFFORDABILITY**, **HOUSING AFFORDABILITY**, and **MEASURING HOUSING AFFORDABILITY**, which define and

¹ Tassoul, M., & Buijs, J. (2007). Clustering: An essential step from diverging to converging. *Creativity and Innovation Management*, 16(1), 16–26.

quantify the relationship between housing costs and household income. The cluster expands to encompass aspects of economic stability and wellbeing through concepts like **FINANCIAL WELLBEING** and **WINDOW GUIDANCE AFFORDABILITY**, ensuring context-specific affordability considerations.

This group of concepts also includes systemic financial mechanisms related to the **FINANCIALISATION** of housing, highlighting alternative financing models such as **GRANT-OF-USE COOPERATIVE HOUSING**, alongside support measures like **HOUSING ALLOWANCES** and **GREEN LAND VALUE TAX**. Long-term economic sustainability is represented through terms like **VIABILITY** assessments and **LIFE-CYCLE COSTING**, emphasising the importance of sustaining affordability solutions over time.

Policy and governance

This cluster represents the institutional structures that shape housing development and management. It encompasses policy frameworks and strategies that integrate multiple objectives, ranging from traditional **HOUSING POLICY** to innovative **ECOSOCIAL POLICIES** that combine environmental and social goals, as well as policies targeting disadvantaged groups, such as **TARGETED UNIVERSALISM**.

Governance is a central theme, encompassing terms such as **HOUSING REGIME** and **HOUSING GOVERNANCE**, which are key for creating and implementing housing policies. The cluster also includes **COLLABORATIVE GOVERNANCE** and **DELIBERATIVE DEMOCRACY**, reflecting a shift towards more inclusive and participatory decision-making processes. Additionally, the growing significance of local-level governance in tackling housing challenges is captured through terms linked to the **NEW MUNICIPALISM** movement and **PUBLIC-CIVIC PARTNERSHIPS**.

Community and social issues

This cluster focuses on social dynamics and community engagement in housing, addressing processes, mechanisms, and impacts. It includes collaborative processes—such as **PARTICIPATORY APPROACHES** and **COLLABORATIVE HOUSING**—social equity strategies such as **SOCIAL HOUSING** and **ASSET-BASED WELFARE**, and social equity frameworks like the **CAPABILITY APPROACH** and human-centered, **TRAUMA-INFORMED DESIGN**. Community-driven initiatives, including **COMMUNITY-LED HOUSING**, **URBAN COMMONS**, and **URBAN INFORMALITY**, are also central elements of this cluster.

Social qualities that drive positive change—such as social **SUSTAINABILITY**, **SOCIAL VALUE**, **COMMUNITY EMPOWERMENT**, and **SOCIAL INNOVATION**—are represented, often realised through community spaces that foster interaction and cohesion, including **THIRD PLACES** and **SOCIAL INFRASTRUCTURE**. Finally, the cluster addresses critical social challenges, including **HOMELESSNESS**, the **PRECARIAT**, and **ENERGY POVERTY**, highlighting the intersections between social, economic, and environmental sustainability.

Design, planning and construction

The fourth cluster comprises concepts related to building and urban design, focusing on affordability and sustainability. It is characterised by design **FLEXIBILITY**, including principles such as **OPEN BUILDING** and **DESIGN FOR DISASSEMBLY**, alongside approaches like **INDUSTRIALISED CONSTRUCTION** and **MASS CUSTOMISATION**, enabled by technological advances in **PRODUCT PLATFORMS** and **BIM**. Several concepts connect technical and social considerations in design such as **CO-CREATION**, **PLACE-MAKING**, **DIRECT ACTION**, **DESIGN ACTIVISM**, and **SPATIAL AGENCY**, which also serve as a bridge between clusters three and four.

Research and evaluation

This cluster provides essential methodological frameworks and analytical tools for advancing both theoretical understanding and practical implementation in sustainable and affordable housing. At its core, it underscores the importance of integrated knowledge production and systematic evaluation methods that bridge theory and practice across—and beyond—disciplinary boundaries. It encompasses research paradigms and methodologies, such as **TRANSDISCIPLINARITY** and **CRITICAL UTOPIAN ACTION RESEARCH**, as well as conceptual approaches like path dependence and **TECHNO OPTIMISM**. Impact evaluation is addressed through terms like **HOUSING QUALITY** and methods including **LIFE-CYCLE ASSESSMENT**, **POST-OCCUPANCY EVALUATION**, and associated **FRAMEWORKS**.

Environmental and resource management

This cluster addresses aspects of environmental performance. Terms such as **ENVIRONMENTALLY SUSTAINABLE SOCIAL HOUSING**, **BUILT ENVIRONMENT SUSTAINABILITY**, and **JUST TRANSITION** highlight how housing can respond to environmental challenges while also meeting social and economic responsibilities. Resource and energy considerations form a substantial part of this cluster, encompassing both social equity and technical performance. Relevant concepts cover building performance—such as **THERMAL INSULATION AND AIR TIGHTNESS**, and **INDOOR THERMAL COMFORT**—as well as energy strategies aimed at reducing greenhouse gas emissions, including **ENERGY RETROFIT**, **HOUSING RETROFIT**, and **BUILDING DECARBONISATION**. The cluster also captures the complexities of achieving predicted energy performance improvements through terms like the **PREBOUND EFFECT** and **PERFORMANCE GAP IN RETROFIT**. Finally, **ENERGY COMMUNITIES**, **CIRCULAR ECONOMY**, and **URBAN COMMONS** point to collective approaches to energy and resource management.

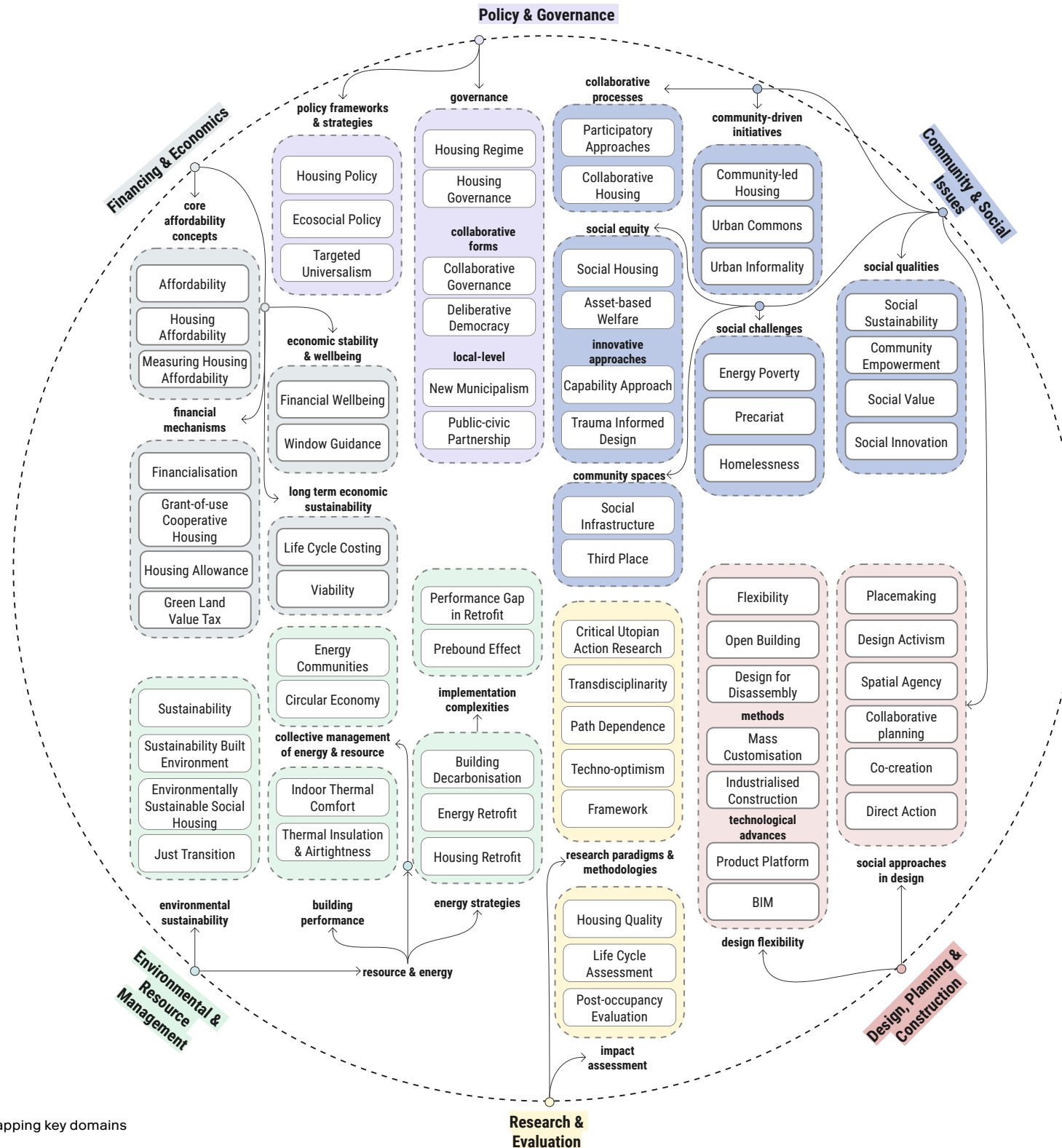


FIGURE 3.2.1: Object clustering: Mapping key domains

CLUSTER 2: HOUSING AS CAPABILITY: REFRAMING AFFORDABILITY THROUGH SHARED VALUES

Gestalt clustering involves grouping concepts based on their emergent interconnections and shared underlying meanings. Applied to the vocabulary, it allows us to see how terms like **AFFORDABILITY**, **CAPABILITY APPROACH**, **COMMUNITY EMPOWERMENT**, and **CO-CREATION** form a conceptual whole. Each term gains deeper meaning when understood in relation to the others, revealing a shared concern for human wellbeing, agency, and justice in the context of housing. Through gestalt clustering, we are able to uncover the underlying structure and coherence of this domain, making visible the values and logics that connect technical, social, and ethical dimensions of sustainable and affordable housing.

This cluster reflects a comprehensive understanding of housing—one that moves beyond technical and physical attributes. Housing is not merely seen as shelter or infrastructure, but as a multidimensional space that encompasses people's aspirations, household composition, lived experiences, and overall wellbeing. This perspective integrates both tangible and intangible elements that collectively shape how housing impacts human life.

A central concept in this cluster is **AFFORDABILITY**, a pivotal focus of RE-DWELL's research programme. While conventional definitions of **HOUSING AFFORDABILITY** rely on financial metrics—typically assessing the ratio of housing costs to household income, a broader approach recognises that affordability must also encompass dimensions of wellbeing, security, and access to opportunities. When housing is holistically affordable, it enables individuals and families to allocate their resources—whether financial, emotional, or social—towards personal development, community engagement, and life satisfaction.

This holistic perspective directly aligns with the **CAPABILITY APPROACH**, which reframes affordability beyond economic efficiency toward human development. The capability approach focuses not just on the resources people hold, but on the real freedoms they have to pursue the lives they value. It accounts for material and non-material conditions—such as dignity, justice, and autonomy—and views wellbeing as a function of the opportunities people can access and realise.

In this framing, the individual is not seen in isolation, but rather as embedded within complex networks of relationships—familial, social, and institutional. These networks form a kind of social humus—a relational environment that can either nourish or constrain an individual's ability to develop and exercise their capabilities. Here, **COMMUNITY EMPOWERMENT** becomes a central process: enabling people to shape their environments and claim agency in housing production and policy.

This is exemplified by **GRANT-OF-USE COOPERATIVE HOUSING**, **COLLABORATIVE HOUSING**, and other **CO-CREATION** models, where residents are involved in the design, planning, and governance of their dwellings. These models build both technical and social capacities, empowering participants to shape not only their own homes but

also neighbourhoods and cities at large. These practices address today's interconnected urban challenges—affordability, sustainability, inclusion, and social cohesion—not merely through provision but through collective engagement and share agency.

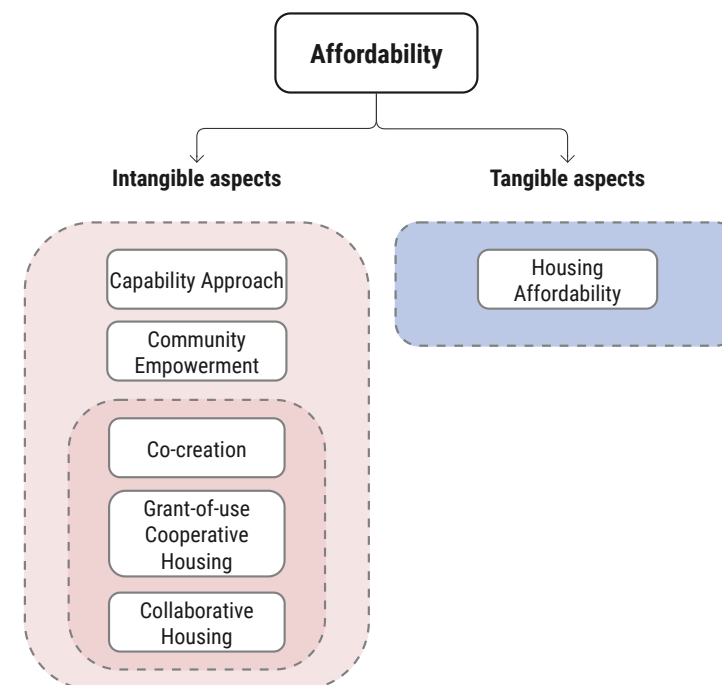


FIGURE 3.2.2: Gestalt clustering: Integrative synthesis around the capability approach.

CLUSTER 3: PATHS AND PURPOSES IN SUSTAINABLE HOUSING SOLUTIONS

Functional clustering organises concepts based on their roles, purposes, or strategies in addressing a particular problem—in this case, the provision of affordable and sustainable housing. Accordingly, vocabulary concepts are grouped into two functional categories that reflect their roles in tackling housing challenges:

- Processes and methods (paths): The ways housing challenges are approached.
- Intentions and outcomes (purposes): The goals and desired impacts of these efforts.

This functional perspective helps map the broader solution space for affordable and sustainable housing by showing not only what solutions exist, but how they work and what they aim to achieve.

Processes and methods

These five terms illustrate different ways of engaging stakeholders and organising action:

- **CO-CREATION** describes collaborative efforts among citizens, professionals, and organisations, emphasising shared decision-making and citizen empowerment.
- **COLLABORATIVE GOVERNANCE** refers to the joint management of public issues by government bodies and non-governmental actors through collective decision-making.
- **JUST TRANSITION** focuses on guiding the shift toward a sustainable economy in a way that is fair and inclusive, considering social and environmental changes.
- **PARTICIPATORY APPROACHES** involve engaging community members and other stakeholders in decision-making to ensure outcomes reflect their needs and priorities.
- **PLACEMAKING** is the collaborative shaping of public spaces to enhance health, happiness, and social cohesion by leveraging community assets.

Intentions and outcomes

These five terms reflect the goals and results that the above processes aim to realise:

- **CIRCULAR ECONOMY** promotes resource reuse and waste minimisation through closed-loop systems that reduce environmental impact.
- **COMMUNITY-LED HOUSING** involves housing projects initiated and governed by local residents to meet community-specific needs affordably.
- **COLLABORATIVE HOUSING** includes a variety of shared housing models that combine different governance and ownership arrangements, including some commercial initiatives.
- **ENERGY COMMUNITIES** are groups producing and managing renewable energy locally to improve sustainability and energy independence.
- **URBAN COMMONS** are community-managed shared resources, such as public spaces or housing, emphasising cooperation and equitable access.

The interrelationships among concepts within each subcluster reveal possible avenues for critical reflection and practical engagement. This way of organising the vocabulary helps uncover strategies that can be further developed by linking related ideas, opening up new possibilities for combining and adapting existing

approaches. It also highlights where gaps remain—areas that may require fresh methods or innovative thinking. Above all, it supports a shift toward practical, purpose-driven action by focusing on what the concepts do in context, foregrounding use, adaptation, and relational effects.

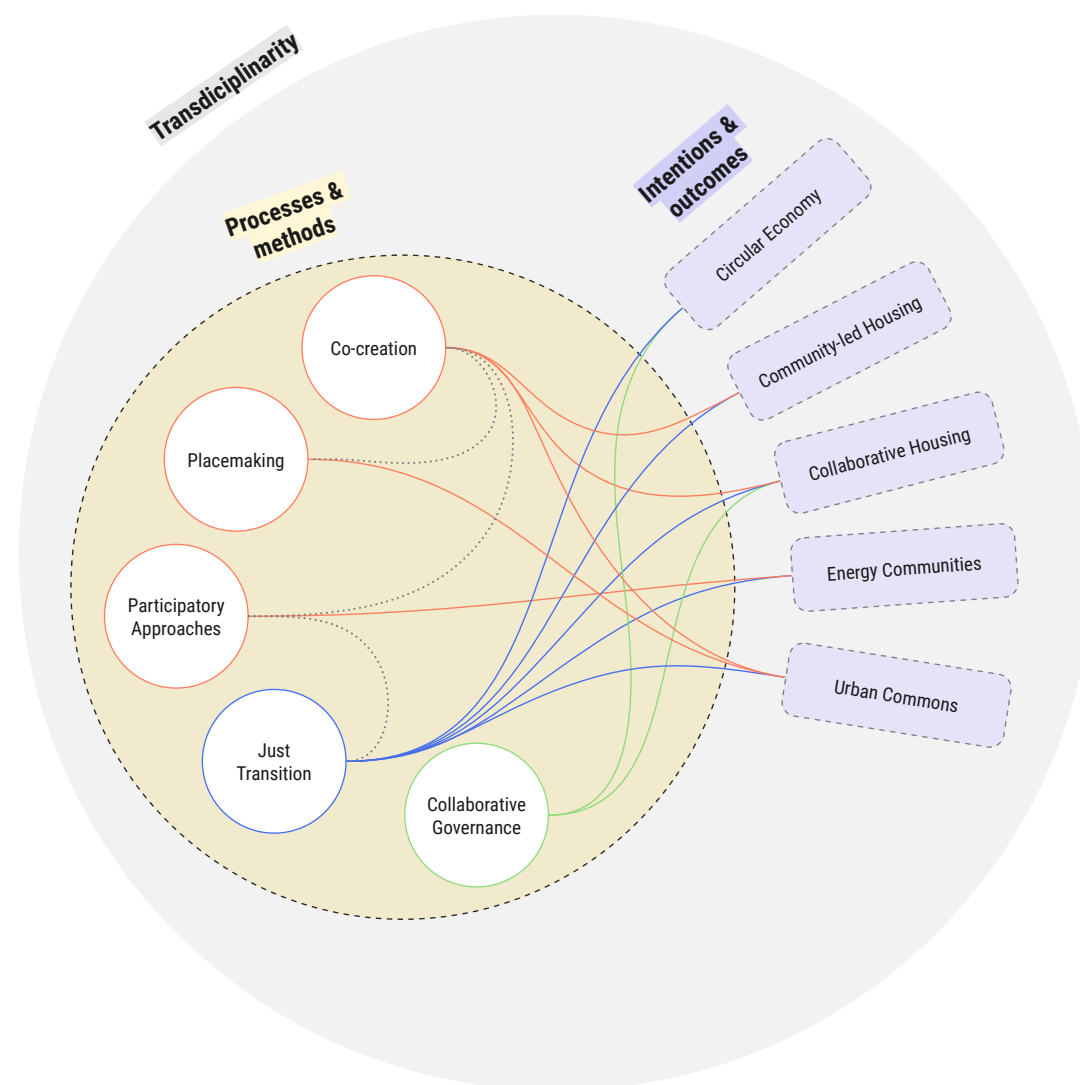


FIGURE 3.2.3: Functional clustering: Methods and purposes for housing transformation

PARTICIPATORY APPROACHES aim to ensure that communities actively shape their environments. Among these, **CO-CREATION** involves the shared exercise of decision-making power, but it differs by placing greater emphasis on the prominent roles of citizens, including aspects of self-organisation, increased commitment, and a sense of ownership. **CO-CREATION** also stresses partnerships between local authorities, professionals, and non-expert stakeholders.

By involving public, private, and non-profit actors alongside residents, **COLLABORATIVE HOUSING** can enhance the long-term viability of housing schemes through hybrid governance models that combine private investment with resident participation and social objectives. However, ensuring affordability and sustainability requires robust state oversight and regulatory frameworks.

In the context of housing and neighbourhood development, **PLACEMAKING** refers to the creation, management, and revitalisation of public spaces, which often occurs through *co-creation*. This is particularly relevant in strategic placemaking, which targets specific outcomes such as enhancing the economic, social, and cultural vitality of communities—for instance, through the development of mixed-use, pedestrian-oriented environments that address diverse needs, including housing and recreation. In this way, communities become integral to the ongoing transformation and stewardship of their living environments.

Both **PLACEMAKING** and **CO-CREATION** are closely linked to the concept of the **URBAN COMMONS**, which offers an alternative model of governance rooted in collective stewardship and cooperation. The urban commons serve as a community-driven response to the privatisation and commodification of urban resources such as housing and public space. These approaches foster commoning activities—the collaborative processes of accessing, negotiating, and governing shared urban resources.

A **JUST TRANSITION** envisions a shift toward a post-carbon society, moving away from extractive economies toward those grounded in sustainability and regeneration. In housing, this transition entails the intersection of justice and sustainability, with affordable and sustainable housing playing a vital role in ensuring equitable access to shelter, services, and opportunities. In light of the limitations of top-down and market-driven housing models, there is growing support for resident-led, co-created housing (i.e. **COMMUNITY-LED HOUSING**) as a pathway to a just transition.

Other expressions of **JUST TRANSITION** principles—often involving **PARTICIPATORY APPROACHES** and the creation of *urban commons* at the neighbourhood scale—include energy communities, community-led cycling infrastructure, and resource regeneration through the **CIRCULAR ECONOMY**. For example, **ENERGY COMMUNITIES** generate renewable energy (e.g., solar, wind, biomass), reducing dependence on external providers, lowering costs, and improving energy security. The **CIRCULAR ECONOMY** complements housing initiatives through practices such as shared infrastructure, building reuse and retrofitting, and low-impact lifestyles, including urban gardening, composting, and cooperatives.

Finally, **COLLABORATIVE GOVERNANCE** is essential for enabling local ownership of urban resources and promoting sustainable and affordable housing. Early-stage involvement of users, supported by local authorities and technical experts, can influence cost allocation and foster cost-saving and resource-sharing strategies. Nevertheless, government collaboration remains crucial to guarantee equitable access and to counteract the profit-driven dynamics of conventional housing development. Through policy, it is vital to ensure that communities remain central to urban transformation.

CLUSTER 4: RURAL STUDIO'S MODEL: INTERLINKING AFFORDABLE HOUSING, SUSTAINABILITY, AND PARTICIPATORY EDUCATION

This cluster extends the functional method by examining **RURAL STUDIO**, an architectural education programme that demonstrates how ethical and social concerns can be embedded in design practice, using key vocabulary concepts to explore the translation of theory into real-world application.

For decades, Rural Studio, an off-campus, client-driven educational programme in Hale County, Alabama, United States, has been a pioneering model in design-build architectural education and community engagement. Founded in 1993 by Samuel Mockbee and D.K. Ruth to address ethical gaps and the theory-practice divide in architecture, it offers students hands-on experience in real-world construction while positively impacting the local community. Hale County, a predominantly Black, working-class area and one of Alabama's poorest regions, faces high **HOMELESSNESS** rates due to inadequate welfare policies and the increasing **FINANCIALISATION** of housing, which subjects a fundamental human right to the volatility of market forces. The region also struggles with social tensions, including racism and discrimination.

The Rural Studio pedagogic model can be effectively analysed through the lens of functional clustering, focusing on three distinct subclusters: sustainability, critical awareness and capacity building.

The Studio's hands-on design-build education and its innovative, low-cost, **AFFORDABLE HOUSING** solutions, such as the \$20K House, form a functional subcluster focused on social, economic and environmental **SUSTAINABILITY**. Students work within strict budgetary limits, navigating real-world constraints such as material performance, and energy efficiency to create a **SUSTAINABLE BUILT ENVIRONMENT**, and **LIFE-CYCLE COSTING**, while directly confronting housing precarity in the region.

The focus on **SOCIAL SUSTAINABILITY** is reflected in the Studio's engagement with local communities. Its emphasis on **CO-CREATION** and **PARTICIPATORY APPROACHES** underscore the importance of active community involvement. Students collaborate closely with residents, ensuring that projects are shaped by the priorities of the people they are intended to serve. For example, the fifth-year programme facilitates direct client involvement through regular feedback sessions, collabora-

tive design reviews, and iterative planning processes. This also includes **POST-OCCUPANCY EVALUATION**—a method through which completed projects are assessed over time in relation to how they are inhabited and experienced. This long-term feedback loop deepens the Studio's commitment to adaptability and improves the relevance and longevity of its interventions.

Through immersive exposure to the social and economic realities of Hale County, students develop an expanded ethical framework and a sharpened, critical awareness of their role in addressing systemic housing inequalities—such as **HOMELESSNESS** and **FINANCIALISATION**—through spatial practices grounded in empathy, equity, and collaboration. Additionally, reflective pedagogic practices, which challenge students' assumptions and foster **SPATIAL AGENCY**, constitute a third subcluster focused on capacity building. This encompasses not only the skills and knowledge students acquire but also to ongoing community empowerment sustained by the studio's continuous presence and meaningful engagement in the area. This ensures that future architects grasp the broader systemic issues underlying housing inequities, while local communities develop the skills and partnerships necessary to address systemic failures.

By distinguishing functionally different yet interrelated concepts, the clustering of vocabulary terms highlights how Rural Studio's model offers complementary pathways for addressing the complex challenges involved in housing production through a community-centred architectural practice, deeply embedded in the lives and struggles of the people it serves.

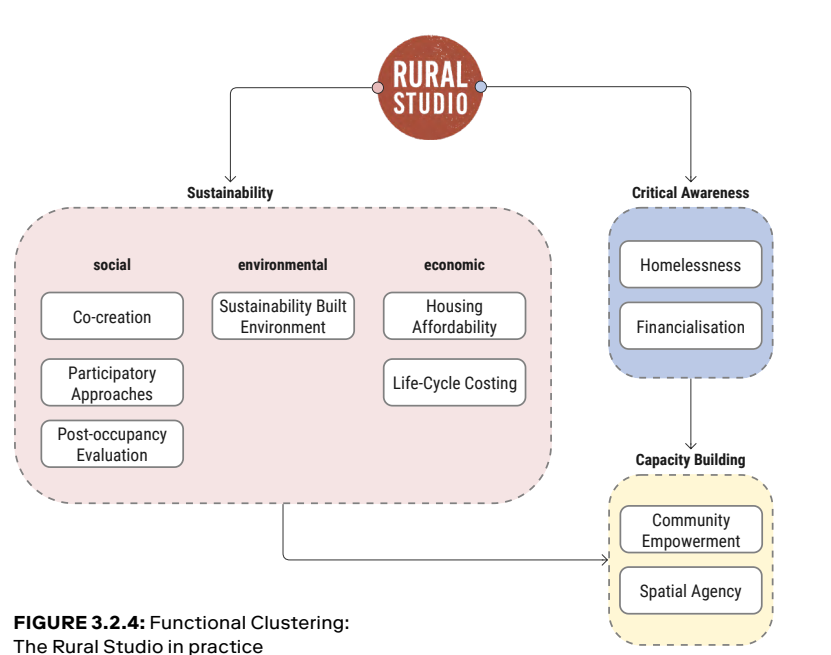


FIGURE 3.2.4: Functional Clustering: The Rural Studio in practice

CLUSTER 5: ADDRESSING REAL-WORLD CHALLENGES: ADAPTIVE REUSE OF VACANT BUILDINGS FOR HOUSING

Unlike the preceding clusters, which explored broad concepts, analytical methods, or specific case studies, this cluster focuses on a concrete, real-world challenge: the reuse of vacant buildings for housing—an issue identified by early-stage researchers. This challenge intersects two critical objectives: addressing the urgent need for affordable housing and reducing environmental impacts by limiting urban sprawl and conserving resources. In this context, adaptive reuse—the practice of repurposing underutilised or abandoned buildings—emerges as a practical, sustainable, and resource-efficient strategy.

What sets this cluster apart is its problem-driven orientation: it begins with a tangible question and draws on the vocabulary to explore pathways toward viable solutions. While not strictly adhering to a single clustering method, it incorporates both object-based and functional elements by grouping relevant terms around a shared practical objective. This method reveals meaningful connections among concepts and fosters a holistic, transdisciplinary understanding of how vacant buildings reuse can be addressed, while highlighting why this issue matters. By anchoring theoretical inquiry in a concrete housing challenge, the cluster provides a framework for understanding how integrated thinking can drive innovative strategies across design, policy, and community engagement.

Affordability and financial considerations

At the core of this challenge lie the issues of **AFFORDABILITY** and **HOUSING AFFORDABILITY**. While reusing vacant buildings can help provide housing for those in need, mitigate urban sprawl and reduce resource consumption associated with new construction, the high costs of retrofitting often result in increased housing prices. Key concepts such as **FINANCIAL WELLBEING**, **LIFE-CYCLE COSTING**, and **VIABILITY** assessments, are essential for addressing this tension, as they emphasise the importance of balancing upfront investment with long-term affordability and sustainability. Frameworks that incorporate these concepts can guide decision-making to ensure that adaptive reuse remains both financially viable and socially beneficial. Metrics such as the **WINDOW GUIDANCE**, which accounts for total living expenses beyond just housing costs, offer valuable tools for developing context-specific affordability measures. Additionally, innovative financing mechanisms such as the **GREEN LAND VALUE TAX**, which encourages developments that prioritise local community needs over speculative interests, can help foster adaptive reuse projects that are more sustainable and socially responsible.

Sustainability and environmental performance

Rehabilitating vacant buildings aligns with **SUSTAINABILITY** and **CIRCULAR ECONOMY** principles by reducing material consumption, greenhouse gas emissions, and the demand for new land development—all central concerns in creating more **SUS-**

TAINABLE BUILT ENVIRONMENTS. Concepts like **BUILDING DECARBONISATION**, **ENERGY RETROFIT**, and **HOUSING RETROFIT** highlight the technical considerations involved in achieving net-zero or low-carbon housing solutions. However, achieving the desired environmental outcomes often requires navigating complexities like the **PREBOUND EFFECT**, where initial energy consumption is lower than estimated, and the **PERFORMANCE GAP**, where buildings do not achieve expected energy savings in use. Addressing these issues calls for robust **POST-OCCUPANCY EVALUATION** frameworks to assess both actual building performance and occupant satisfaction. Additionally, integrating **ENERGY COMMUNITIES** into reuse projects can support collective energy production and management, further enhancing sustainability outcomes.

Policy, governance, and institutional frameworks

Adaptive reuse is shaped by **HOUSING POLICY** and **HOUSING GOVERNANCE**. In contexts marked by budget austerity and neoliberal urban policies, public authorities often sell vacant properties to private developers, raising critical concerns about social accountability and environmental justice. To counterbalance these trends, mechanisms such as **COLLABORATIVE GOVERNANCE** and **PUBLIC-CIVIC PARTNERSHIPS** play a crucial role by involving communities directly in redevelopment decisions. Policy innovations such as **TARGETED UNIVERSALISM**—which address the needs of marginalised groups while benefiting all—and **ECOSOCIAL POLICY** offer pathways to create incentives encouraging private developers to prioritise affordability, sustainability, and inclusivity. The **NEW MUNICIPALISM** movement exemplifies how local governments can reclaim decision-making power to advance community-driven solutions, ensuring that the reuse of vacant buildings serves the public interest rather than perpetuating existing inequalities.

Community engagement and social dimensions

Addressing the challenge of reusing vacant buildings requires prioritising **COMMUNITY EMPOWERMENT** and fostering **SOCIAL VALUE**. **PARTICIPATORY APPROACHES** ensure that redevelopment responds to the lived experiences of local residents. Tools such as **CO-CREATION** and **PLACEMAKING** can transform neglected spaces into vibrant **THIRD PLACES**, informal community hubs that support social **SUSTAINABILITY** and community building. Inclusive planning processes not only democratise decision-making but also contribute to the development of **SOCIAL INFRASTRUCTURE** such as community centres and public gathering spaces. **POST-OCCUPANCY EVALUATIONS** can be used to assess how effectively redeveloped buildings meet the social needs of their occupants over time.

Integrating the challenge into a transdisciplinary framework

The interconnectedness of the vocabulary terms provides valuable insights into how adaptive reuse projects can be conceptualised and implemented. Reusing vacant buildings for housing encapsulates the complexity of addressing afforda-

ble and sustainable housing challenges. As highlighted in previous clusters, the integration of diverse disciplines—such as economics, policy, design, and social sciences—provides a richer understanding of how to navigate competing demands and conflicting priorities. This challenge-based approach emphasises the **TRANS-DISCIPLINARY** nature of housing research and practice, demonstrating that effective solutions must simultaneously address financial viability, environmental impact, governance structures, and community wellbeing. By framing the reuse of vacant buildings as both a practical problem and a theoretical inquiry, this cluster helps bridge the gap between real-world applications and abstract concepts. The clustering process not only clarifies the relationships between key terms but also highlights the importance of reflexivity in housing research.

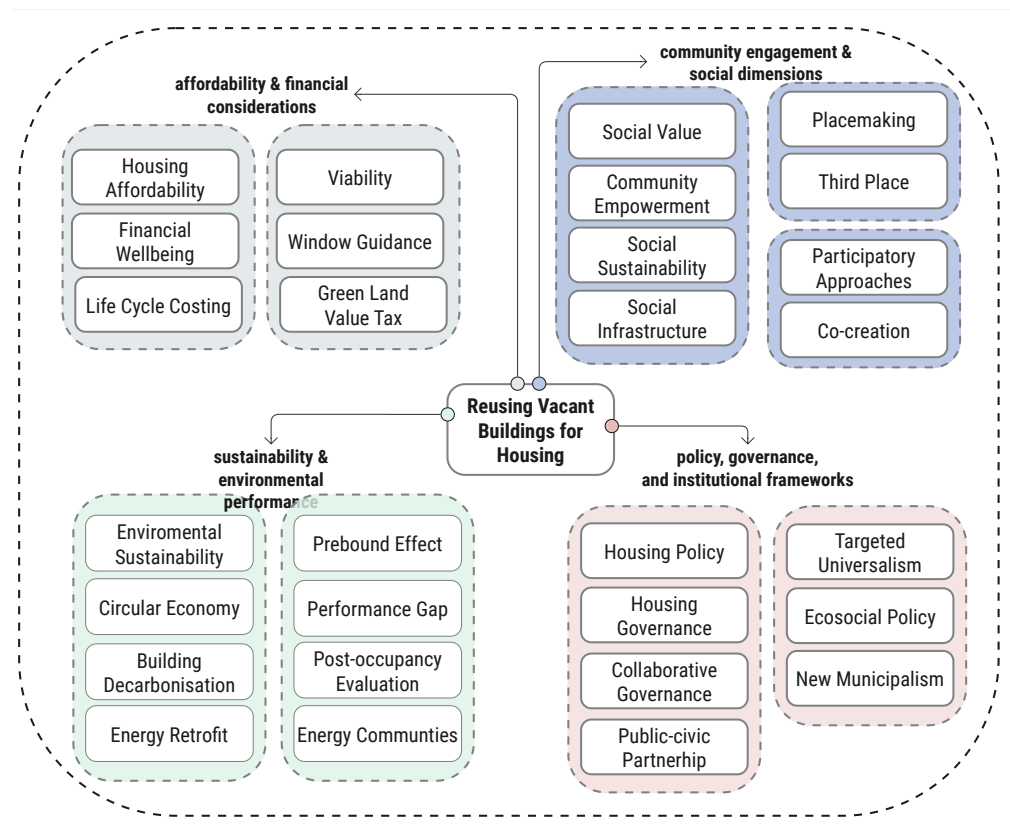
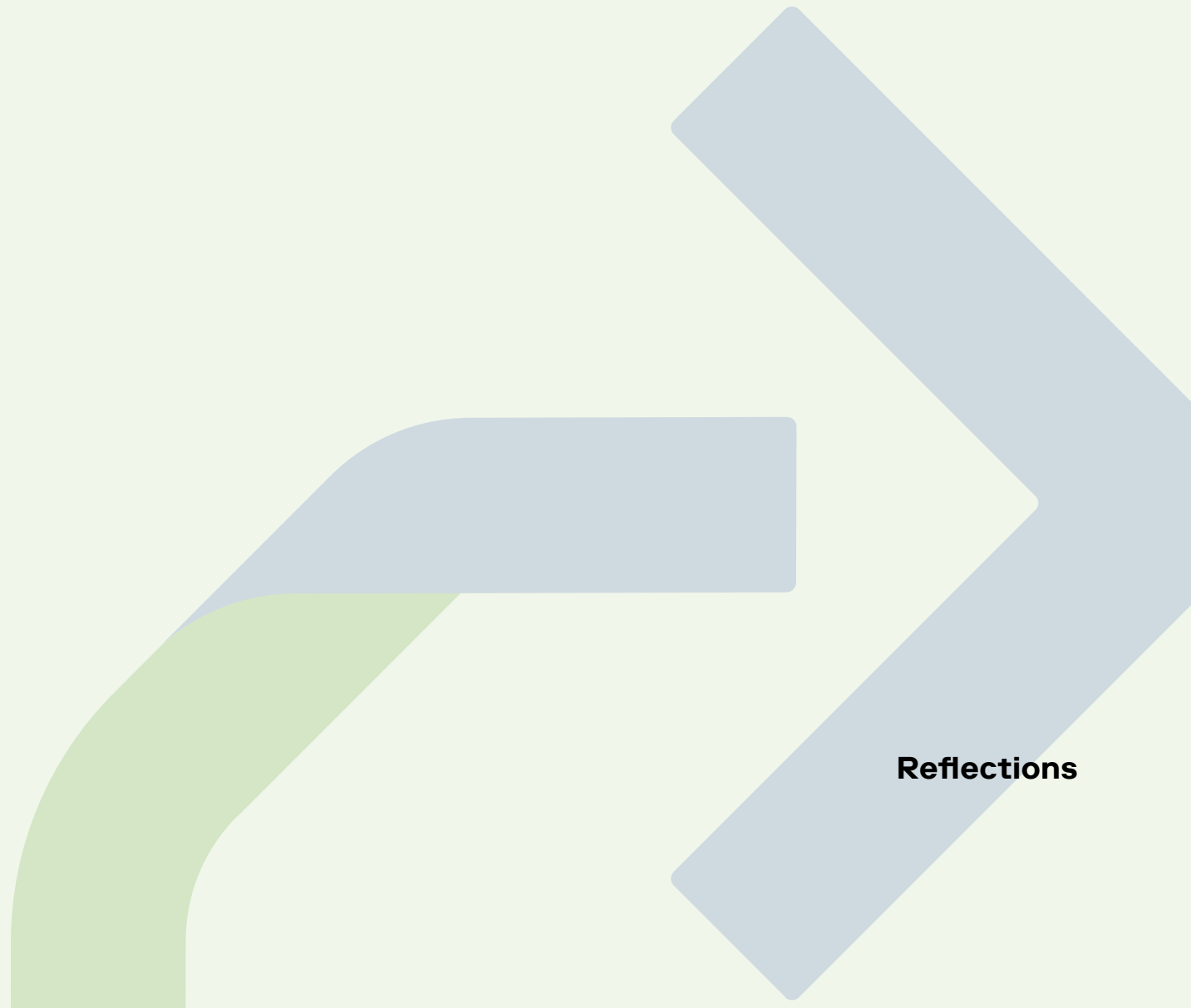


FIGURE 3.2.5: Applied Clustering: Repurposing vacant buildings for affordable housing



Reflections

The RE-DWELL vocabulary serves as a tool for fostering a shared language among scholars working across multiple fields on issues of housing affordability and sustainability. The choice of the term “vocabulary” over “glossary” or “dictionary” is both deliberate and significant in the context of transdisciplinary research. A dictionary is a formal reference work that lists words of a language with definitions, usage, and often etymology, primarily serving as a tool for looking up meanings. A glossary typically provides a brief, static list of definitions tied to a single text or a well-defined field, helping readers understand specific terminology. In contrast, a vocabulary is a dynamic, evolving set of concepts that organises and structures knowledge. By engaging with its terms—defining, interpreting, and applying them—researchers refine both their understanding of the domain and the questions they investigate.

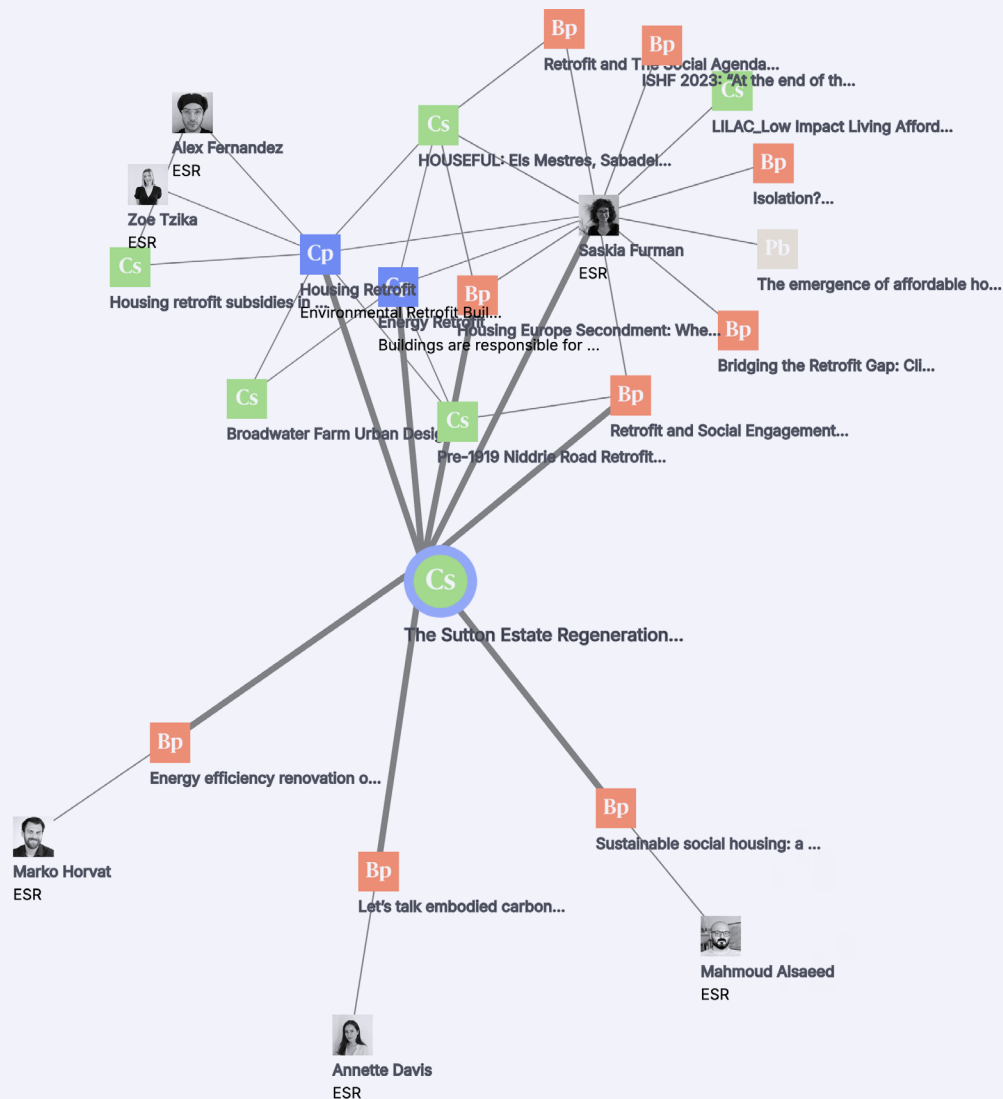
This dynamic character is evident in the operationalisation of the vocabulary within project activities. Clustering exercises reveal not only conceptual linkages across key themes concerning housing affordability and sustainability but also methodological insights into how terms can be organised to address real-world housing challenges. Through various clustering strategies—ranging from thematic to problem-oriented and case-based approaches—researchers have demonstrated the value of a shared vocabulary in fostering integrated thinking across disciplinary boundaries.

Ultimately, the significance of the vocabulary lies in its capacity to evolve—that is, to be questioned, adapted, and enriched by the very actors it seeks to support. It should be noted, however, that both the vocabulary and its clustering have been developed solely by academic researchers. While this ensures conceptual rigour within interdisciplinary collaboration, it raises questions about the transdisciplinary goals of the RE-DWELL project. Transdisciplinarity involves not only interdisciplinary academic collaboration but also the meaningful integration of non-academic perspectives, including those from practitioners, policymakers, and community members. In this regard, the current vocabulary may be considered interdisciplinary rather than fully transdisciplinary.

To engage a broader range of stakeholders, the knowledge embodied in the vocabulary must be applied in practical, real-world contexts. For example, discussing conceptual linkages in the context of an initiative to repurpose vacant buildings can help stakeholders—such as architects, local authorities, community groups, and housing providers—identify key issues, navigate regulations, and align on shared goals. Collaborative activities such as co-design workshops, participatory planning sessions, and stakeholder consultations create opportunities to test, refine, and adapt ideas derived from the vocabulary. Feedback generated through these processes can add new layers of meaning to existing concepts or give rise to new ones.

This progression—from knowledge generated within academic disciplines to knowledge co-produced through collaborative, practice-oriented engagement—highlights an essential challenge of transdisciplinary housing research. By enabling structured dialogue across disciplinary boundaries, sectors, and governance levels, the RE-DWELL vocabulary and its clustering methodologies function not only as analytical frameworks but also as an evolving knowledge base, continuously refined through sustained transdisciplinary collaboration (→ see 5.3).

Case library



Case-centred network map highlighting *The Sutton Estate Regeneration* as a focal study within RE-DWELL, connected to ESRs, theoretical concepts, blog entries, and associated case studies.

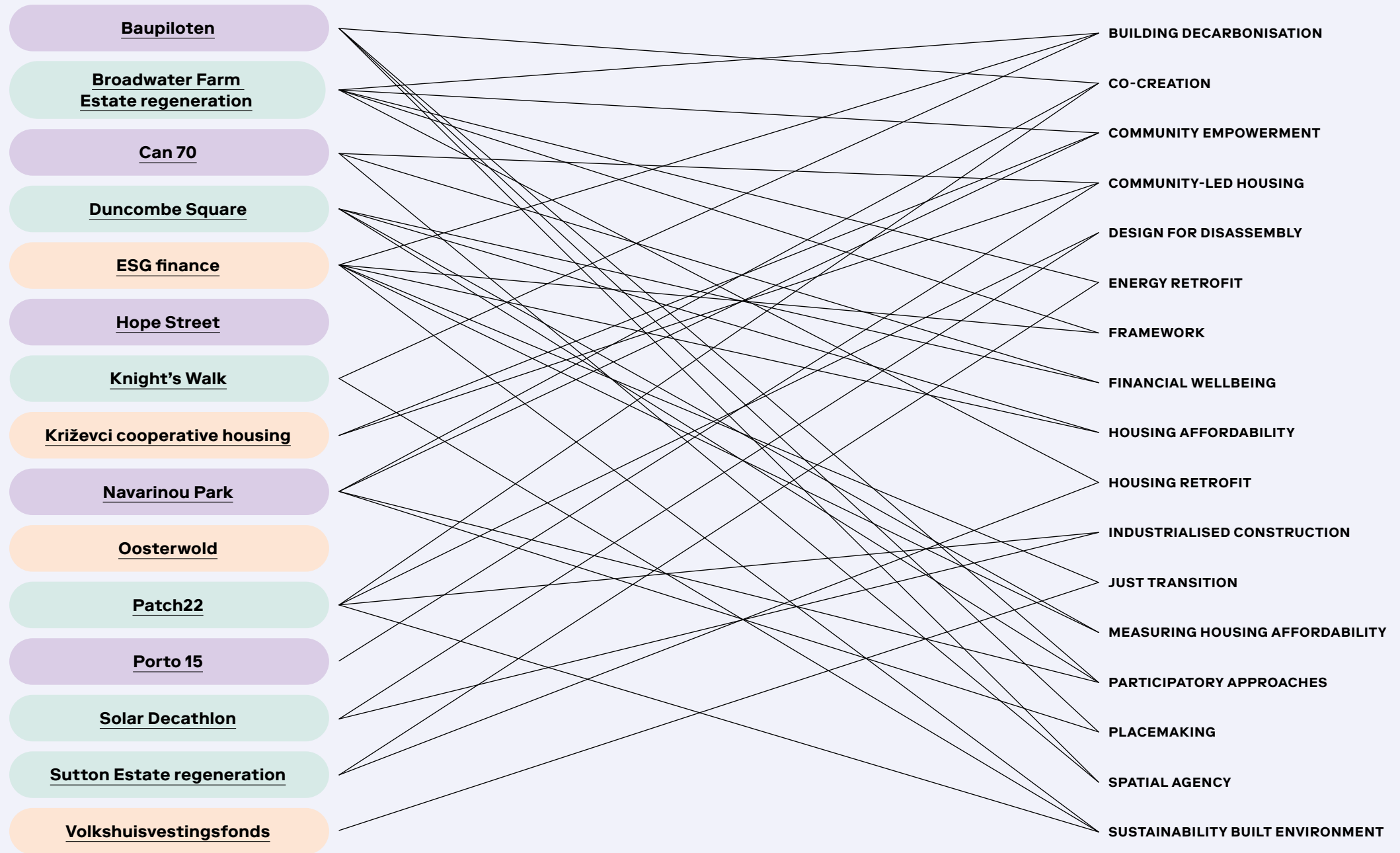
Introduction

The RE-DWELL case library complements the vocabulary by grounding shared concepts in real-world precedents related to affordable and sustainable housing. It provides a structured framework through which early-stage researchers document, analyse, and relate buildings, projects, policies, and processes encountered in their research and professional engagements, supporting the translation of research insights into situated examples of practice.

The case library functions as a learning and research resource that supports transdisciplinary knowledge construction. By situating cases within specific social, institutional, economic, and geographical contexts, it enables researchers to examine how housing approaches are shaped, adapted, or negotiated in practice. Each case is analysed in relation to the three RE-DWELL research areas—Design, Planning and Building; Community Participation; and Policy and Financing—as well as broader sustainability objectives, encouraging critical and reflexive engagement with implementation processes, trade-offs, and outcomes.

Beyond comparative analysis, the case library supports transdisciplinary knowledge construction by linking theory and practice, situating housing approaches within their specific social and institutional contexts, and foregrounding the roles of multiple actors involved in housing procurement. Through reflexive and comparative engagement with cases, the library helps researchers and practitioners explore how actors, constraints, and strategies interact in housing delivery, informing discussion and learning across disciplinary and professional contexts.

CASES AND VOCABULARY CONNECTIONS



Baupiloten

Berlin, Germany

Edited text based on case documentation by Effrosyni Roussou.



Source: <https://www.arch2o.com/taka-tuka-land-baupiloten/>

Initiating entity

TU Berlin
Susanne Hofmann
Architects

Place

Berlin, Germany

Period

2001-

Objectives

Prepare students for professional life by integrating education, research and real-world experience

Context

Neighbourhood, build-ings

Stakeholders

Municipalities, public schools, local communities, associations, design and construction professionals

Educational/participatory methods

Participatory design, co-creation, experiential learning, live projects

Baupiloten, founded by Susanne Hofmann at TU Berlin in 2001, is both an architecture practice and an educational platform that engages advanced students in participatory design-build projects. It aims to bridge the gap between architectural education and practice by integrating research and real-world experience.

By addressing the lack of practical training in German architecture programmes, Baupiloten connects learning with building, fosters interdisciplinary collaboration and involves students in all project stages. Participation is key, valuing user inputs alongside expert knowledge. Despite criticism, Hofmann argues that participation enhances creativity, lowers costs, strengthens social cohesion, and ensures architectural quality.

“Atmosphere” is a central concept in the pedagogic model, understood as the emotional and sensory qualities of a space—including acoustics, lighting, texture, and spatial layout—that shape user experience. Rather than being merely aesthetic, atmosphere serves as a communication tool that expresses complex ideas and emotions beyond traditional drawings, enabling designers to articulate and define desired qualities that engage users more effectively and ensure the final design resonates with their needs and preferences.

RELATED CONCEPTS

- : CO-CREATION
- : DESIGN ACTIVISM
- : PARTICIPATORY APPROACHES
- : PLACEMAKING
- : SPATIAL AGENCY

ALIGNMENT WITH PROJECT RESEARCH AREAS

The Baupiloten training model equips architects with essential transdisciplinary skills to design and build affordable and sustainable living environments.

Design, Planning and Building

The Baupiloten training integrates real-world design-build projects with user-centred participatory design and sustainability principles. Emphasising the idea that ‘architecture is participation,’ it actively involves users at every stage of the design process, from the initial concept to the final detailing. This hands-on model bridges architectural design with construction, ensuring practical feasibility while encouraging collaboration with stakeholders such as engineers, policymakers, and social scientists. Through cross-disciplinary learning and knowledge exchange, it promotes innovative, socially responsive, and policy-aligned approaches to the built environment. When applied in architectural

practice, these skills will enable students to gain a deeper understanding of residents' needs, how they plan to use or inhabit their living spaces, and assist them in shaping and refining those ideas.

Community Participation

A key goal of this educational model is to amplify the voices of future users, who may often belong to underrepresented groups in society. Many initiatives carried out within Baupiloten focus on underserved communities in Berlin and beyond, prioritising social impact and responsive design solutions. Numerous projects specifically involve children's perspectives, ensuring their ideas actively shape the design process.

Through participatory design, future architects develop collaborative and communication skills, learning to engage with users as equal partners in the design process. This experiential learning enhances their ability to integrate social, economic, and environmental factors into their work. They gain expertise in co-creation, cost-efficient planning, and adaptive design, ensuring that solutions are both innovative and practical. Additionally, future architects refine their problem-solving, critical thinking, and collaborative skills by balancing creativity with real-world constraints, preparing them to work effectively in multi-disciplinary teams and tackle complex housing challenges.

Policy and Financing

While the primary focus is on participatory design, the model ensures that students are exposed to the financial and administrative aspects involved in the design and construction of the built environment. Architects-in-training collaborate with clients and stakeholders, including local authorities and developers, to navigate budgeting, resource allocation, and regulatory compliance. This experience provides valuable insight into the financial constraints and administrative processes that influence the design and construction of affordable and sustainable housing.

Design, Planning, and Building

Experiential learning: Encourages learning through direct experience, allowing students to develop problem-solving skills by working on live projects.

Hands-on projects: Provides practical exposure to design and construction processes, helping students understand the complexities of building in real-world conditions.

Materiality: Focuses on the selection and application of materials to enhance durability, sustainability, and aesthetic quality in architectural design.

Participatory design-build: Engages students in real-world projects where they collaborate with users and stakeholders to design and construct functional spaces.

Spatial quality: Examines how space is perceived and experienced, ensuring that designs prioritise comfort, usability, and emotional impact.

Experiential learning provides students with real-world challenges where they must engage with users and stakeholders.

Participatory design-build fosters social cohesion and inclusivity by uniting communities in user-centered co-creation.

Selecting durable, sustainable, and local materials ensures cost-effective, long-lasting designs that align with public-sector priorities like affordability and environmental responsibility.

Community Participation

Collaborative decision-making: Promotes dialogue between architects, users, and policymakers, balancing expertise and lived experience to achieve well-rounded design solutions.

Inclusive architecture: Prioritises accessibility, cultural diversity, and equity in design, ensuring that built environments serve a broad range of users.

Social cohesion: Strengthens community bonds by fostering shared decision-making, creating inclusive spaces that encourage interaction and connection.

User involvement: Actively engages future occupants in the design process, ensuring their insights and experiences shape the final outcome.

Policy and Financing

Cost-effective solutions: Develops innovative design approaches that optimise resources and minimise costs without compromising quality.

Public-sector collaboration: Works with municipalities, schools, and institutions to develop projects that align with public interests and policy goals.

Broadwater Farm Estate regeneration

London, UK

Edited text based on case documentation by Leonardo Ricaurte.



Source: Leonardo Ricaurte

Architects

Haringey Borough
Architects' Department
(original project)
Karakusevic Carson
Architects (regeneration)

Location

London, United Kingdom

Project year

2004 (regeneration
project)

Construction period

1966–71 (original project)

Housing type

Multifamily housing

Urban context

Housing estate

Construction system

Industrialised construction (original project)

Project status

Ongoing

Broadwater Farm Estate is a key example of large-scale, council-led housing built in post-war Britain. Home to nearly 5,000 residents, this housing estate represents a significant example of London's social housing landscape. Developed by the Borough of Haringey, this high-density modernist estate in Tottenham has faced shifting housing policies, social struggles, and multiple redevelopment efforts over the past five decades. Now, it stands on the brink of its most ambitious regeneration project yet.

Outlined in the Urban Design Framework (UDF), the regeneration strategy honours the estate's history while modernising its infrastructure and appearance. The design brief, shaped through collaboration between architects, residents, the wider community and the council, aims to address both current community concerns and future needs. The plan includes replacing structurally unsafe blocks, increasing housing density with new developments, revamping existing and creating additional public spaces, and refurbishing remaining buildings.

If realised as planned, the regeneration of Broadwater Farm could serve as a model for future housing projects across the UK and Europe.

RELATED CONCEPTS

- : BUILDING DECARBONISATION
- : COLLABORATIVE PLANNING
- : COMMUNITY EMPOWERMENT
- : ENERGY RETROFIT
- : FRAMEWORK
- : HOUSING RETROFIT
- : PARTICIPATORY APPROACHES
- : PLACEMAKING
- : SOCIAL HOUSING
- : SOCIAL VALUE

ALIGNMENT WITH PROJECT RESEARCH AREAS

The UDF for the regeneration of Broadwater Farm Estate serves as a case study of integrated solutions for housing estate upgrading, combining architectural innovation, resident participation, and policy-driven strategies to create more inclusive and resilient urban environments.

Design, Planning and Building

The Broadwater Farm Estate regeneration focuses on retrofitting and redeveloping existing housing blocks to improve safety, sustainability, and liveability. The UDF integrates new housing developments, public spaces, and infrastructure upgrades, while respecting the estate's modernist heritage.

A diverse mix of flats will be provided, catering to a range of household sizes and needs. These homes will include passive design features to ensure high insulation standards and energy efficiency. To minimise disruption to the existing community, a balanced strategy of targeted demolition, refurbishment, and new construction will be adopted—complemented by the renovation of public and shared ground-floor spaces to maximise both current and future social value.

People are at the heart of the regeneration strategy. All homes will be within a 15-minute walk of key facilities, and walking, cycling, and public transport will be prioritised. Nature-based solutions and infrastructure improvements will enhance residents' health and wellbeing while reducing environmental impact.

Community Participation

A central element of the regeneration process is meaningful collaboration between residents, architects, and local authorities. Extensive community engagement—including workshops, co-design sessions, and targeted outreach—has ensured the inclusion of underrepresented and hard-to-reach groups. Insights from these participatory activities informed the development of a community brief, which has been integrated into the UDF guiding the regeneration.

To ensure transparency and ongoing involvement, the local council, in partnership with an independent expert, has launched an online platform. This platform enables residents and stakeholders to track the project's progress both in person and online. Looking ahead, residents and community groups are expected to take an active role in using and managing the new facilities and public spaces, becoming stewards of the renewed estate.

Policy and Financing

The regeneration of the estate is shaped by local housing policies and funding strategies, reflecting broader challenges in the UK's social housing landscape. Central to the project are issues such as council-led redevelopment, housing affordability, and long-term financial sustainability. All new homes delivered through the project will remain in council ownership, preserving their social purpose and ensuring continued access to affordable housing.

To deliver a cost-effective regeneration while minimising disruption to the existing community—a common drawback of relying on private sales to fund social housing—the council and planners have prioritised a substantial retrofit of the majority of the estate.

Design, Planning, and Building

Customised housing: A wide range of flats for various target groups and sizes, incorporating passive design measures for energy efficiency.

Health and wellbeing: Measures aim to enhance residents' health and wellbeing while reducing environmental impact.

Retrofitting and redevelopment: Focus on upgrading existing housing blocks to improve safety, sustainability, and liveability.

Sustainable construction: Use of industrialised construction methods reflecting a shift toward adaptable and sustainable urban design.

Sustainable mobility: Promotion of walking, cycling, and public transport through improved infrastructure and nature-based interventions.

By offering a variety of housing options, residents have the opportunity to express their needs and preferences, creating a more inclusive approach to housing design.

Health and wellbeing can be significantly improved when residents are actively engaged in the development of spaces that promote wellbeing.

Community Participation

Accountability: An online platform was set up by the local council, in collaboration with an expert third party, allowing residents and stakeholders to track the project's progress both online and in person.

Active engagement: Residents and community groups are expected to actively use the new facilities and spaces and play a role in their management.

Collaboration: The regeneration process involves collaboration between residents, architects, and local authorities, with engagement through workshops, co-design events, and activities targeting hard-to-reach communities.

The participation of residents and local authorities ensures that the project is shaped in accordance with local policy objectives, such as affordability, sustainability, and community integration.

Policy and Financing

Cost-effective regeneration: To avoid community disruption, the council opted for a substantial retrofit rather than relying on private sales for funding.

Local housing policies: The redevelopment is shaped by local housing policies and funding mechanisms, addressing broader UK social housing challenges.

Public ownership: All new homes built will remain under council ownership to maintain their social purpose.

Retrofitting and redevelopment strategies that maintain public ownership of homes help ensure that the estate is redeveloped in a way that benefits the community and retains long-term affordability.

Can 70 senior cooperative housing

Barcelona, Spain

Edited text based on case documentation by Zoe Tzika.



Source: Sostre Civic

Architects Peris+Toral	Housing type Senior cohousing
Location Barcelona, Spain	Urban context City
Project year 2018– ongoing	Construction system Compressed earth blocks
Construction period 2024–26	Project status Under construction

Can 70 is the first senior cohousing project in the city of Barcelona and the first in Spain to be built on public land under a grant-of-use regime. It forms part of Sostre Civic, a cooperative that brings together multiple housing initiatives. Can 70 pioneers a new model of ageing based on mutual support, collective living, and democratic governance, empowering residents to actively shape their own futures.

The vision for Can 70 began in 2015, when a group of friends came together to explore alternative ways of living during their senior years. Their journey involved extensive community-building, advocacy, and logistical challenges—from securing institutional support and financing, to acquiring suitable land. A major milestone was reached in 2021 when the group was granted a 99-year lease on a public plot by the city council, marking a powerful example of public-community partnership.

The project introduces several innovations in housing provision, design, governance, and community building. From the outset, the residents have been fully involved at every stage of development, working closely with architects and other facilitators, ensuring that their living space reflects their values and needs. The design of the cohousing integrates private living units with ample communal spaces and includes areas open to the wider neighbourhood, strengthening its role as a social catalyst within the local community.

Can 70 is about rethinking how people live as they grow older. By participating in the development of their dwelling, residents provide a community-led alternative to traditional eldercare and housing models. The project aims to create a strong, supportive community and serve as a replicable model for future senior cohousing projects.

RELATED CONCEPTS

- : COMMUNITY-LED HOUSING
- : FINANCIAL WELLBEING
- : GRANT-OF-USE COOPERATIVE HOUSING
- : PUBLIC-CIVIC PARTNERSHIP

ALIGNMENT WITH PROJECT RESEARCH AREAS

By integrating sustainable design, shared governance, and mutual care into its cohousing model, Can 70 addresses the topics of the RE-DWELL research framework in various ways.

Design, Planning, and Building

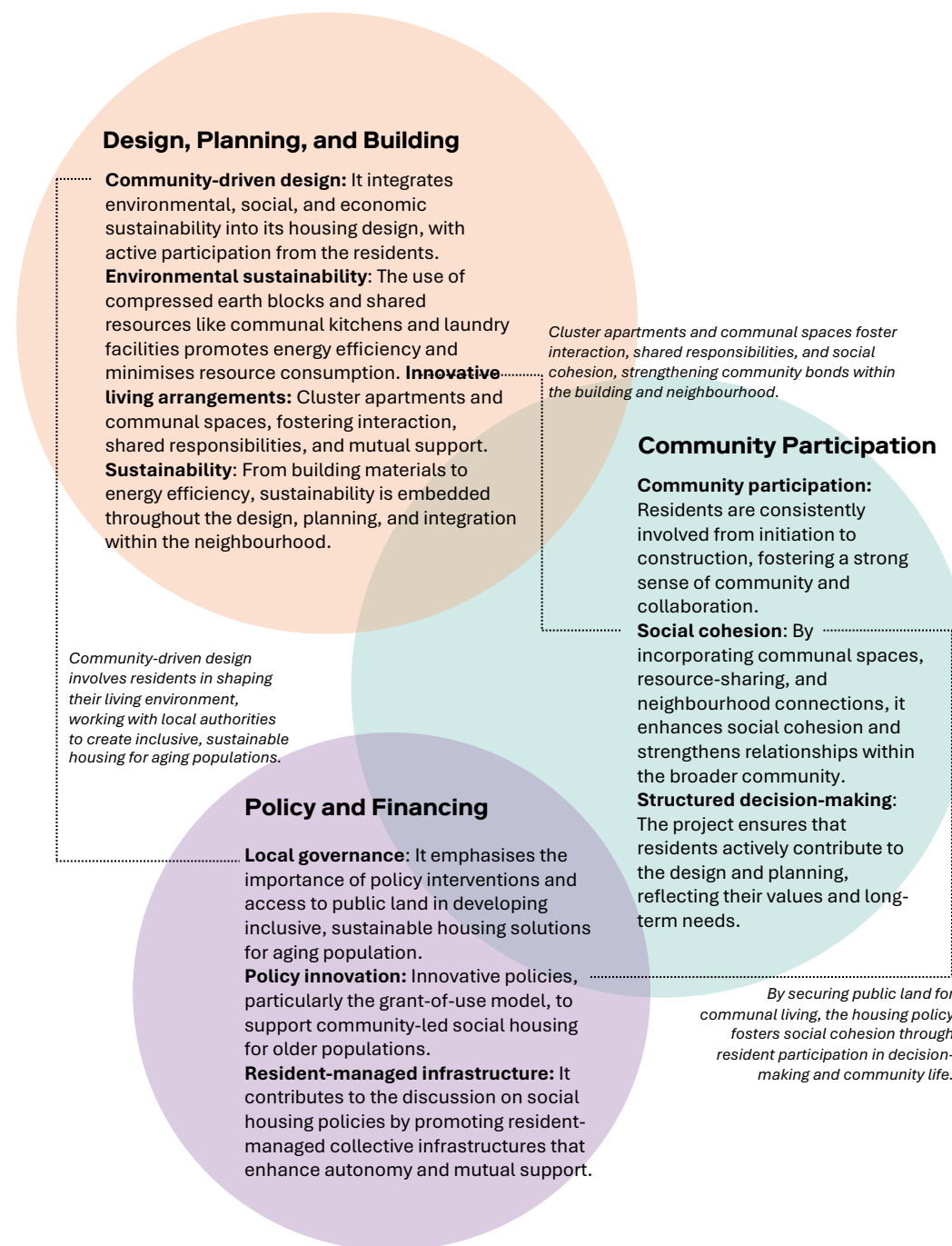
Can70 exemplifies sustainable planning by integrating environmental, social, and economic dimensions into its housing design. Innovative living arrangements—such as cluster apartments and communal spaces—foster interaction, shared responsibilities, and mutual support. The project's emphasis on community involvement ensures that sustainability is embedded at multiple levels, from the building's materials and energy efficiency to its integration within the neighbourhood. By incorporating public facilities and activities, Can 70 strengthens local connections, extending its impact beyond just the residents. Its commitment to environmental sustainability is evident in choices like compressed earth blocks, which regulate temperature naturally, and shared resources such as communal kitchens and laundry facilities, to minimise energy consumption and promote resource efficiency.

Community Participation

This community-led housing ensures a high degree of participation from its members. From initiation to construction, the residents have been consistently engaged, fostering a strong community and collaboratively achieving their housing aspirations. Residents actively contribute through structured decision-making, ensuring the project reflects their values and long-term needs. Moreover, by incorporating communal spaces, resource-sharing, and connections with the broader neighbourhood, Can 70 strengthens social cohesion both among its residents and within the wider community.

Policy and Financing

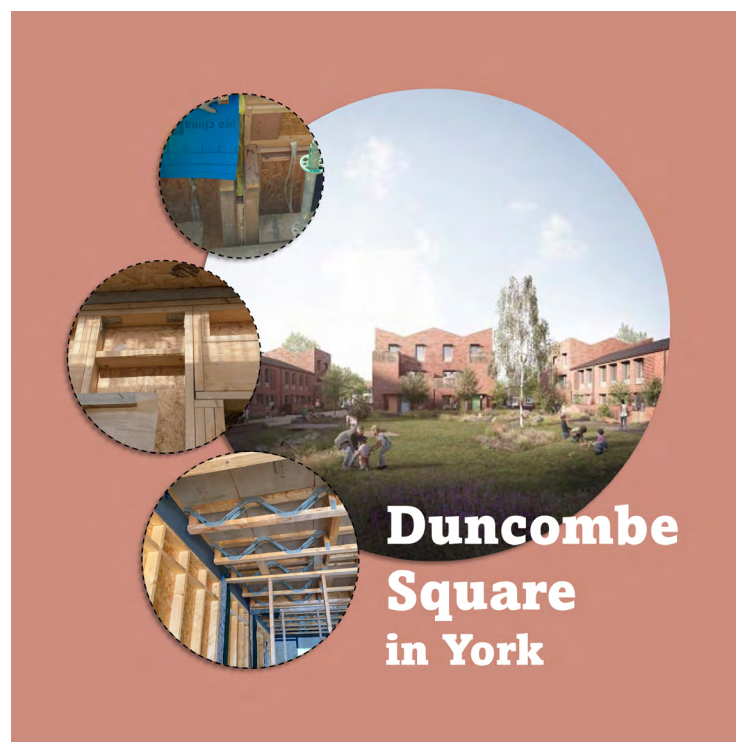
The initiative explores policy innovations and regulatory instruments that support community-led social housing for older populations, particularly through the grant-of-use model. The project demonstrates a sustainable approach to housing by leveraging public-community partnerships and innovative procurement strategies. It also contributes to the broader debate on social housing policies by advocating for resident-managed collective infrastructures that enhance autonomy and mutual support. Through active engagement with local governance, Can 70 highlights the crucial role of policy interventions and access to public land in fostering sustainable, inclusive housing solutions for ageing populations.



Duncombe Square housing

York, UK

Edited text based on case documentation by Aya Elghandour.



Source: <https://www.york.gov.uk/housing/housing-delivery-programme-1/3>

Architect Mikhail Riches	Housing type Terraced housing
Location York, United Kingdom	Urban context City centre
Project year 2020	Construction system Off-site timber frame construction
Construction period 2022–2024	Project status Built

Duncombe Square, a housing project in the City of York, is a key part of the council's housing delivery programme, launched after a climate emergency was declared in March 2019. According to Passivhaus Trust, it is Yorkshire's largest affordable housing project, designed to promote healthy, low-carbon living. The homes are designed with warmth in mind and well-ventilated interiors reduce risks of excess cold and mould—common health hazards in British housing. Features like air-source heat pumps and PV panels are expected to cut energy use and bills by 70%, achieving zero-carbon in-use and ensuring affordable running costs for residents.

With 60% of its 34 homes classified as affordable housing, the development includes a mix of one-bedroom flats to four-bedroom family homes, complemented by outdoor spaces and a communal green area. Designed by Mikhail Riches, a Stirling Prize-winning architect, the project exemplifies sustainable, community-focused housing. Extensive public consultations helped shape the design, ensuring alignment with local needs.

Recognised with multiple accolades, including the Housing Design Awards and Planning Awards 2022, Duncombe Square demonstrates how modern, sustainable design can enhance local architecture and community wellbeing. The council hopes it will serve as a model for other local authorities and housing developers across the UK.

RELATED CONCEPTS

- : FINANCIAL WELLBEING
- : HOUSING AFFORDABILITY
- : MEASURING HOUSING AFFORDABILITY
- : PARTICIPATORY APPROACHES
- : SOCIAL SUSTAINABILITY

ALIGNMENT WITH PROJECT RESEARCH AREAS

By integrating sustainable design, active community involvement, and forward-thinking policy implementation, Duncombe Square serves as a model for affordable, sustainable, and health-focused housing.

Design, Planning and Building

This project integrates design, planning, and construction with a focus on sustainability and residents' wellbeing. Following Passivhaus principles, it enhances indoor air quality and energy efficiency while using sustainable materials like brick, render, and timber shingles to create a modern yet contextually fitting design. The low-rise, high-density terraced housing blends seamlessly

with the local architectural identity. Unlike conventional design-build procurement, the architect led the process in close collaboration with the contractor, ensuring airtightness, energy efficiency, and high indoor air quality through precise installations and multiple tests. The primary structure employs off-site timber frame construction for added sustainability. Planning prioritises a pedestrian-friendly, child-centred neighbourhood, with vehicle parking along the perimeter and dedicated cycle parking. Communal green spaces, growing plots, and private planters encourage outdoor activity and foster community interaction.

Community Participation

The community has been actively involved through design consultation, enhanced social infrastructure, and workforce development initiatives. Local residents and Clifton Green primary school students helped to shape the design through drop-in events, workshops, and online sessions during the COVID-19 lockdown. The development fosters social interaction and sustainability by reducing car dependency, enhancing cycling infrastructure, and incorporating communal spaces like food-growing areas and child-friendly zones. Additionally, Caddick Construction provides training for staff, new hires, and students, while the City of York council partners with York College and Job Centre Plus to develop 'green skills.' The site also serves as a case study, promoting sustainable construction practices.

Policy and Financing

The Duncombe Square project is funded through Homes England's Affordable Homes Programme and local sources, securing additional funding from right-to-buy receipts and market sales. The total project cost is £14 million, with £2 million allocated to land, £10 million to construction, and £2 million for additional costs. To ensure economic sustainability, 60% of the homes are designated to affordable housing—20% for social rent and 40% for shared ownership—exceeding local planning requirements. The remaining 40% are market-rate homes, helping to subsidise the affordable housing units. This financial model supports a self-sustaining development strategy, ensuring long-term affordability despite limited government funding.

Design, Planning, and Building

Community spaces: Features communal green areas, growing plots, and private planters to encourage outdoor activity and social interaction.

Housing type: Low-rise, high-density terraced housing that blends with the local architectural identity.

Material use: Incorporates sustainable materials like brick, render, and timber shingles for a modern yet contextually fitting design.

Sustainability and wellbeing: Designed with Passivhaus principles to enhance indoor air quality and energy efficiency.

Urban planning: Prioritises a pedestrian-friendly, child-focused neighbourhood with perimeter vehicle parking and dedicated cycle parking.

The focus on Passivhaus principles and off-site timber frame construction not only supports sustainability but also provides training opportunities for workers, ensuring that sustainable construction skills are developed and shared.

The low-rise, high-density terraced housing model allows for more homes to be built within a compact footprint, helping to maximise affordable housing availability while maintaining high design and sustainability standards.

Community Participation

Community engagement: Local residents and school students contributed to the design through drop-in events, workshops, and online sessions during the COVID-19 lockdown.

Social and environmental focus: The development promotes social interaction and sustainability by reducing car dependency, enhancing cycling infrastructure, and incorporating communal spaces like food-growing areas and child-friendly zones.

Workforce development: Caddick Construction provides training for staff, new hires, and students, while the City of York Council collaborates with York College and Job Centre Plus to develop "Green Skills."

Policy and Financing

Affordable housing allocation: 60% of homes designated as affordable—20% for social rent and 40% for shared ownership, exceeding local planning requirements.

Economic sustainability: A self-sustaining financial model ensuring long-term affordability despite limited government funding.

Funding sources: Supported by Homes England's Affordable Homes Programme and local funding, supplemented by right-to-buy receipts and market sales.

Market-rate homes: 40% of homes sold at market rates to help subsidise affordable units.

By reducing car dependency, enhancing cycling infrastructure, and integrating communal green spaces, the project lowers living costs for residents, supporting long-term affordability and financial sustainability.

ESG finance

European-Global

Edited text based on case documentation by Alejandro Fernández.



Source: RE-DWELL

Instrument Regulation	Target group -
Issued 2020s	Housing tenure -
Application period 2020s	Sector Economics, sociology, finance
Scope European-Global	

The regulation of financial markets using Environmental, Social, and Governance (ESG) criteria has emerged as a central priority for the European Union in its effort to promote sustainable development. Key legislative initiatives, such as the EU Green Taxonomy, are designed to define and classify sustainable economic activities. These measures aim to improve transparency, enhance accountability, and steer private capital toward investments that contribute to the EU’s environmental objectives, particularly the transition to a low-carbon economy.

ESG finance, when effectively aligned with sustainability and social equity goals, can play a pivotal role in supporting the transformation of the housing sector. By linking access to capital with environmental and social performance, it fosters the development of more resilient, inclusive, and environmentally responsible built environments. This alignment not only advances climate goals but also promotes long-term social wellbeing and economic stability across European communities.

For social housing organisations, the integration of ESG criteria into financial regulation presents both opportunities and challenges. As Member States increasingly incorporate decarbonisation targets for the residential sector into national legislation, these organisations must find ways to meet new environmental standards without compromising their core mission of providing affordable, secure housing for vulnerable populations.

RELATED CONCEPTS

- : BUILDING DECARBONISATION
- : FRAMEWORK
- : HOUSING AFFORDABILITY
- : HOUSING GOVERNANCE
- : HOUSING POLICY
- : HOUSING REGIME
- : JUST TRANSITION
- : MEASURING HOUSING AFFORDABILITY
- : SOCIAL HOUSING
- : SUSTAINABILITY BUILT ENVIRONMENT

ALIGNMENT WITH PROJECT RESEARCH AREAS

ESG finance holds transformative potential to shape housing solutions that are not only environmentally conscious but also socially inclusive and rooted in ethical governance.

Design, Planning and Building

ESG finance influences housing projects by prioritising sustainability, energy efficiency, and long-term environmental impact. These financial instruments incentivise social housing organisations to adopt energy-efficient standards, ensuring that buildings are constructed or renovated to meet stringent energy performance targets. Thus, ESG directly affects the design and construction of affordable housing through green bonds and sustainability-linked loans. Moreover, it directs funding toward retrofitting existing buildings to improve their energy efficiency, ensuring that both new and existing housing stock contribute to reducing carbon emissions. The EU Green Taxonomy provides criteria for environmentally friendly investments, pushing housing developers to integrate sustainable building practices and energy efficiency into their projects. The growing demand for ESG-compliant housing also aligns with the EU's Renovation Wave, which focuses on decarbonising the built environment.

Community Participation

Sustainable finance ensures that investments account not only for environmental outcomes but also for social impacts, particularly on vulnerable groups. By embedding social factors into financial frameworks, ESG finance supports affordable housing solutions that respond to the challenges marginalised communities face in accessing adequate housing. It also encourages inclusive decision-making, empowering communities to participate in the design and development of their living environments. In doing so, ESG finance fosters stronger community engagement and helps ensure that housing initiatives reflect the needs and wellbeing of underserved populations—advancing both equity and inclusivity.

Policy and Financing

The EU Green Taxonomy and the Sustainable Finance Disclosure Regulation play a crucial role in shaping sustainable finance within the social housing sector by reshaping investment practices. These regulations channel both public and private finance toward sustainable housing initiatives, encouraging policy innovation. Instruments like the EU Green Bond Standards and Sustainability-Linked Loans influence the availability and cost of capital, motivating housing providers to meet energy efficiency and decarbonisation targets. They also enhance transparency and accountability, helping to mitigate the risk of greenwashing. Furthermore, ESG finance introduces governance frameworks that promote ethical decision-making, ensuring that housing projects are not only financially viable but also socially responsible.

Design, Planning, and Building

Affordable housing: Supports affordable housing development via green bonds and sustainability-linked loans (SLBs).

Building retrofitting: Directs funding towards upgrading existing buildings to improve energy efficiency and reduce carbon emissions.

Decarbonisation: ESG finance aligns with EU efforts to decarbonise the built environment through sustainable housing solutions.

Energy efficiency: Encourages social housing organisations to meet strict energy efficiency targets through financial instruments.

Efforts to decarbonise the built environment go beyond environmental benefits by addressing social equity, ensuring that vulnerable groups have access to sustainable, energy-efficient housing.

Access to sustainable finance, such as green bonds and sustainability-linked loans (SLBs), ensures funding is available for affordable housing projects, making them financially viable for social housing organisations.

Community Participation

Community participation: ESG principles encourage residents to engage in decision-making, shaping their living environments.

Equity and inclusivity: Aligns housing initiatives with the needs of disadvantaged populations, fostering social justice.

Social impact focus: Prioritises both environmental sustainability and social equity, ensuring investments benefit vulnerable groups.

Ethical governance frameworks promote transparency and accountability in decision-making, ensuring that communities have a voice in shaping housing projects.

Policy and Financing

Capital accessibility: EU Green Bond Standards and Sustainability-Linked Loans influence the availability and cost of funding for housing providers.

Ethical governance: ESG finance introduces frameworks to promote ethical decision-making and social responsibility in housing projects.

Sustainable finance regulations: The EU Green Taxonomy and SFDR guide investment towards environmentally and socially responsible housing projects.

Transparency and accountability: Strengthened regulations reduce the risk of greenwashing and ensure responsible investment.

Hope Street

Southampton, UK

Edited text based on case documentation by Anna Martin.



Source: <https://snugarchitects.co.uk/our-work/hope-street>

Architects
Snug Architects

Housing type
Supportive housing

Location
Southampton, United Kingdom

Urban context
City

Project year
2021

Construction system
Cross-laminated timber

Construction period
2023

Project status
Built

Hope Street is a pioneering residential community designed to support women involved in the justice system, particularly those that have committed low-risk, non-violent offences and are often primary caregivers for their children. Established by the charity One Small Thing, it provides an alternative to traditional custodial sentences, offering a trauma-informed environment that focuses on rehabilitation rather than punishment. The services include accommodation, mental health support, substance abuse programmes, educational opportunities, and assistance with maintaining family relationships. It is a model of compassionate justice that prioritises rehabilitation, family preservation, and social reintegration.

Designed with healing in mind, the community features a café and garden, enabling residents to develop skills and engage with the local community. The trauma-informed design ensures a supportive, calming space that reduces the risk of re-traumatisation. Launched as a pilot project in Hampshire in 2019 and completed in the summer of 2023, Hope Street has received significant acclaim, winning the 2024 RIBA MacEwen Award for architecture that serves the common good.

RELATED CONCEPTS

- : PARTICIPATORY APPROACHES
- : SOCIAL VALUE
- : TRAUMA-INFORMED DESIGN

ALIGNMENT WITH PROJECT RESEARCH AREAS

By focusing on innovative design, promoting active community participation, and aligning with progressive policy frameworks, Hope Street sets an example of how housing can play a critical role in rehabilitating and reintegrating vulnerable populations into society.

Design, Planning and Building

Hope Street's architectural design is deeply rooted in trauma-informed principles, prioritising the wellbeing of residents while also addressing their specific needs as women engaged in the justice system. The architectural design prioritises building trust with residents, encouraging their active participation in the healing process. The housing offers sanctuary while fostering community, supporting personal recovery alongside collective empowerment.

The communal spaces are designed to foster social interaction, support skill development, and encourage integration with the wider community—reflecting a commitment to socially supportive and sustainable design. The on-site coffee shop, open to both residents and the public, provides women with opportunities to build hospitality skills while actively engaging with the local neighbourhood.

Community Participation

Community involvement was a central element in the development of Hope Street. The design team incorporated residents' feedback into all aspects of the project—from overall layout to landscaping and interior design. Through a series of workshops, architects gained crucial insights into features that could either trigger negative memories or foster feelings of safety and empowerment. This input significantly influenced decisions around the organisation of living spaces, material choices, and colour schemes.

The collaborative approach ensured that the lived experiences of justice-involved women remained at the heart of the design process. For instance, residents shared that pastel colours—originally selected for their calming effect—evoked memories of institutional settings like prisons and hospitals. This led to a reassessment of the colour palette to better align with residents' preferences and emotional wellbeing.

Policy and Financing

The project benefited from a range of supportive policies and financing mechanisms, including land-use provisions dedicated to affordable housing and streamlined development approval processes. These measures not only helped to reduce costs but also ensured a timely completion. Close collaboration with local authorities and funding bodies played a pivotal role in navigating complex planning regulations and securing the necessary financial backing, enabling the successful realisation of the project's vision.

Design, Planning, and Building

Communal spaces: The design includes communal spaces, such as a coffee shop and lounges, which promote social interaction, skill development, and community integration.

Shelter: Provides a sanctuary for women involved in the justice system while fostering a sense of community, supporting both personal recovery and collective empowerment.

Trauma-informed design: The architectural design is grounded in trauma-informed principles, prioritising the wellbeing of residents.

The communal spaces promote social interaction, skill development, and community integration, aligning with the concept of social empowerment, where design choices foster residents' personal growth and involvement with the local community.

Community Participation

Community involvement: Workshops gathering insights from residents on design elements that foster safety and empowerment.

Design collaboration: Insights from residents led to the adjustment of pastel colours, initially intended for calmness, to better align with preferences and avoid institutional associations.

Social empowerment: Design choices, such as communal spaces, promote skill development and integration with the local community.

The realisation of the shelter was made possible through public financing, which provided the essential resources to bring this vision to life.

Policy and Financing

Financial backing: Public financing secured the necessary support to bring the project's vision to fruition.

Public engagement: Close cooperation with local authorities and funding bodies was essential in navigating complex planning regulations.

Supportive policies: Benefited from land-use provisions dedicated to affordable housing and streamlined development approval processes.

Knight's Walk

London, UK

Edited text based on case documentation by Mahmoud Alsaeed.



Source: Mae Architects, 2022

Architects Mae Architects	Housing type Multifamily housing (apartments)
Location Renfrew Road, London Borough of Lambeth, United Kingdom	Urban context Housing estate
Project year 2019 (planning permission obtained)	Construction system Steel structure (fabric first approach)
Construction period Phase 1 (completed 2022), phase 2 (ongoing)	Project status Built

The Knight's Walk project, also known as Lambeth's Homes, comprises 84 residential units, all of which are council housing—a form of social housing managed directly by the local council. Situated on Renfrew Road in the densely populated north London borough of Lambeth, the development was delivered in two phases. The first phase saw the construction of 16 rental flats on the site of a former multi-storey car park. In the second phase, 17 existing council homes and one privately owned property were demolished to accommodate 68 new flats.

At its core, this initiative aimed to regenerate the urban fabric by creating healthy, inclusive environments and strengthening connections with the surrounding community. It promotes social cohesion through shared spaces and activities, while aligning with the local authority's long-term sustainability goals and strategic vision. Knight's Walk stands out for its fabric-first approach and commitment to high sustainability standards, addressing key issues such as energy efficiency, overheating, tenant relocation, consistent build quality, and the delivery of warm, comfortable homes.

In 2022, Knight's Walk was awarded the Local Authority Building Control Building Excellence London Regional Award, the Construction News Awards and the Housing Design Awards, all of which recognise excellence in sustainable and affordable housing practices.

RELATED CONCEPTS

- : BUILDING DECARBONISATION
- : ENVIRONMENTALLY SUSTAINABLE SOCIAL HOUSING
- : INDOOR THERMAL COMFORT
- : SUSTAINABILITY BUILT ENVIRONMENT

ALIGNMENT WITH PROJECT RESEARCH AREAS

The Knight's Walk project aligns with RE-DWELL's three key research areas by integrating sustainable design, fostering resident involvement, and navigating policy frameworks to deliver affordable and high-quality housing.

Design, Planning and Building

Knight's Walk is grounded in a holistic approach to sustainable design, integrating environmental, economic, and social sustainability with a strong focus on wellbeing and quality of life.

Environmental sustainability is promoted through passive design strategies, renewable energy sources, and energy-efficient electrification. Key measures include mechanical ventilation with heat recovery, enhancements to local bio-

diversity, and sustainable drainage systems that support long-term climate resilience and carbon reduction. Economic sustainability is achieved through accelerated construction techniques and a fabric-first approach, which help minimise construction time, material waste, noise pollution, and CO₂ emissions—contributing to both cost-efficiency and environmental performance. Social sustainability is supported through inclusive community engagement practices that centre local voices, foster a sense of ownership, and strengthen neighbourhood cohesion. Residents played an active role in shaping the project, ensuring that it responded to their needs and aspirations. Together, these strategies reflect a comprehensive commitment to wellbeing, ensuring that the built environment not only meets technical standards but also provides residents with healthy, comfortable, and dignified homes.

Community Participation

The Knight's Walk project actively supports community participation by involving residents in the redevelopment process from the outset. Through co-design workshops and continuous dialogue with architects and the local council, tenants had a direct influence on housing layouts, communal spaces, and sustainability features. Transparent communication ensured that their concerns were addressed, fostering trust and inclusivity.

The project also prioritised social cohesion by incorporating communal gardens and shared spaces that encourage interaction among residents. Additionally, careful tenant relocation planning minimised disruption, allowing existing residents to transition smoothly into their new homes. By prioritising community engagement, Knight's Walk exemplifies a socially inclusive, resident-driven approach to housing development.

Policy and Financing

The Knight's Walk project complies with national, regional, and local regulations, including the UK building regulations (Part L, which focuses on energy efficiency), Greater London sustainability guidelines, and Lambeth's housing design standards. These frameworks ensure high standards for energy efficiency, insulation, and carbon reduction, contributing to the project's B energy rating, with potential to reach an A rating. The project also leveraged public funding and planning policies to replace outdated housing with high-quality, energy-efficient homes while maintaining affordability for existing tenants. By demonstrating how policy-driven urban renewal can be both financially viable and socially inclusive, Knight's Walk serves as a replicable model for sustainable, community-focused housing development.

Design, Planning, and Building

Environmental sustainability:

Achieved through passive design strategies that enhance energy efficiency.

Economic sustainability: Supported by accelerated construction methods and a fabric-first approach, reducing time and costs.

Fabric-first: Minimises material waste, noise pollution, and CO₂ emissions while optimising construction efficiency.

Green building principles: Includes renewable energy sources, reduces carbon emissions, and maximises social and economic benefits.

Sustainable design integration: Incorporates economic, environmental, social, and human sustainability in planning and construction.

Applying green building principles, sustainable design integration, and accelerated construction methods provides valuable insights for developing guidelines that ensure future projects meet environmental, economic, and social sustainability goals efficiently.

Sustainable design integration balances environmental, economic, and social factors, conserving resources while promoting social sustainability through community spaces and walkability.

Policy and Financing

Governance and policy alignment:

The project navigates the regulatory landscape by aligning various policies and standards, including Building Regulations Part L, regional guidelines for Greater London, and voluntary standards like Lambeth's Housing Design Standards.

Insights for future developments:

The project offers valuable insights that can inform the development of comprehensive design guidelines for similar future projects.

Community Participation

Publicly accessible spaces:

Features include a public garden, cricket pitch, and revitalisation of Cotton Garden Park through adaptive reuse.

Prioritising walkability: Promotes accessibility and social interaction with well-defined pathways, landmarks, and entry points, creating a seamless flow through the site.

Social sustainability: Enhanced through community engagement strategies focusing on local needs and inclusivity, fostering a resilient and equitable urban environment.

Križevci cooperative housing

Croatia

Edited text based on case documentation by Marko Horvat.



Source: <https://forbes.n1info.hr/aktualno/u-europi-je-hit-a-uskoro-ce-bitimoguće-i-u-hrvatskoj-novi-model-gradnje-priustivih-stanova/>

Instrument
Incentive

Issued
2021

Application period
2021-2023

Scope
Local

Target group
Young first-time buyers,
the elderly

Housing tenure
Cooperative housing

Sector
Economics, fiscal policy

Housing affordability is shaped by factors such as local housing prices, income levels, and interest rates, and is measured by the relationship between housing prices and income. In Croatia, affordability issues affect both urban and rural areas, where low incomes and the high energy inefficiency of homes—particularly in rural regions—worsen the problem. Low interest rates have spurred property investment, driving up prices and encouraging market speculation, especially in tourist areas. Furthermore, the financialisation of housing and foreign investment have contributed to the affordability crisis.

Collaborative housing models—such as cohousing and housing cooperatives—offer viable alternatives to the current housing system. These models emphasise resident participation, mutual respect, and solidarity, and are often supported by innovative financing mechanisms like crowdfunding. Housing cooperatives, where members share ownership and decision-making, help mitigate market speculation and ensure long-term affordability.

Croatia intended to test this model through a pilot project in Križevci, which was meant to establish a sustainable framework for cooperative housing. The project aimed to convert a former military base into cooperative housing, with support from the local government and various organisations. If successful, it would have demonstrated the potential of cooperative housing as a community-driven solution to the challenges of housing affordability and market volatility in Croatia. However, the project remained at the conceptual stage and was never implemented in practice.

RELATED CONCEPTS

- : COMMUNITY EMPOWERMENT
- : COMMUNITY-LED HOUSING
- : SOCIAL VALUE

ALIGNMENT WITH PROJECT RESEARCH AREAS

This cooperative housing initiative in Križevci exemplifies the principles of sustainability, community empowerment, and policy innovation, all of which are crucial in tackling housing affordability challenges. It offers a model that not only meets local needs but also has the potential for scaling and replication across other regions of Croatia and beyond.

Design, Planning and Building

The pilot project makes significant contributions to construction, building retrofitting, and urban regeneration. Key features include the use of natural and locally sourced materials in construction and renovation, enhancing energy

efficiency through deep retrofitting, and implementing energy-efficient technologies such as photovoltaic systems for electricity generation.

Community Participation

Community participation is fundamental to cooperative housing projects, as it fosters a sense of ownership and long-term commitment among residents. Engaging future dwellers in planning and decision-making ensures that housing solutions are tailored to their specific needs and preferences, enhancing both functionality and liveability.

Active participation also promotes social cohesion by encouraging interpersonal connections and community networks. Ultimately, it helps shape the housing development to reflect residents' aspirations, strengthening the cooperative's foundation and supporting the growth of a thriving, inclusive community.

This project includes initiatives to educate potential members about their roles and responsibilities within the cooperative, expected behaviours, and practices for ensuring its long-term sustainability. Furthermore, community input supports environmental and operational sustainability by encouraging effective management, proactive maintenance, and transparent, democratic governance.

Policy and Financing

This pilot project is crucial for evaluating the potential of alternative housing models within Croatia's housing market. It shows that residents in smaller cities are interested in forming housing cooperatives, suggesting that similar initiatives could be successful in larger urban areas.

Currently, affordable housing—cooperative housing included—is not a priority in government policy, and there is no supportive legal framework to facilitate such initiatives. Key challenges include the lack of regulation for housing cooperatives, insufficient institutional support, and the absence of long-term loan options in the Croatian financial market. To address these challenges, a viable solution would be the establishment of an intermediary organisation to oversee all aspects of cooperative housing projects, from securing financing to managing execution, thus ensuring regulatory compliance, professional oversight, and long-term sustainability.

Design, Planning, and Building

Building retrofitting: Focuses on improving energy efficiency through deep renovation and the implementation of energy-efficient technologies, such as photovoltaic systems.

Industrial construction: Emphasises the use of natural and local materials in the construction and renovation of existing buildings.

Urban regeneration: Aims to regenerate urban areas by enhancing energy efficiency and sustainability in existing buildings.

Retrofitting projects foster social cohesion by creating shared spaces and involving the community in planning and renovation, enhancing belonging and unity.

Building ownership and commitment is key to cooperative housing success. However, limited long-term loans in Croatia make it hard for residents to invest, discouraging participation and growth.

Community Participation

Democratic governance: Promotes inclusivity and sustainability through transparent decision-making processes.

Educational activities: Provides educational opportunities to future members on responsibilities and sustainable operation.

Ownership and commitment: Fosters a sense of ownership and long-term dedication among residents.

Shaping development: Aligns development with residents' desires, strengthening the cooperative foundation.

Social cohesion: Promotes a cohesive, supportive community through long-term engagement.

Democratic governance needs clear laws; without them, cooperative models are hard to implement.

Policy and Financing

Financial constraints: Lack of long-term loan options in the Croatian financial market

Legal barriers: Absence of supportive legal framework for housing cooperatives, and issues with regulating and institutionalising these relationships.

Overlooked policy area: Affordable housing, including cooperative housing, lacks attention in current policy.

The use of natural and local materials in industrial construction may be undervalued or overlooked by policy.

Navarinou Park

Athens, Greece

Edited text based on case documentation by Androniki Pappa.



Source: Androniki Pappa

Initiating entity
Exarcheia residents initiative

Place
Exarcheia neighbourhood, Athens

Period
Since 2009

Objectives
Transformation of an empty plot into a self-managed community park

Context
Grassroots urban reclamation

Stakeholders
Residents, activist groups, local residents

Educational/participatory methods
Activism, co-construction, co-creation, co-governance, collective action, commoning, network development, occupation of public space, and public campaigns

Navarinou Park in Exarcheia, Athens, is an urban commons initiative launched in 2009 through the collective efforts of neighbours and activists in response to the city's shortage of green spaces. By occupying and transforming an abandoned parking lot into a self-managed green area for recreation and play, the park stands as a strong example of grassroots urban regeneration. It is driven by commoning practices such as co-creation, co-construction, and collective stewardship.

The park is managed through a model of social self-governance, with decisions made collectively in an open assembly. Operating on a non-profit, non-proprietary basis, it has evolved independently of state or market structures, guided by principles of solidarity, participation, and openness. Despite challenges such as declining participation and external pressures, Navarinou Park continues to serve as a dynamic example of urban commoning. It offers social, cultural, and environmental value, while reinforcing community resilience, collective agency, and social capital.

RELATED CONCEPTS

- : CO-CREATION
- : COMMUNITY EMPOWERMENT
- : DIRECT ACTION
- : PARTICIPATORY APPROACHES
- : PLACEMAKING
- : SOCIAL SUSTAINABILITY
- : SPATIAL AGENCY
- : URBAN COMMONS

ALIGNMENT WITH PROJECT RESEARCH AREAS

By integrating sustainable design, community governance, and alternative policy frameworks, Navarinou Park serves as a radical yet effective model for reclaiming urban spaces, advancing social equity and enabling environmentally responsible urban transformation.

Design, Planning and Building

The transformation of an abandoned parking lot into a communal green space exemplifies innovative urban design and planning. Through a participatory, self-built process, community members actively contributed to shaping functional spaces, resulting in sustainable and context-sensitive spatial outcomes. The project highlights the importance of translating collective needs into a cohesive physical and social environment through grassroots action and collaborative planning.

Community Participation

Community involvement lies at the heart of Navarinou Park's success. Governed by local residents through a model of social self-governance and collective decision-making, the initiative fosters inclusive participation by engaging the community in both the design and management of the space. This grassroots approach ensures the park reflects shared values of solidarity, openness, and cooperation. Over time, it has evolved into a symbol of social cohesion, where collective efforts strengthen neighbourhood ties and contribute to the building of social capital.

Policy and Financing

Navarinou Park operates independently of traditional public funding mechanisms, adopting a non-profit, non-proprietary model for resource management and long-term sustainability. By rejecting private ownership and commercial interests, it presents an alternative framework for managing public urban space—one firmly rooted in community stewardship. This model challenges conventional policy paradigms and exemplifies a cost-effective, sustainable strategy for urban regeneration. Consequently, it serves as a valuable reference for neighbourhoods and municipalities seeking inclusive, community-driven urban development.

Design, Planning, and Building

Grassroots, adaptive approach: The project is driven by the local community, adapting to the evolving needs of the area and its residents.

Community-led transformation: The park was created by local residents, who took over and transformed a neglected parking lot into a vibrant green space.

Continuous growth: The park's evolution and improvements are sustained by ongoing community involvement, ensuring its relevance and adaptability.

Sustainability and spatial quality: The park prioritises sustainable practices and thoughtful design to ensure a high-quality environment that meets the needs of the community.

The park's focus on sustainability and spatial quality creates a high-quality environment that fosters social cohesion, uniting the community through shared responsibility and thoughtful design.

The park's growth is sustained by shared responsibility, with residents managing maintenance, events, and problem-solving to meet community needs.

Community Participation

Co-governance: Local residents, activists, and other stakeholders participate in decision-making through an open assembly, ensuring inclusive governance.

Participatory decision-making: Park governance is driven by collaborative efforts, ensuring that all decisions reflect the community's needs.

Shared responsibility: Local residents actively manage the park, handling tasks like maintenance, organising events, and solving challenges as they arise.

Social cohesion: The park fosters a sense of belonging and collective ownership, promoting unity and shared responsibility among community members.

The park promotes belonging and collective ownership, strengthened by community-driven funding through crowdfunding and non-profit efforts, enhancing social bonds and resilience.

Policy and Financing

Alternative funding models: Operating outside of traditional funding and policy frameworks, the park fosters social inclusion and community resilience.

Crowdfunding: The park thrives on community-driven financial support, avoiding traditional public or private funding.

Self-sustaining, non-profit model: The park's development and upkeep follow a non-profit, self-sustaining model, ensuring its continued existence and growth.

The park's transformation is funded through crowdfunding, allowing the community to drive its creation and upkeep.

Oosterwold

Almere, The Netherlands

Edited text based on case documentation by Andreas Panagidis.



Source: MVRDV, © Daria Scagliola

Planners MVRDV, Municipality of Almere	Housing type Single-family, multifamily, collective housing
Location Almere, The Netherlands	Amenities Shops, grocery stores, schools
Project year 2011	Instrument Urban plan, urban regulation
Construction period 2011–present	

The Oosterwold greenfield site in Almere, Netherlands, exemplifies an innovative model of self-organised urban development. Initiated in the aftermath of the 2008 financial crisis, the project departs from conventional planning practices by enabling individuals, housing associations, and developers to purchase land without a predefined master plan. Instead, development is guided by flexible regulations governing land use, energy production, and infrastructure, resulting in a diverse mix of residential and agricultural spaces. Residents take an active role in the design and management of communal services—including roads, waste, and water systems—fostering a participatory, do-it-yourself urbanism.

While the project aims to promote affordable and sustainable living, it also faces challenges related to potential exclusivity and varying environmental standards. Nevertheless, Oosterwold has supported the development of cohousing initiatives and affordable rental housing, effectively combining private investment with community-led governance. The initiative offers valuable lessons on how self-organised urban growth can challenge market-dependent housing models and advance collaborative, inclusive approaches to affordable housing development.

RELATED CONCEPTS

- : COLLABORATIVE GOVERNANCE
- : COMMUNITY EMPOWERMENT
- : PARTICIPATORY APPROACHES
- : PUBLIC-CIVIC PARTNERSHIP
- : SUSTAINABILITY BUILT ENVIRONMENT

ALIGNMENT WITH PROJECT RESEARCH AREAS

Oosterwold exemplifies how self-organised urban development can address affordable housing challenges through flexible planning, community participation, and forward-thinking policies that decentralise neighbourhood planning.

Design, Planning and Building

Oosterwold follows an ‘organic area development’ model (organische gebiedsontwikkeling), a Dutch planning concept characterised by flexible, step-by-step urban growth. Unlike traditional top-down approaches, where governments define a detailed master plan prior to development, this model emphasises bottom-up, incremental progress driven by private actors—such as residents, developers, cooperatives, and small businesses.

The development integrates residential areas with sustainable agriculture, placing strong emphasis on the use of renewable energy and the local production of food. Despite its low-density layout, Oosterwold maintains a strong

sustainability focus by incorporating these practices into the daily routines and infrastructure of community life. As a large-scale, experimental greenfield development, it is particularly notable for blending residential and agricultural uses by dedicating a significant portion of land to suburban farming.

Community Participation

Oosterwold's development is rooted in active citizen engagement, with residents collectively managing essential infrastructure such as roads, waste, water, energy, and communal green spaces. This participatory governance model empowers residents, fosters a strong sense of community, and aligns development with shared needs and values.

As one of the most radical examples of active citizenship, Oosterwold shifts planning responsibilities from local authorities to the community. Unlike conventional state-led planning, it encourages private initiative and offers regulatory flexibility, enabling residents to directly shape their living environment. The model supports knowledge exchange among all stakeholders—experts and non-experts alike—leading to an organic, adaptive distribution of land uses that evolves with the community.

Policy and Financing

An innovative land sale model—offering plots below market value—supports affordable housing by enabling residents to integrate agricultural activity with residential living, thereby promoting sustainability and self-sufficiency. As a planning experiment, Oosterwold offers insights for policy innovation at the intersection of housing, self-organisation, collaborative governance, and local energy and food production.

Design, Planning, and Building

Low-density layout: The development has a low-density layout, with an emphasis on sustainability in daily community life.

Mixed land uses: Includes a combination of residential spaces and sustainable agriculture.

Organic area development model: Land is sold to individuals, housing associations, and developers without a pre-determined master plan.

Resident-driven design: Residents are responsible for designing and building their own homes, allowing for diverse architectural styles.

Sustainable practices: Focus on sustainable building practices and integration of renewable energy and food production at the neighbourhood level.

Selling plots below market value makes housing more affordable and fosters diverse development based on individual and collective needs.

As the community is involved in land use decisions, residents may also play a role in managing shared services like water management, enhancing the overall sustainability of both land and services.

Community Participation

Community-driven development: Land use is determined by the needs and demands of the residents.

Co-production of public services: Shared responsibility for services like water management between residents and the municipality.

Knowledge sharing: Encourages collaboration between experts and non-experts among stakeholders.

Participatory governance: Fosters community spirit, ensures development aligns with collective needs and values.

The exchange of insights between different stakeholders can lead to policies addressing urban energy, food production, and self-organisation, helping refine best practices for future policy development.

Policy and Financing

Innovative land sale model: Plots are sold below market value, making housing more affordable.

Optimising resources: Co-production approach helps optimise resource use and strengthen community ties.

Policy influence: This experiment could shape new policies addressing the links between housing, self-organisation, collaborative governance, and urban energy and food production.

Patch22

Amsterdam, The Netherlands

Edited text based on case documentation by Carolina Martin.



Source: Luuk Kramer

Architects Frantzen et al architecten	Housing type Multifamily housing
Location Amsterdam, The Netherlands	Urban context Redevelopment of an industrial area
Project year 2009–2016	Construction system Timber structure and façade with prefabricated concrete core
Construction period 2014–2016	Project status Built

Patch22 stands as an innovative response to the environmental and economic housing challenges of our time. Winner of the 2009 Amsterdam Buiksloterham Sustainability tender, the building not only garnered recognition for its sustainability scores but also stood out for its innovative circular design and adaptability to unforeseen future uses.

Embracing Open Building principles, the project prioritises flexibility in dwelling sizes and layouts, offering a thoughtful response to the demands outlined in the tender. The 30-metre high wooden structure currently houses 33 diverse dwellings, showcasing its adaptability by potentially subdividing the building into independent office floors or a maximum of 48 apartments.

Sustainability at Patch22 is a holistic endeavour, reflecting a nuanced approach to environmental, social, and economic dimensions. Resident participation in the design process not only fosters diversity but also strengthens a sense of belonging. Patch22 serves as a long-term investment, adapting to changing needs and potentially acquiring different uses over time. This adaptability aligns with the project's broader commitment to sustainability, emphasising long-term benefits over immediate gains.

RELATED CONCEPTS

- : CO-CREATION
- : DESIGN FOR DISASSEMBLY
- : INDUSTRIALISED CONSTRUCTION
- : OPEN BUILDING
- : SUSTAINABILITY BUILT ENVIRONMENT

ALIGNMENT WITH PROJECT RESEARCH AREAS

Patch22 shows how urban regeneration, community involvement, and innovative policy frameworks can come together to address housing needs in a sustainable and inclusive manner.

Design, Planning and Building

The design philosophy embraced in Patch22 places significant emphasis on designing for flexibility and adaptability. The subdivision of space within the support structure into multiple residential units is facilitated by the absence of load-bearing division walls and vertical shafts inside the apartments, along with the use of a horizontal services distribution. These design features enhance the building's flexibility in terms of use, layout, and apartment sizes.

Furthermore, the use of industrialised construction demonstrates how flexibility can be achieved within a sustainable framework. Efficient on-site assembly, reduced waste generation, and the incorporation of dry joints facilitate the future disassembly and reuse of building components. Additionally, the use of timber in both the structure and façade contributes to carbon sequestration, while integrated photovoltaic panels and rainwater collection systems support the goal of creating an energy-neutral building.

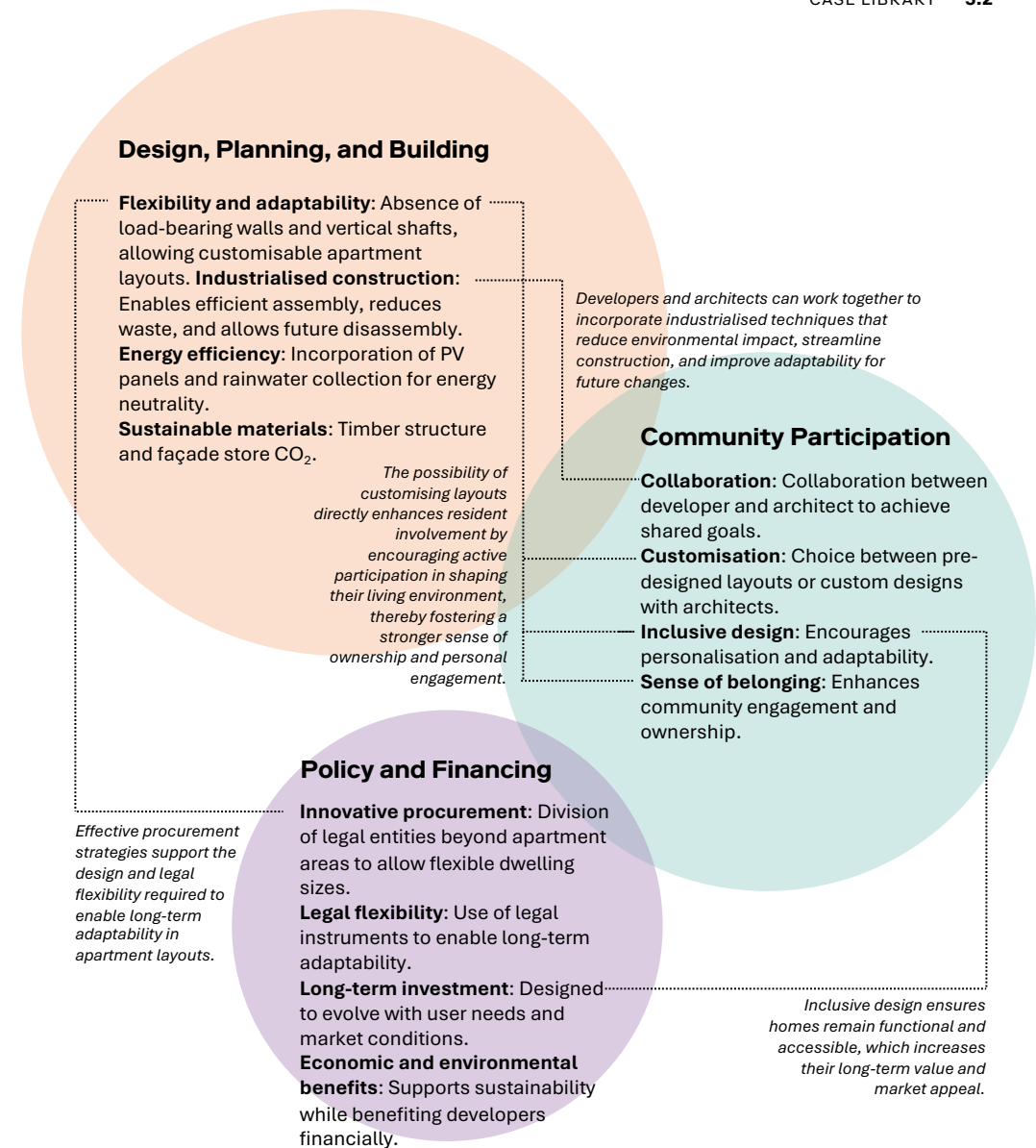
Community Participation

The project enables resident involvement in defining their own dwellings. The level of customisation is tailored to their preferences, with residents having the option to choose from pre-designed layouts or collaborate closely with architects to create custom layouts. This fosters inclusive design and cultivates a greater sense of belonging among residents.

Policy and Financing

Patch22 serves as a compelling example of how legal instruments can support long-term flexibility in building use and adaptation. Enabled by an innovative procurement process, the project allows for the legal division of spaces in multiple configurations—not limited to residential units. This flexibility makes it possible to repurpose or reconfigure areas over time, accommodating evolving resident needs or market conditions.

What makes Patch22 particularly distinctive is its demonstration of effective collaboration between a developer and an architect—stakeholders who often have divergent goals. Their shared vision resulted in a building designed as a long-term, adaptable asset that serves both residential and office functions. This versatility not only supports user needs over time but also aligns environmental sustainability with the financial interests of the developer.



Porto 15

Italy

Edited text based on case documentation by Lucia Chaloin.



Source: Lucia Chaloin

Instrument
Regulations

Issued
2018

Application period
2018–present

Scope
Country, regional, local

Target group
Young, low income, vulnerable groups

Housing tenure
Tenancy, public housing, cohousing

Sector
Sociology, public policy, urbanism

Porto 15 is Italy's first public rental cohousing project dedicated to residents under 35. Developed by three public welfare institutions in Bologna, it was designed and managed in collaboration with the residents. The project involved renovating a historic 1914 building to create eighteen residential units, comprising both two-bedroom and three-bedroom apartments. In 2017, after an intensive co-production process with residents and local authorities, the project welcomed its first tenants.

The initiative marked a groundbreaking example of public engagement, offering an alternative to traditional public housing models. Porto 15 challenges the conventional role of public housing providers by repositioning public administration as a service facilitator, while tenants become active participants within both the cohousing community and the broader neighbourhood through social and environmental sustainability initiatives. The collaborative design and management of shared spaces foster the development of new community competencies.

Following the success of Porto 15, Bologna introduced its first building regulations for collaborative housing. Consequently, Porto 15 is expected to inspire similar affordable cohousing projects not only within the city but across Italy.

RELATED CONCEPTS

- : AFFORDABILITY
- : CO-CREATION
- : COLLABORATIVE GOVERNANCE
- : COLLABORATIVE HOUSING
- : ENVIRONMENTALLY SUSTAINABLE SOCIAL HOUSING
- : PARTICIPATORY APPROACHES

ALIGNMENT WITH PROJECT RESEARCH AREAS

The renovation of a historic building in Bologna, with active resident participation, fostered social cohesion and influenced municipal policies and financing models for cohousing.

Design, Planning and Building

The project involved the renovation of a section of an early twentieth-century building, part of a broader initiative to repurpose Italy's extensive, underutilised public building stock. The primary goal was to enhance the building's energy performance through sustainable upgrades. This comprehensive retrofit included thermal insulation and the complete replacement of core systems—heating, ventilation, electrical, and plumbing. Future residents participated in the design of the shared basement spaces, choosing to include communal

facilities such as a laundry room, storage, and a music room. These collective amenities reduce management costs while fostering a strong sense of community.

Community Participation

As a rental cohousing initiative, Porto 15 is grounded in active resident participation to foster social connections both within the building and in the surrounding neighbourhood. Resident involvement began during the co-design phase, encouraging future tenants to take ownership of the space and develop a sense of belonging. Several communal areas were intentionally left undefined, giving residents the freedom to determine their use, build relationships, engage in collective management, organise recreational activities, collaborate with local organisations, and host events. To support and formalise these shared efforts, the municipality encouraged residents to establish an association, which continues to promote collaborative initiatives benefiting the wider community.

Policy and Financing

Porto 15 has broadened perspectives on existing housing models, creating an opportunity for local authorities to introduce new regulations that support future collaborative housing initiatives. These regulations emphasise clear technical standards and prioritise the social utility of such projects. The initiative has also sparked reflection on financing models and long-term sustainability, leading to the creation of dedicated municipal funding for affordable housing, including a specific fund for cohousing. Moreover, European funding—particularly through instruments like the National Recovery and Resilience Plan—is expected to play a crucial role in the coming years in advancing affordable social housing in Italy, with targeted support for collaborative housing projects.

Design, Planning, and Building

Communal space transformation:

Basement areas repurposed into shared facilities, including a bicycle repair workshop, laundry, and music room, enhancing social interaction.

Energy efficiency upgrades:

Installation of thermal insulation and modern heating, ventilation, electricity, and water systems to improve sustainability and reduce energy consumption.

Flexible shared spaces:

Certain communal areas intentionally left vacant for residents to collectively decide their use, promoting adaptability and shared decision-making.

Resident-led design:

Future residents actively contributed to the planning process, shaping communal spaces to foster engagement and community ownership.

Allowing residents to determine the use of communal areas fosters collective decision-making, similar to the association's role in organising community initiatives.

Policy and Financing

Alternative financing:

Encouraged discussions on new funding models, resulting in municipal funds for cohousing initiatives.

European funding support:

The national Recovery and Resilience Plan is expected to play a key role in funding affordable social housing in the coming years.

Policy influence:

Led to new housing regulations in Bologna with clear technical criteria and a strong focus on social utility.

Public-private partnerships:

Highlighted the importance of collaboration between public and private sectors in social housing development.

The energy-efficient upgrades align with the priorities of European funding programmes, which focus on green and affordable housing solutions.

Community Participation

Co-design sessions:

Future residents engaged in planning from the outset, fostering a sense of ownership and belonging.

Community-building training:

Prospective tenants completed 40 hours of training to strengthen group cohesion and collaboration.

Diverse and inclusive selection:

Residents were chosen based on their commitment to social diversity, including individuals with migration backgrounds and integration challenges.

Resident association:

A formal group was established to promote collaborative initiatives benefiting both the neighbourhood and the wider city.

Future residents' active involvement in co-designing their living spaces contributed to the creation of housing regulations in Bologna that emphasise social utility, reflecting their input in both individual homes and communal areas.

Solar Decathlon Europe 2022

Wuppertal, Germany

Edited text based on case documentation by Annette Davis.



Source: Annette Davis

Architects

18 university teams

Location

Wuppertal, Germany

Project year

2021–22

Construction period

2022

Housing type

Multifamily housing

Urban context

City centre

Construction system

Prefabrication, design for disassembly

Project status

Built

The Solar Decathlon Europe (SDE) is a university competition in which student-led teams design and construct innovative, environmentally sustainable House Demonstration Units on a 1:1 scale. Launched in the USA in 2002 and expanded to Europe in 2010, the competition involves university research groups sponsored by industry partners, such as contractors and product manufacturers. After the competition, the homes are opened to the public for guided tours, showcasing advancements in sustainable housing.

The SDE 2022 edition, held in Wuppertal, Germany, under the theme “SDE Goes Urban!”, featured 18 teams from 11 countries. Teams were given the option to choose from three tasks that address real-world urban challenges within the Mirker Quartier: 1. Renovation and expansion, 2. Closing gaps in construction, and 3. Renovation with the addition of stories. These tasks encompassed challenges such as urban regeneration, housing quality, and community needs, while also considering social dynamics—including inclusivity and accessibility) and economic factors such as affordability and sustainability.

Housing units were constructed using prefabricated building systems, assembled in the teams' home countries, then disassembled and transported to the competition site for reassembly within two weeks.

RELATED CONCEPTS

- : BIM
- : DESIGN FOR DISASSEMBLY
- : INDUSTRIALISED CONSTRUCTION

ALIGNMENT WITH PROJECT RESEARCH AREAS

The 2022 edition of the Solar Decathlon Europe competition focused on affordable, sustainable housing by incorporating circular design principles, such as material reuse and energy efficiency.

Design, Planning and Building

The competition focused on design and building challenges that address both architecture and engineering, with an emphasis on urban design and adaptability to various contexts. Detailed design criteria include aesthetic quality, structural integrity, durability, design coherence, and energy performance.

Central to the competition is circular design, which prioritises material reuse, energy efficiency, and waste reduction. These principles are vital for creating affordable, environmentally responsible housing by minimising the environmental impact of construction and materials. To achieve this, industrialised con-

struction techniques like prefabrication, modular construction, and automation are encouraged to enable faster, cost-effective, and sustainable housing solutions. Additionally, integrating renewable energy sources and optimising material use are considered crucial for further reducing environmental impact and achieving long-term cost savings, thereby contributing to a more sustainable built environment.

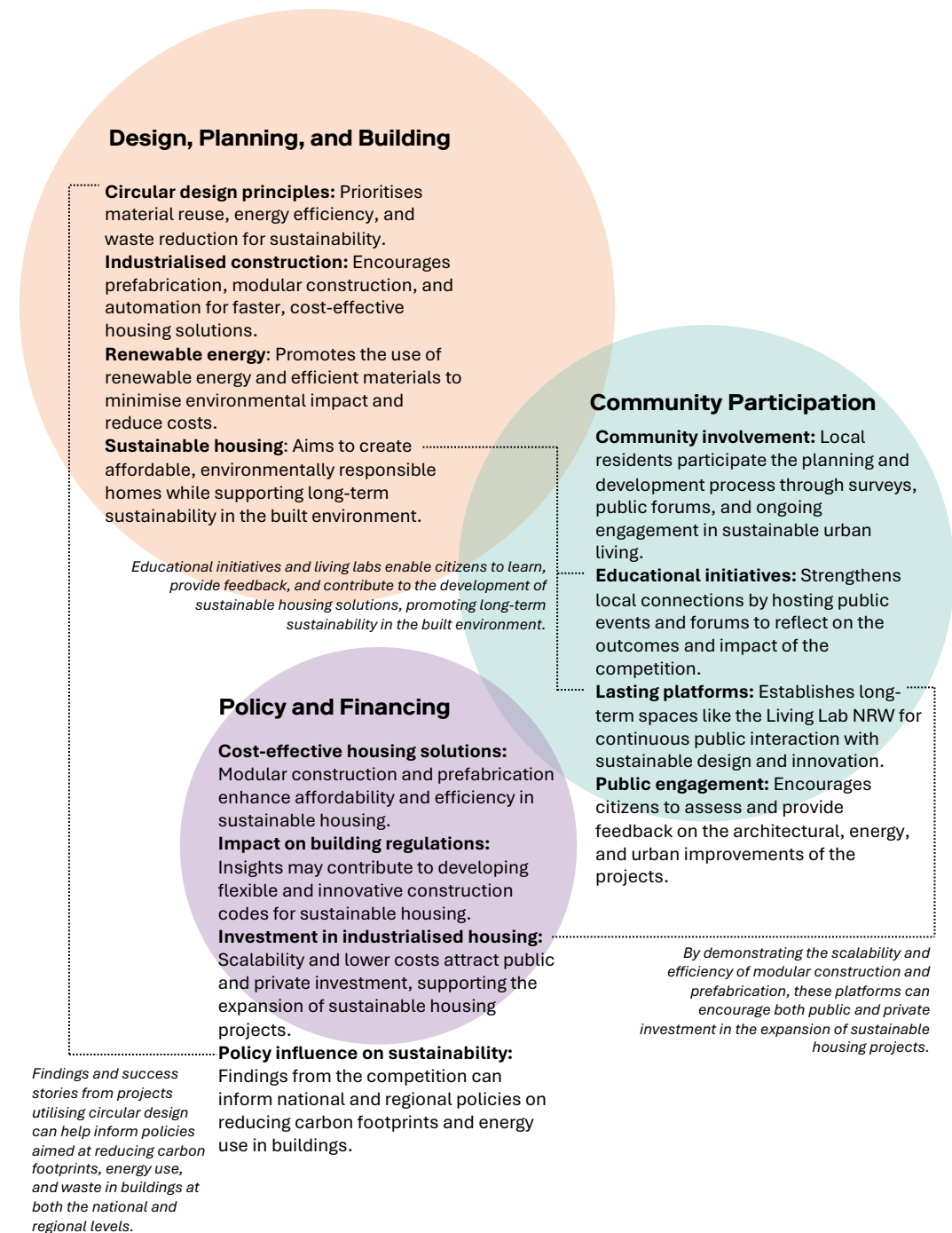
Community Participation

The competition promoted community participation by involving residents in the planning and development process. This included hosting public forums for knowledge exchange and the creation of long-lasting platforms for ongoing engagement and education in sustainable urban living.

Citizens of Wuppertal were invited to assess whether the solutions met architectural and energy standards and improved urban living. Leading up to the event, teams conducted neighbourhood surveys to understand public perceptions of issues such as immigration, housing ownership, and local challenges, to ensure that the projects addressed real community needs. The competition also strengthened local connections through educational initiatives and public events, such as the “1st Living Lab NRW Forum” held in 2023, a year after the contest, which examined the competition’s outcomes and its impact on teaching and research.

Policy and Financing

The insights gained from Solar Decathlon projects can inform national and regional policy decisions, potentially shaping the future of sustainable housing development. By guiding the evolution of building codes and regulations, these findings could promote greater flexibility and innovation in construction practices. Financing innovative housing is also a key theme, particularly through the use of modular construction and prefabrication, which make sustainable housing more cost-effective. The scalability and affordability of industrialised housing make it an attractive option for both public and private investors, facilitating the growth of sustainable housing solutions.



Sutton Estate regeneration

London, UK

Edited text based on case documentation by Saskia Furman.



Source: Saskia Furman

Architects

ECP Monson (original building)
HTA Design LLP (retrofit project)

Location

London, United Kingdom

Project year

2004–present (renovation)

Construction period

1913 (original building)

Housing type

Blocks of single family flats

Urban context

Housing estate in city centre

Construction system

Red brick solid construction (original building); Brick masonry, lime mortar, and plaster; double and triple glazed windows with aluminium frames and trickle vents (retrofit project)

Project status

Completed and occupied

The Sutton Estate in Chelsea was funded by philanthropist William Richard Sutton, who bequeathed his fortune to the creation of the Sutton Model Dwellings Trust (now Clarion Housing Group) in 1900. At that time, a quarter of Chelsea's population lived in poverty, often in overcrowded housing with poor sanitation and health conditions. Sutton's trust aimed to provide social housing for the poor in densely populated areas across England. Built between 1912 and 1914, the Sutton Estate was the third of four social housing estates established in Chelsea by philanthropic organisations. However, by the 21st century, the estate had fallen into demise and required significant refurbishment.

Plans to refurbish, retrofit and regenerate the estate began in 2019 and were approved in 2021. The project involves a deep energy retrofit of four buildings, including the installation of lifts and the provision of wheelchair access for ground-floor apartments. The project enhances energy efficiency with double-glazed windows, trickle vents, and a ground-source heat pump system. It also reopens closed balconies for private outdoor spaces and focuses on sustainable landscaping with a communal garden and cycle path.

RELATED CONCEPTS

- : ENERGY RETROFIT
- : ENVIRONMENTALLY SUSTAINABLE SOCIAL HOUSING
- : HOUSING RETROFIT
- : INDOOR THERMAL COMFORT
- : PARTICIPATORY APPROACHES
- : SOCIAL SUSTAINABILITY
- : SOCIAL VALUE
- : THERMAL INSULATION AND AIRTIGHTNESS

ALIGNMENT WITH PROJECT RESEARCH AREAS

The Sutton Estate regeneration project incorporates sustainable building practices, energy efficiency, and the integration of green spaces to promote sustainability in its multiple dimensions, environmental, social and economic.

Design, Planning and Building

Energy efficiency is at the core of both the design and maintenance strategies, with the goal of reducing energy bills and enhancing resident comfort. Energy performance is optimised through enhanced insulation, improved airtightness, and the installation of energy-efficient systems, targeting a 38% reduction in energy consumption. Additionally, internal layouts are being redesigned to better meet residents' needs, with larger family units and the installation of lifts to improve accessibility. The maintenance retrofitting includes updates to kitch-

ens, bathrooms, and windows, all while residents remain on-site to minimise disruption. These upgrades not only make the homes more affordable but also foster a more sustainable and liveable community.

Community Participation

Emphasis on resident involvement ensures that the renovation project addresses their needs and fosters a sense of ownership and community within the estate. Although Clarion maintained central decision-making, residents were actively engaged throughout the planning and design phases. They received regular updates through newsletters from the building owners and were invited to participate through leaflets, questionnaires, and interactive events such as workshops, public exhibitions, and stakeholder walkabouts. A Resident Steering Group was formed to provide feedback, address concerns, and test design strategies, ensuring the project met their needs.

The regeneration promotes ongoing community engagement through communal events, such as a gardening club, senior lunches, and outdoor activities in the renovated sunken garden. Furthermore, apprenticeship schemes offer opportunities for residents to develop skills, contributing to the community's social value.

Policy and Financing

The retrofit was financed by the housing association Clarion Housing Group, which owns the buildings. The redevelopment maintains the estate's social purpose by keeping the new homes under the association's ownership, ensuring that they continue to be available as social rental housing.

Design, Planning, and Building

Accessibility improvements:

The installation of lifts improves accessibility for all residents, especially those with mobility challenges.

Energy performance optimisation:

Better insulation and energy-efficient systems making homes greener and more cost-effective.

Maintenance retrofitting:

Updates to kitchens, bathrooms, and windows modernise the homes with minimal disruption to residents, ensuring comfort and functionality.

Sustainability and affordability:

The upgrades aim to make homes more affordable and sustainable, creating a comfortable, eco-friendly, and economically viable community.

Unit layout redesign:

Homes are being redesigned with larger family units and improved functionality to better meet modern living needs.

Engagement activities allowed residents to provide input, helping to ensure that the retrofitting work met their needs and preferences.

Residents are regularly updated on the energy-efficient upgrades through newsletters and Design Update leaflets, ensuring transparency and a clear understanding of how these improvements contribute to energy efficiency.

Community Participation

Communication updates: Regular newsletters and Design Update leaflets were provided to keep residents informed about the project's progress.

Community building: Engaging residents through communal activities such as a gardening club, senior lunches, and events in the renovated sunken garden, promoting social interaction.

Engagement activities: Direct inputs received through questionnaires, workshops, exhibitions, and walkabouts. Additionally, a resident group offered feedback on design strategies.

Resident involvement: They actively participated in the planning and design phases, ensuring the renovation met their needs and fostering a sense of ownership.

Policy and Financing

Clarion Housing Group's financial investment supports the focus on making homes more affordable and sustainable, ensuring the renovation is completed without affecting residents' financial stability.

Financing: Clarion Housing Group funded the retrofit, ensuring the renovation was completed without financial strain on residents while maintaining affordability.

Maintaining social purpose:

The estate's social purpose is preserved by keeping the renovated homes under the housing associations' ownership, ensuring continued affordable housing for residents and stability for the community.

Volkshuisvestingsfonds

The Netherlands

Edited text based on case documentation by Tijn Croon.



Source: Ministerie van BZK (2021)

Instrument
Subsidy fund

Issued
2021

Application period
2021–2024

Scope
Country

Target group
Deprived neighbourhoods

Housing tenure
Private rental sector (primarily)

Sector
Public policy

The Dutch Volkshuisvestingsfonds (VHF) (in English, Public Housing Fund) aims to address both energy efficiency and socio-economic disparities by targeting renovation subsidies at neighbourhoods with substandard housing and socio-economic deprivation. Initiated in 2021 by the Dutch Ministry of the Interior and Kingdom Relations, the VHF seeks to prevent the decline of disadvantaged neighbourhoods by supporting the retrofitting and upgrading of existing housing stock, as well as the improvement of public spaces.

The fund prioritises municipalities with urban renewal areas and regions with population decline. Despite its innovative design, the VHF faces implementation challenges such as high administrative burdens on municipalities, the need for sustained financial resources, and complexities in measuring long-term impacts. Moreover, stakeholder engagement—particularly involving private landlords—and compliance with EU state-aid legislation present further obstacles. Addressing these issues is vital for the VHF to achieve its dual objective of enhancing energy efficiency and socio-economic upliftment.

RELATED CONCEPTS

- : ENERGY POVERTY
- : FINANCIAL WELLBEING
- : JUST TRANSITION

ALIGNMENT WITH PROJECT RESEARCH AREAS

The Volkshuisvestingsfonds addresses the tensions between housing affordability and sustainability. Through its innovative approach to improving energy efficiency and addressing socio-economic disparities in deprived neighbourhoods, its potential impact cuts across the three key RE-DWELL research areas.

Design, Planning and Building

At the core of the VHF is a focus on retrofitting and upgrading existing housing stock in deprived areas, making substantial progress in both design and sustainability. The fund prioritises energy-efficient renovations that meet high environmental standards, supporting long-term sustainable urban development. By targeting substandard housing, the fund addresses both energy efficiency and housing affordability, ultimately improving overall liveability. It reflects principles of integrated urban planning by aligning housing renovation with environmental objectives and social equity in underserved neighbourhoods.

Community Participation

The VHF promotes local engagement by targeting municipalities undergoing urban renewal and communities experiencing socio-economic hardship. By concentrating on neighbourhoods with substandard housing, the fund allocates resources according to the severity of local conditions, ensuring support reaches those most in need. Notably, it adopts a distinctively Dutch approach by prioritising interventions at the neighbourhood scale rather than focusing solely on individual households. This localised model enhances overall liveability by improving shared public spaces, strengthening social cohesion, and addressing structural inequalities affecting entire communities.

Policy and Financing

A data-driven, resource-targeted approach to subsidising energy efficiency improvements and urban regeneration is a key feature of this policy instrument. By focusing on municipalities with the greatest needs, the fund ensures that resources are allocated effectively, promoting policy impact and public accountability. However, challenges such as the administrative burden on municipalities and the complexities of EU state-aid compliance may hinder both efficiency and equitable resource distribution. These issues highlight the need for robust policy frameworks and multilevel governance to address them effectively.

Design, Planning, and Building

Energy-efficient renovations:

Prioritises renovations that meet high environmental standards, promoting long-term sustainability.

Energy efficiency and housing

affordability: Targets substandard housing to improve both energy performance and affordability, enhancing livability.

Retrofitting and upgrading existing

housing: Focuses on improving housing stock in deprived areas with an emphasis on design and sustainability.

Sustainable urban planning:

Demonstrates how urban planning can reduce housing disparities and foster environmental justice.

Both aim to improve community-wide quality of life, with retrofitting enhancing neighbourhoods rather than individual homes, fostering collective improvement.

Energy-efficient renovations improve livability by enhancing housing quality and sustainability in deprived areas, benefiting the broader community.

Policy and Financing

Barriers: Administrative burdens on municipalities and EU state-aid compliance complexities may hinder efficiency and equitable resource distribution.

Data-driven: Uses a targeted, resource-focused strategy to subsidise energy efficiency and urban regeneration.

Policy frameworks: Highlights the importance of multilevel governance and strong policy frameworks to address these challenges effectively.

Energy-efficient renovations require strong policy frameworks and governance to manage resources, compliance challenges, and achieve environmental and affordability goals.

Community Participation

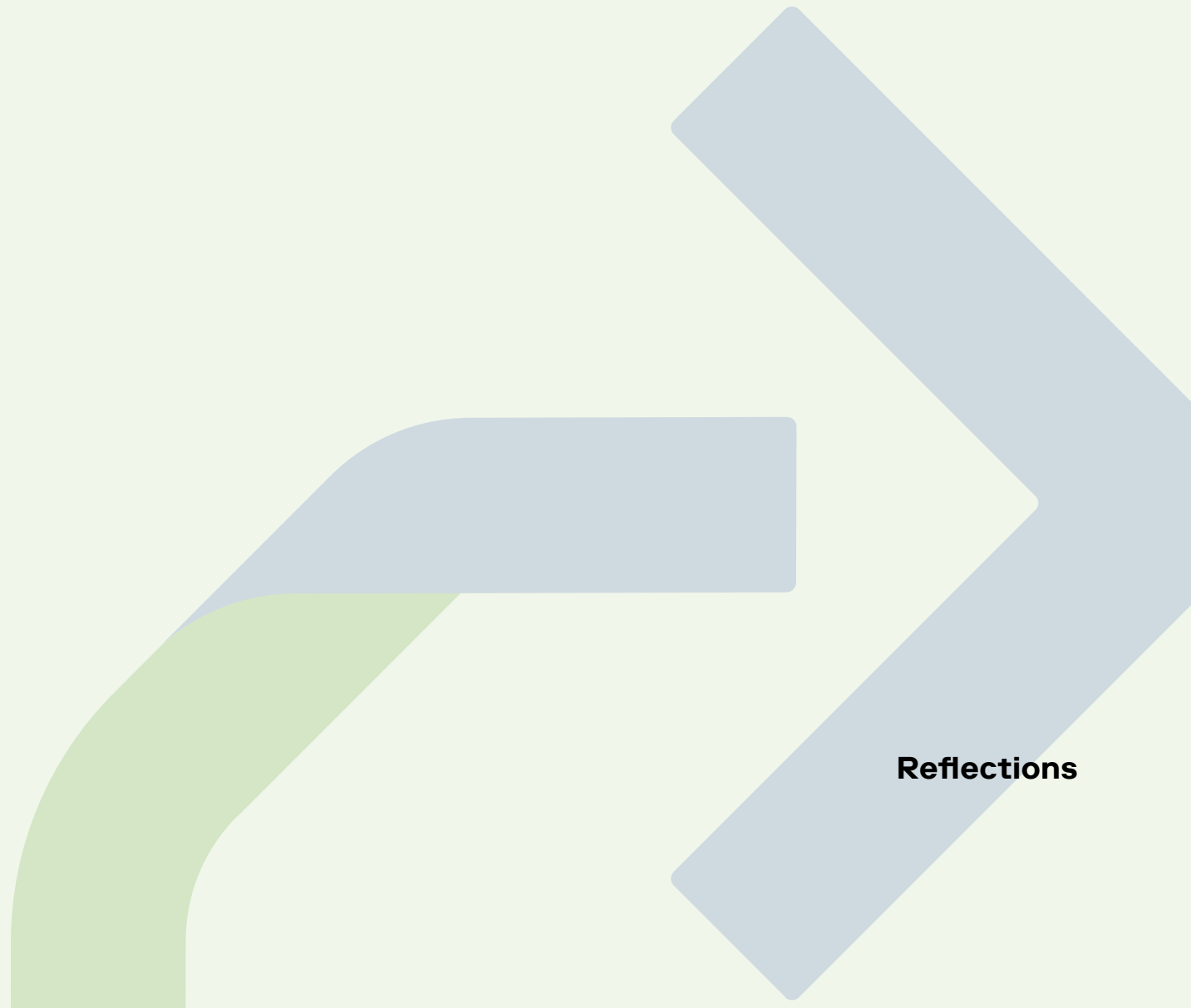
Community-focused: Prioritises neighbourhood-level improvements over individual household focus, enhancing overall liveability.

Improving liveability: Focuses on community-wide benefits rather than individual interventions, promoting broader positive change.

Local involvement: Targets municipalities with urban renewal areas and communities facing socio-economic challenges.

Targeted distribution : Allocates resources based on the severity of substandard housing and socio-economic deprivation, ensuring aid reaches the most in-need regions.

The data-driven approach ensures that resources are focused on the most disadvantaged areas, using evidence to target subsidies effectively.



Reflections

The RE-DWELL case library addresses two fundamental needs. First, it enables researchers to identify, document, and learn from real-world best practices across a wide spectrum of domains, including housing projects, urban developments, socio-political frameworks, and policies, using an analytical and methodologically grounded approach. Second, it provides a structured platform to systematise and share information, facilitating knowledge elicitation, collaboration, and cross-disciplinary learning, while disseminating insights that inform both academic research and practical decision-making.

The case library supports case-based inquiry by assembling analytically documented materials informed by multiple sources. Researchers are encouraged, whenever possible, to engage directly with projects, buildings, policies, and their authors, complementing documentation with first-hand experience. The way a case is documented also reflects the researcher's analytical standpoint: through case selection, emphasis, and interpretation, each study embodies the researcher's perspective, theoretical orientation, and objectives. Some cases have been explored in depth within PhD theses, providing a foundation for case-based research methodologies, informing policy and design decisions, and supporting collaborative, evidence-based approaches to affordable and sustainable housing.

Alongside the ESR's individual research interests, each case is examined through multiple conceptual lenses, including the three RE-DWELL research areas (Design, Planning, and Building; Community Participation; Policy and Financing) and frameworks such as the Sustainable Development Goals. These shared perspectives help identify recurring patterns, relationships between actors and processes, and contextual factors, moving beyond description to generate actionable knowledge.

Within the RE-DWELL learning and research environment, the library also serves as a training tool. By documenting and analysing cases, ESRs develop essential research skills, including the systematic collection and review of precedents, integration of interdisciplinary insights, and application of theory to practice. They also refine writing and communication abilities to translate complex academic knowledge into clear, actionable insights for diverse audiences, ensuring their research is both relevant and impactful.

Ultimately, the RE-DWELL online case library functions as a living, evolving knowledge base, continuously enriched by new research, reflections, and stakeholder contributions. It offers researchers, policymakers, and practitioners—a wide audience within and beyond the RE-DWELL network—a structured and accessible resource to explore, analyse, and apply insights drawn from real-world examples of contemporary affordable and sustainable housing, supporting evidence-based practice and informed decision-making.

Challenges

Introduction

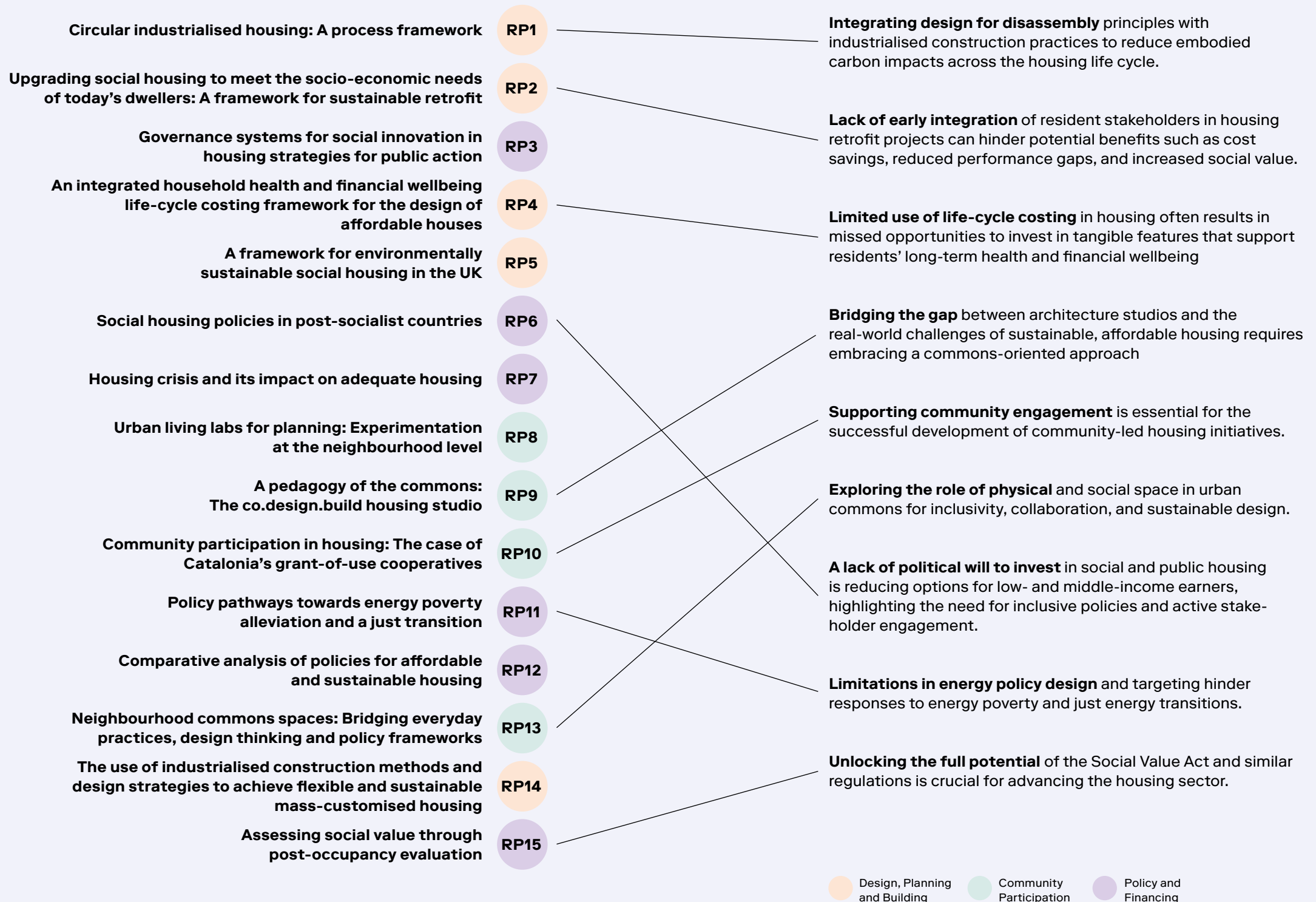
At an advanced stage of their research, early-stage researchers (ESRs) identified a series of critical issues related to affordable and sustainable housing, drawing on their individual doctoral projects and engagement with real-world contexts, including secondments and interactions with non-academic actors (→ see 5.1). Building on these findings, disciplinary expertise, and situated knowledge, the issues were articulated as a set of challenges linked to specific topics, projects, and governance arrangements.

In this context, challenges are understood as expressions of complex real-world situations that cannot be adequately addressed through single disciplinary perspectives or predefined solutions. They capture key tensions and conditions arising from the interaction of multiple actors, sustainability dimensions, spatial levels, and the policies, methods, tools, and practices through which housing is produced and governed. Framed as provisional formulations, challenges make complexity visible while remaining open to further interpretation and refinement.

These challenges play an intermediate role in transdisciplinary knowledge construction. Rather than constituting final problem definitions, they serve as entry points for collective problem framing and dialogue with real-world stakeholders, supporting the co-production of knowledge.

The transdisciplinary knowledge framework provides an analytical structure for situating these challenges within the interplay of actors, sustainability dimensions, spatial scales, and governance and implementation mechanisms. By framing challenges as relational and dynamic conditions shaped by social, environmental, economic, institutional, and technological factors, the framework supports integrated, cross-sectoral responses to affordable and sustainable housing.

EXAMPLES OF CHALLENGES DERIVED FROM RESEARCH PROJECTS



Achieving comfort, inclusivity, and performance in compact, cost-effective designs requires innovative, integrated solutions.

Addressing the diverse needs of multi-family housing through mass customisation strategies that ensure affordability and sustainability.

Improving access to capital markets for social housing organisations through green and social financing instruments.

Lack of knowledge regarding targeted policy instruments designed to alleviate energy poverty.

Long-term engagement of stakeholders is crucial for effective municipality–citizen collaboration in sustainable neighbourhood development.

Unlocking the full potential of the Social Value Act and analogue regulations in the housing sector.

A TRANSDISCIPLINARY KNOWLEDGE FRAMEWORK FOR MAPPING HOUSING CHALLENGES

ACTORS *Those involved in defining the problems at stake and finding solutions.* **Academia/Researchers:** universities, think tanks, and research institutions offering data and evaluation. **Civil society:** NGOs, community-based organisations, tenant associations, and advocacy groups. **International organisations:** UN-Habitat, EU institutions, global funds, and knowledge-sharing platforms. **Private sector:** developers, architects, construction firms, financial institutions, and energy providers. **Public sector:** municipal governments, national ministries, housing agencies, and regulators. **Residents and tenants:** co-creators and beneficiaries of housing solutions.

DIMENSIONS *Core sustainability domains that shape housing initiatives for long-term viability and resilience.* **Economic:** affordability, life-cycle cost efficiency, financing mechanisms, and local job creation. **Environmental:** energy efficiency, emissions reduction, use of sustainable materials, and resilience to climate risks. **Institutional/Political:** governance structures, policy coherence, legal frameworks, and capacity building. **Social:** equity, inclusiveness, community wellbeing, tenant engagement, and cultural adequacy. **Technological:** innovation in construction, smart systems, digitalisation, and performance monitoring.

METHODS *Structured approaches for analysing, framing, and designing sustainable housing solutions, using multidisciplinary and participatory techniques.* **Housing market analysis:** trends in housing demand, affordability, and supply. **Life-cycle assessment:** environmental impact of a housing project over its lifespan. **Participatory action research:** involving stakeholders in the research process to shape solutions. **Social impact assessment:** effects of housing projects on communities and individuals. **Stakeholder needs mapping:** identifying key actors and their needs to guide interventions. **Scenario planning:** evaluating complex systems and anticipating future outcomes. **Design charrettes:** collaborative sessions integrating disciplines to address housing challenges.

SPATIAL LEVELS *Geographic scales at which housing interventions occur, ranging from individual buildings to national policies and programmes.* **Building/Unit:** individual housing units, improving energy efficiency and accessibility. **Neighbourhood/Block:** community infrastructure, green spaces, and local amenities. **Municipality/City:** urban planning, zoning, transport, and sustainability programs. **Metropolitan area:** regional transport networks and interconnected urban development. **Region:** broader policies and cross-border cooperation for sustainable development. **National/Country:** national policies for large-scale housing and urbanisation programmes.

TOOLS *Instruments and techniques used to implement and manage sustainable housing projects, supporting design, evaluation, and performance monitoring.* **BIM:** digital planning; design, construction and management of buildings. **Cost-benefit analysis tools:** assessing financial viability and impact of interventions. **Energy performance certificates:** certifying energy efficiency of buildings. **GIS-based spatial analysis:** mapping and analysing data for planning and housing. **Post-occupancy evaluation:** measuring performance and user satisfaction after occupancy. **Simulation software:** analysing energy use, airflow, and environmental performance. **Toolkits for inclusive design/Cohousing:** practical guides for accessible, collaborative living.

TOPICS *Key focus areas in sustainable housing, addressing challenges related to energy, accessibility, affordability, and social inclusion.* **Building retrofitting:** upgrading existing structures for energy efficiency, comfort, and accessibility. **Circular economy in construction:** promoting material reuse and sustainable resource cycles. **Climate adaptation and mitigation:** designing housing to minimise and withstand environmental impact. **Energy poverty:** reducing vulnerability to energy costs through efficiency and equitable access. **Health and wellbeing:** ensuring indoor environmental quality and resilience to climate-related health risks. **Housing affordability:** addressing price, stability, and legal aspects of housing access. **Inclusive design:** housing that serves diverse needs, including older people and persons with disabilities. **Social housing:** ensuring access for marginalised and low-income populations. **Urban regeneration:** revitalising deteriorated urban areas in an inclusive and sustainable way.

PARTNERSHIPS *Strategic alliances between various sectors and organisations to advance sustainable and affordable housing initiatives.* **Cross-border urban initiatives:** collaborative projects across regions or countries. **Housing cooperatives:** member-owned and controlled housing organisations. **Local-global learning networks:** platforms fostering knowledge exchange across scales. **Public-private partnerships:** joint efforts between public and private sectors for implementation. **Research-industry alliances:** collaboration between academia and the private sector for innovation.

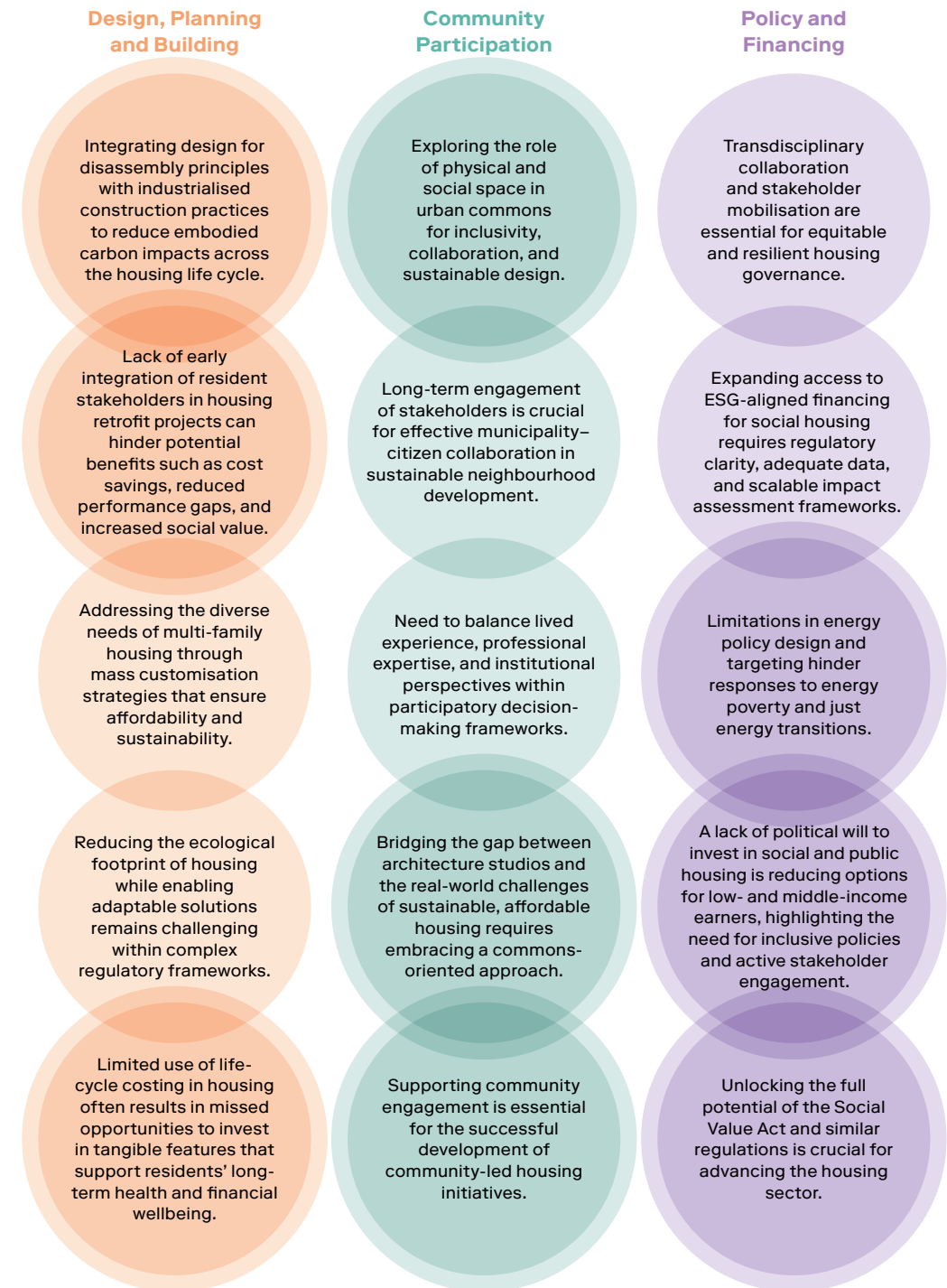
POLICIES *Regulatory frameworks to guide decision-making and investments toward achieving sustainable and affordable housing.* **Green building codes:** regulating and promoting sustainable construction practices. **Integrated housing/Transport planning:** aligning residential development with mobility infrastructure. **Public housing programmes:** government-led initiatives providing affordable housing. **Renewable energy mandates:** requiring the use of renewable energy in housing developments. **Subsidies/Rent controls:** financial support and regulation for affordability. **Tax incentives:** encouraging upgrades of existing buildings for energy efficiency. **Zoning regulations:** governing land use and shaping housing development.

PROJECTS *Initiatives aimed at implementing sustainable and affordable housing solutions, often through innovative models or pilot programmes.* **Community land trusts:** community ownership models securing long-term affordability. **Demonstration projects:** pilots showcasing sustainable building practices. **Eco-districts and zero-carbon neighbourhoods:** developments focused on sustainability and carbon neutrality. **Social housing developments:** construction of affordable housing for marginalised groups. **Retrofitting campaigns:** upgrades to improve energy efficiency for vulnerable populations.

Challenges are positioned within the framework according to the actors involved, the sustainability dimensions and spatial levels they primarily affect, and the methods, tools, policies, partnerships, topics, and projects through which they can be analysed and addressed.

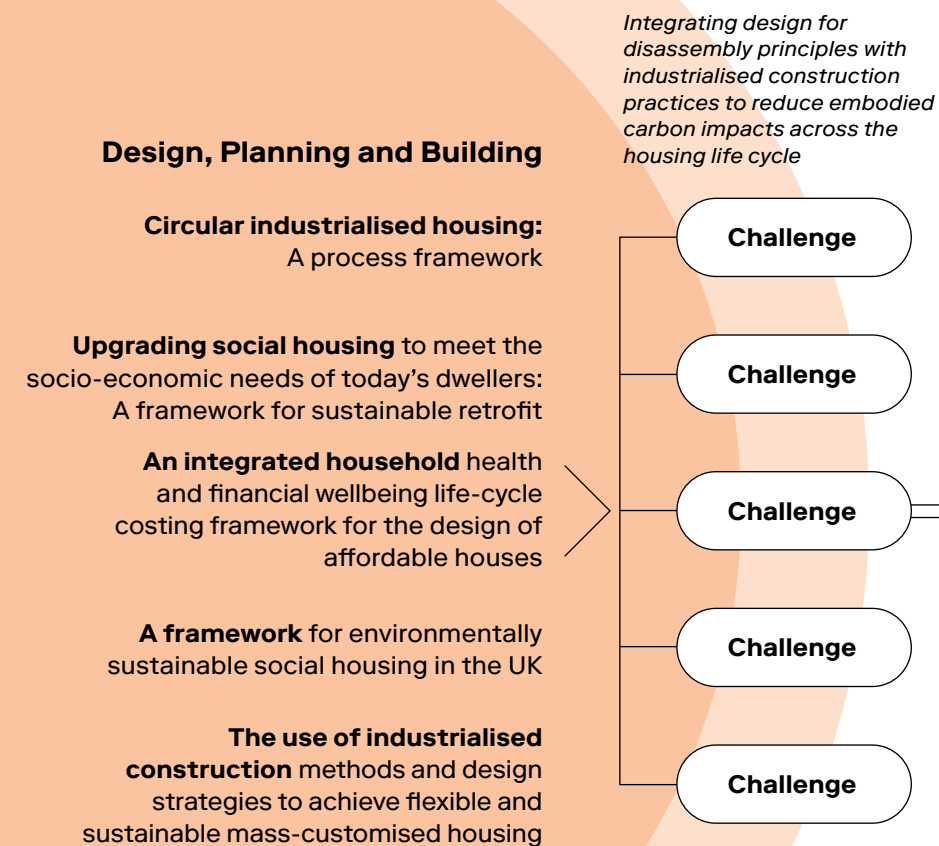
The following sections explore possible interconnections among selected challenges across the three RE-DWELL research areas (→ see Table 5.1.1).

Within each area, specific challenges are used as analytical entry points to identify connections with challenges in the other research areas, as well as with additional components of the RE-DWELL collaborative knowledge framework.



The diagrams accompanying each challenge in the following sections were produced at the Polytechnic University of Valencia by Miriam Pérez García, under the supervision of Carla Sentieri and Leandro Madrazo.

MAPPING SOME POSSIBLE INTERCONNECTIONS BETWEEN CHALLENGES IN DESIGN, PLANNING, AND BUILDING AND CHALLENGES IN OTHER DOMAINS



Long-term engagement of actors in municipality-citizens collaboration towards sustainable neighbourhood development

Community Participation

Urban living labs for planning:
Experimentation at the neighbourhood level

A pedagogy of the commons:
The co.design.build housing studio

Community participation in housing:
The case of Catalonia's grant-of-use cooperatives

Neighbourhood commons spaces:
Bridging everyday practices, design thinking and policy frameworks

Energy efficiency friendly policy is at risk of increasing the embodied energy produced during the whole building life cycle

Policy and Financing

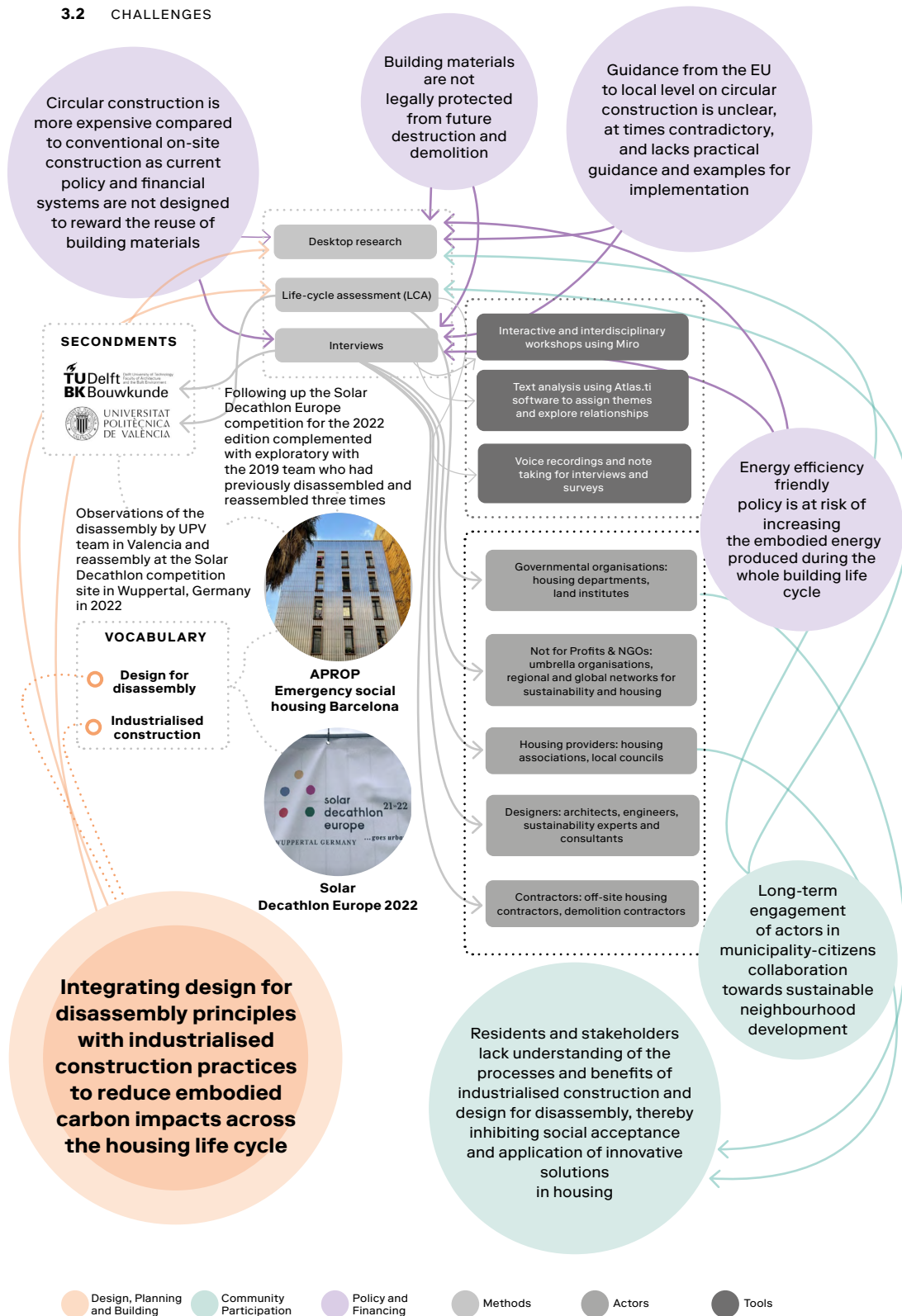
Social housing policies in post-socialist countries

Housing crisis and its impact on adequate housing

Policy pathways towards energy poverty alleviation and a just transition

Comparative analysis of policies for affordable and sustainable housing

Assessing social value through post-occupancy evaluation



Integrating design for disassembly principles with industrialised construction practices to reduce embodied carbon impacts across the housing life cycle

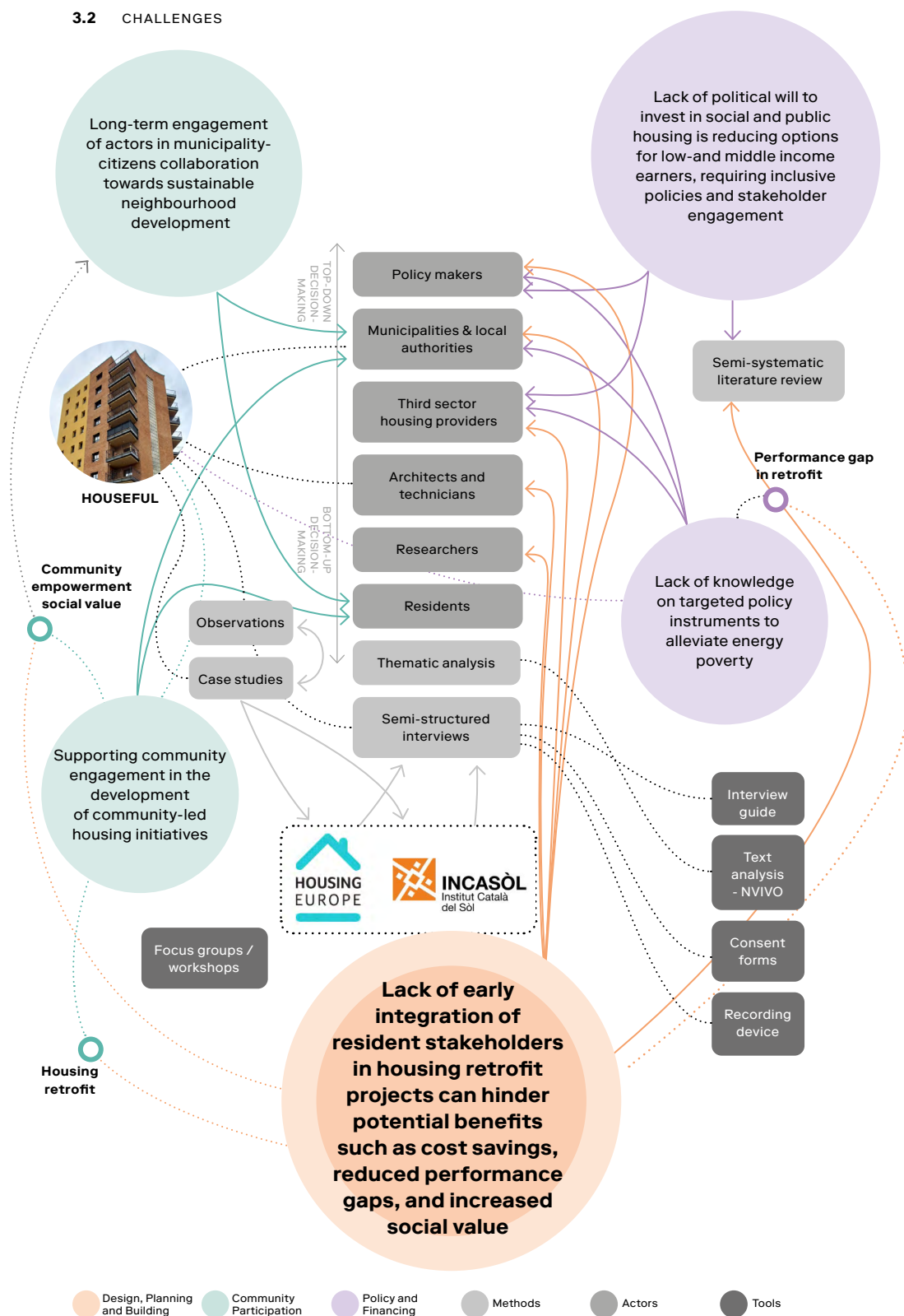
The integration of design for disassembly (DfD) principles with industrialised construction practices aims to reduce the embodied carbon impacts of housing by enabling buildings to be easily deconstructed, reused, and recycled. Sustainable neighbourhood development depends on the engagement of diverse stakeholders, including municipalities, citizens, developers, and other actors. Incorporating DfD and industrialised construction into housing projects benefits from this long-term collaboration. However, residents may not recognise the value of disassembly-friendly designs unless they are informed about how these practices reduce waste, carbon emissions, and long-term costs. This highlights the need for targeted engagement and education to clearly communicate the benefits. Effective implementation of these practices also requires breaking down barriers between sectors and professionals—such as architects, engineers, builders, policymakers, and environmental experts. Interdisciplinary cooperation is essential to ensure that construction methods are not only cost-effective but also environmentally sustainable. For example, architects and engineers can collaborate to design buildings that are easy to disassemble, while policymakers can incentivise the use of sustainable materials.

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Transitioning to the **circular economy** is high on the EU agenda and shows potential to improve both environmental sustainability and affordability of housing in the long term. **Industrialised construction** integrated with **design for disassembly** presents potential to reduce the negative environmental impacts of construction over the whole life cycle by facilitating the systematic reuse of materials. There are however major challenges integrating these approaches in practice, which are largely political and financial. Currently, a short-term view takes precedence; high upfront costs and uncertainty of what will happen to housing stock in the future present key financial barriers. This connects to a lack of legal protection of buildings from future destruction, rather than retention of either building parts or whole buildings. These challenges are exacerbated by unclear, and at times contradictory guidance on

circular construction from the EU down to the local level. Furthermore, energy efficiency friendly policy can compromise the reduction of **embodied energy** over the **whole building life cycle**. Regarding **community participation**, it is important to have support from residents, otherwise housing providers may be disincentivised from applying innovative housing solutions. To overcome these challenges, built environment professionals and local councils require practical guidance based on input and consultation with stakeholders from different fields and exemplary case studies demonstrating successful implementation, ideally proving scalability. Interdisciplinary research, collecting information through interviews and surveys, and **life-cycle assessment** are essential methods to further the circular economy transition in housing.”

Annette Davis



Lack of early integration of resident stakeholders in housing retrofit projects can hinder potential benefits such as cost savings, reduced performance gaps, and increased social value

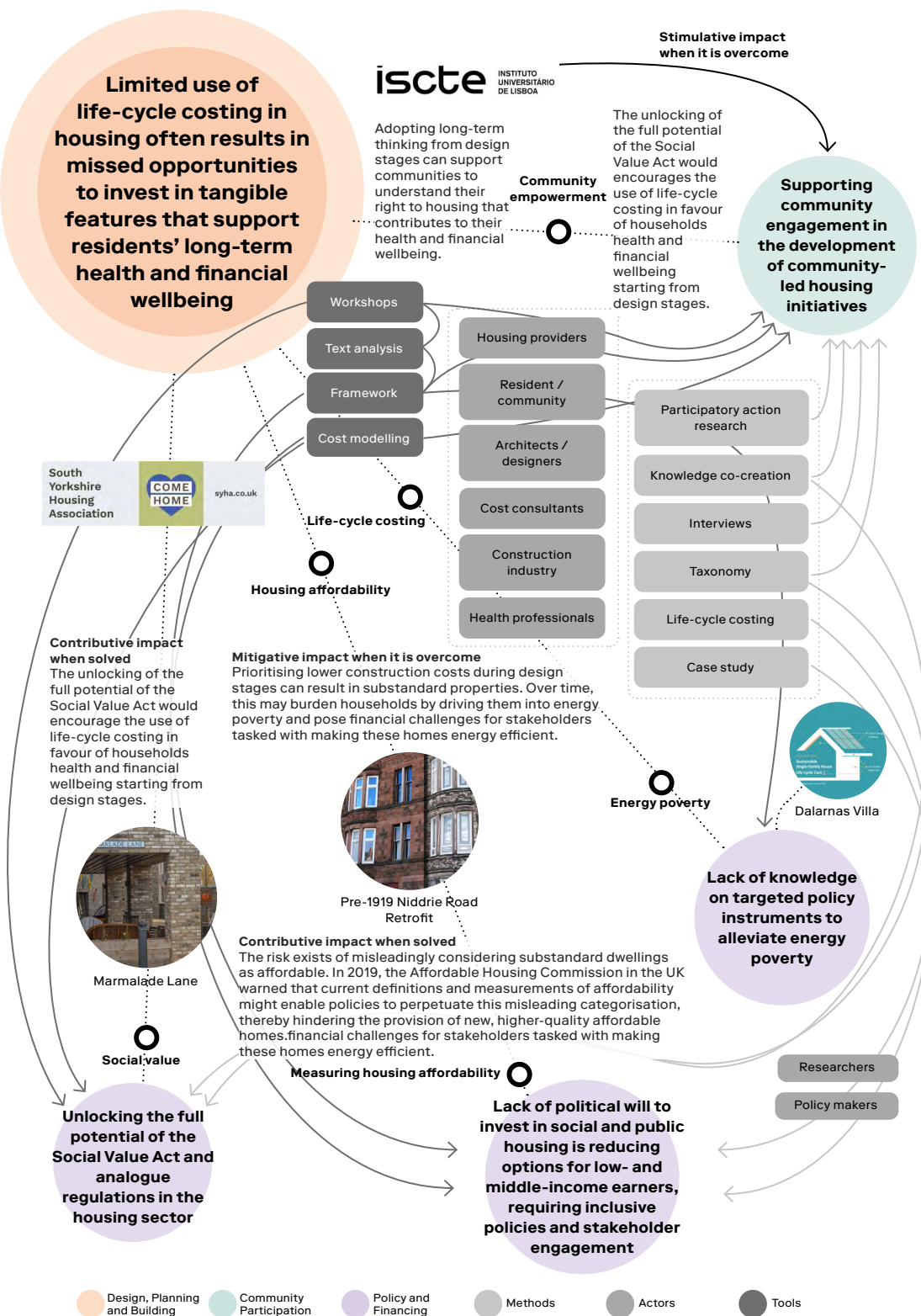
Early integration of resident stakeholders in housing retrofit projects offers significant benefits, including cost savings, improved performance, and increased social value. Engaging residents from the outset ensures that retrofits more effectively address their needs, preferences, and insights, leading to efficient and tailored solutions. For instance, residents can provide valuable input on energy usage and system functionality, contributing to more successful retrofit outcomes. Sustained collaboration between municipalities and residents is crucial for addressing broader community goals such as social cohesion, public health, and financial stability. Supporting community-led initiatives ensures that retrofits extend beyond technical upgrades to foster resilient and sustainable communities. Moreover, a stronger understanding of policy instruments designed to alleviate energy poverty can help better target support for vulnerable groups, thereby increasing the long-term impact of retrofits. However, a persistent lack of political will to invest in social and public housing often restricts resources for retrofitting—particularly for low- and middle-income households. Without adequate investment, these communities are excluded from the benefits of energy-efficient retrofits, such as lower utility bills and improved living conditions.

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Lack of early integration of social housing residents in **retrofit decision-making** can exacerbate **fuel poverty, performance gaps, and resident disempowerment**. Interviews with high-level stakeholders reveal the lack of political will to holistically address retrofit and energy performance, leading to market-based technical solutions that de-prioritise the actual needs of residents. Rather, **social housing, affordable housing, and sustainable housing** are politically weaponised at the expense of equal access to quality housing. Supporting **community engagement in retrofit** can lead to long-term sustainable solutions. Collaboration between building

owners and resident stakeholders in decision-making can repair fractious relationships, empower marginalised groups to engage with energy, increase social value, generate sustainable architecture, and reduce performance gaps. Focus groups and workshops offer a unique opportunity to collaborate between stakeholders and can facilitate valuable knowledge exchange. Researchers play a vital role in observing and analysing key themes to later apply to retrofit alongside architects and designers, translating information into design.”

Saskia Furman



Limited use of life cycle costing in housing often results in missed opportunities to support long-term affordability, health, and environmental sustainability

Life-cycle costing (LCC) evaluates the total cost of a building over its lifespan, including initial investment, maintenance, energy efficiency, and disposal. When combined with community engagement, inclusive policies, and regulations such as the Social Value Act, LCC can help create healthier and more financially secure living environments for vulnerable populations. However, insufficient application of LCC often leads to decisions that overlook long-term savings and health benefits. For example, opting for cheaper materials or systems with higher lifetime energy costs can exacerbate energy poverty, leaving residents unable to afford adequate heating or cooling, thereby negatively impacting both their finances and health. LCC offers long-term solutions to energy poverty but requires targeted policy instruments, such as subsidies for energy-efficient housing or support for green retrofits, to realise its full potential. Integrating LCC into community-led and public housing projects can reduce financial strain and improve health outcomes for residents. To achieve this, political will is essential to prioritise long-term planning over short-term savings. Policies must embed sustainability and health considerations and actively involve communities in developing effective solutions.

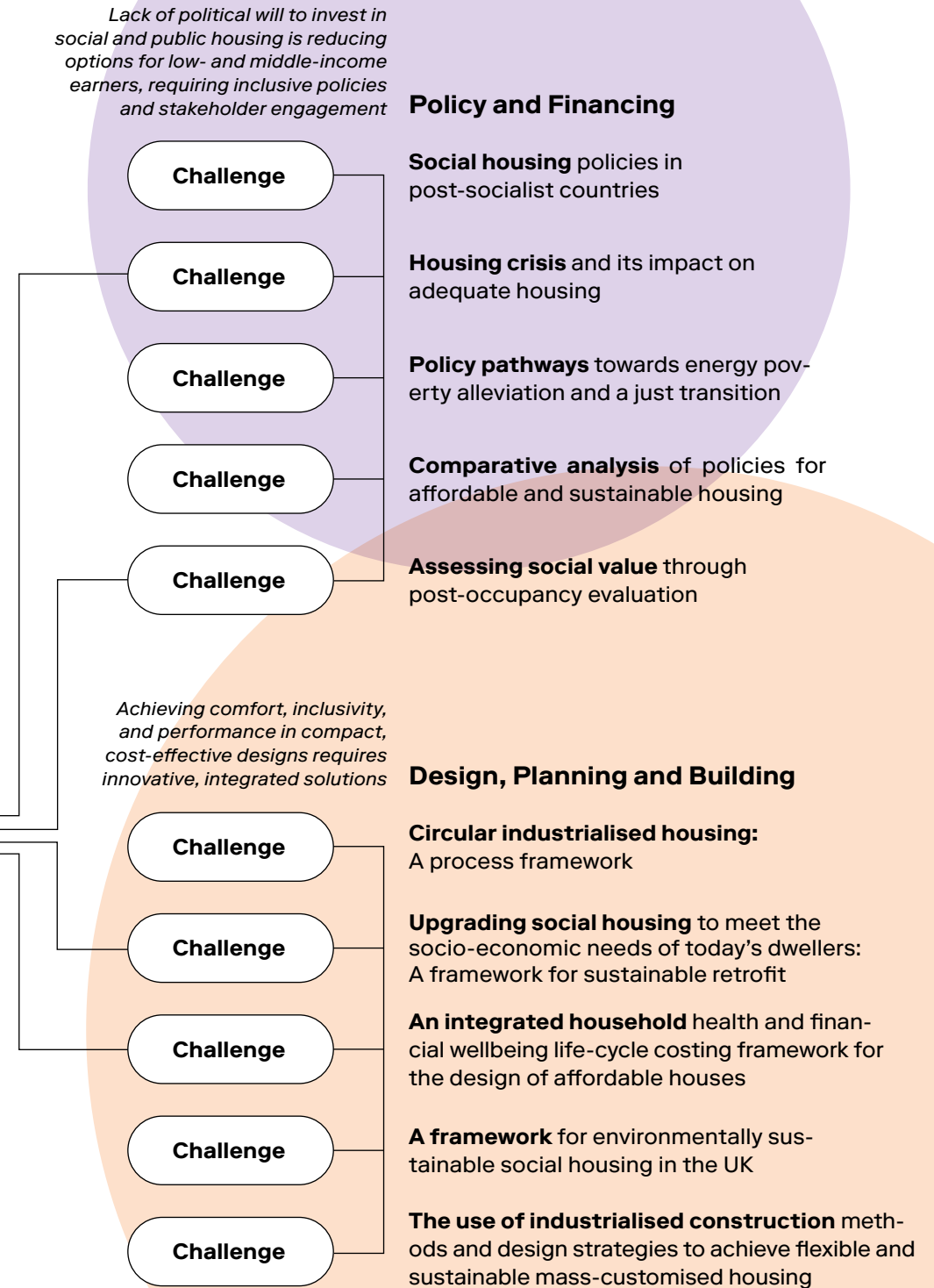
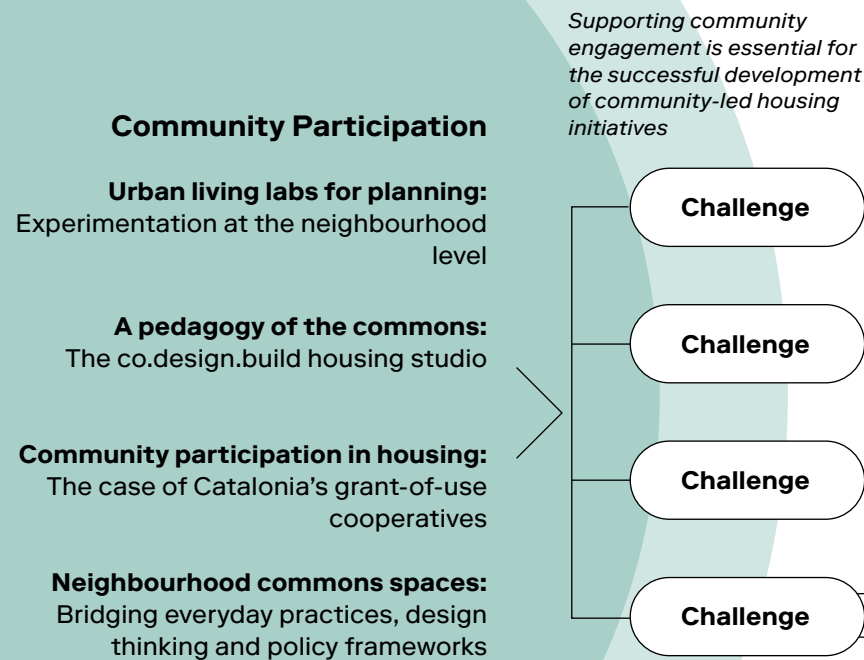
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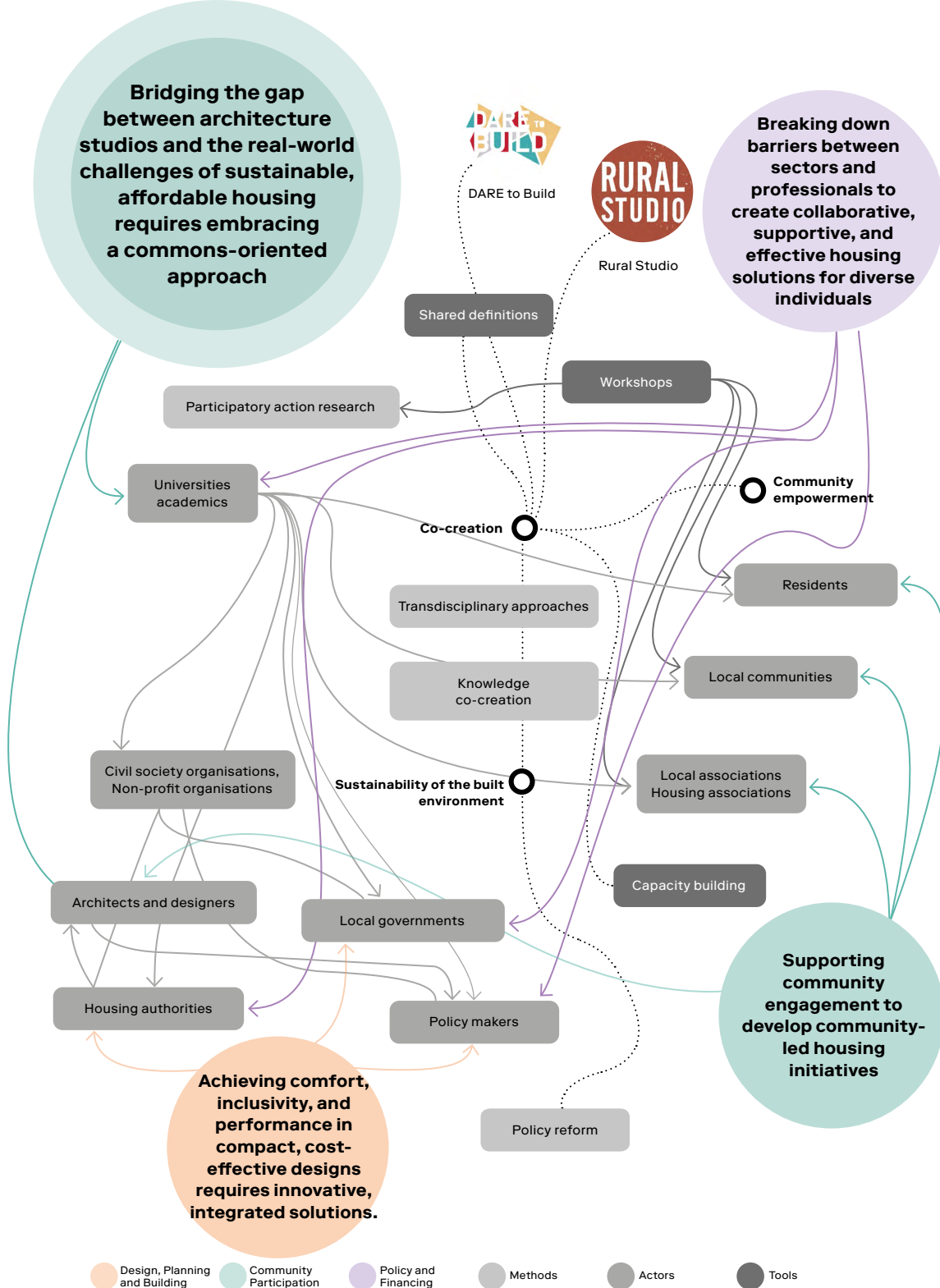
Rethinking housing affordability involves considering both financial and health aspects. From the design stages, **life-cycle costing (LCC)** can support balancing construction costs, future operational expenses (energy, maintenance, repairs), and long-term quality affecting **residents' health and financial wellbeing**. However, the underutilisation of LCC for household favours often leads to oversights in investing in tangible features that impact residents' health and financial wellbeing in the long term. Financing, policy, and community efforts are essential to address this. A shift in the political will can promote investments in **health-enhancing affordable housing**. This investment

helps mitigate energy poverty burdens, such as the Niddrie Road Retrofit case study. Increasing community awareness of long-term considerations of materials, ventilation, and energy systems can lead to choices benefiting climate and health. Such awareness can influence housing policies and stakeholders' agendas, encouraging the design and construction of **quality affordable dwellings**, unlocking the potential of regulations like the **Social Value Act**, and promoting household health and financial stability.”

Aya Elghandour

MAPPING SOME POSSIBLE INTERCONNECTIONS BETWEEN CHALLENGES IN COMMUNITY PARTICIPATION AND CHALLENGES IN OTHER DOMAINS





Bridging the gap between architecture studios and the real-world challenges of sustainable, affordable housing requires embracing a commons-oriented approach

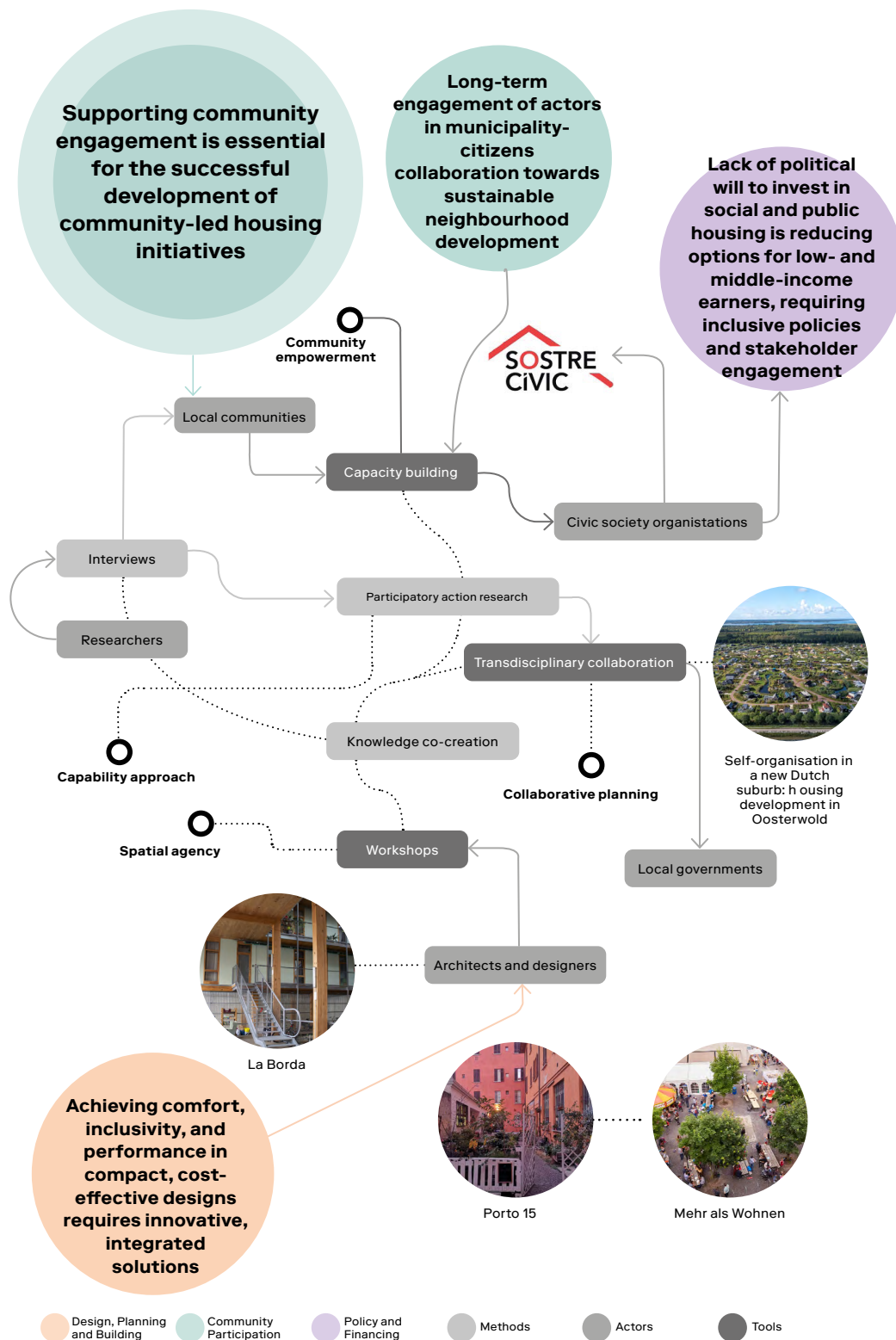
To effectively address affordability, sustainability, and social equity in housing, architectural education must evolve. Future architects should be equipped to think interdisciplinarily, engage in collaborative, community-based processes, navigate policy and finance, and co-create responsive, long-term solutions with residents. However, studio education often lacks the systems-thinking and real-world integration needed to meet these complex demands. A commons-based approach offers a powerful alternative by connecting students with communities, engineers, policymakers, and economists. Embedding community engagement into the curriculum helps students view residents as co-creators, moving beyond passive models of participation. This participatory mindset leads to more socially responsive and empowering design outcomes. Moreover, commons-based education fosters collaboration among planners, sociologists, environmentalists, and community leaders, reflecting the kind of teamwork essential for addressing housing inequalities and broader urban challenges.

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Closing the gap between **housing studio education** in architecture and real-world challenges of providing affordable, sustainable housing is crucial for preparing future design and planning professionals to navigate **complex socio-political and economic landscapes**. A collaborative housing education supports grassroots initiatives, fostering **active citizenship among future professionals** who will contribute to sustainable, inclusive urban environments. Introducing a **commons-based paradigm** within the housing studio, breaking disciplinary boundaries, is essential to foster collaborative and equitable knowledge production

and learning process. Through close cooperation in the form of **co-design and co-build** workshops aimed at addressing existing socio-spatial problems, all participants engage in prefigurative, rather than symbolic action, catalysing empowerment for local communities and students alike. Scholars and educators, using methods like **participatory action research**, play a pivotal role in implementing these collaborative housing design studios.”

Effrosyni Roussou



Supporting community engagement is essential for the successful development of community-led housing initiatives

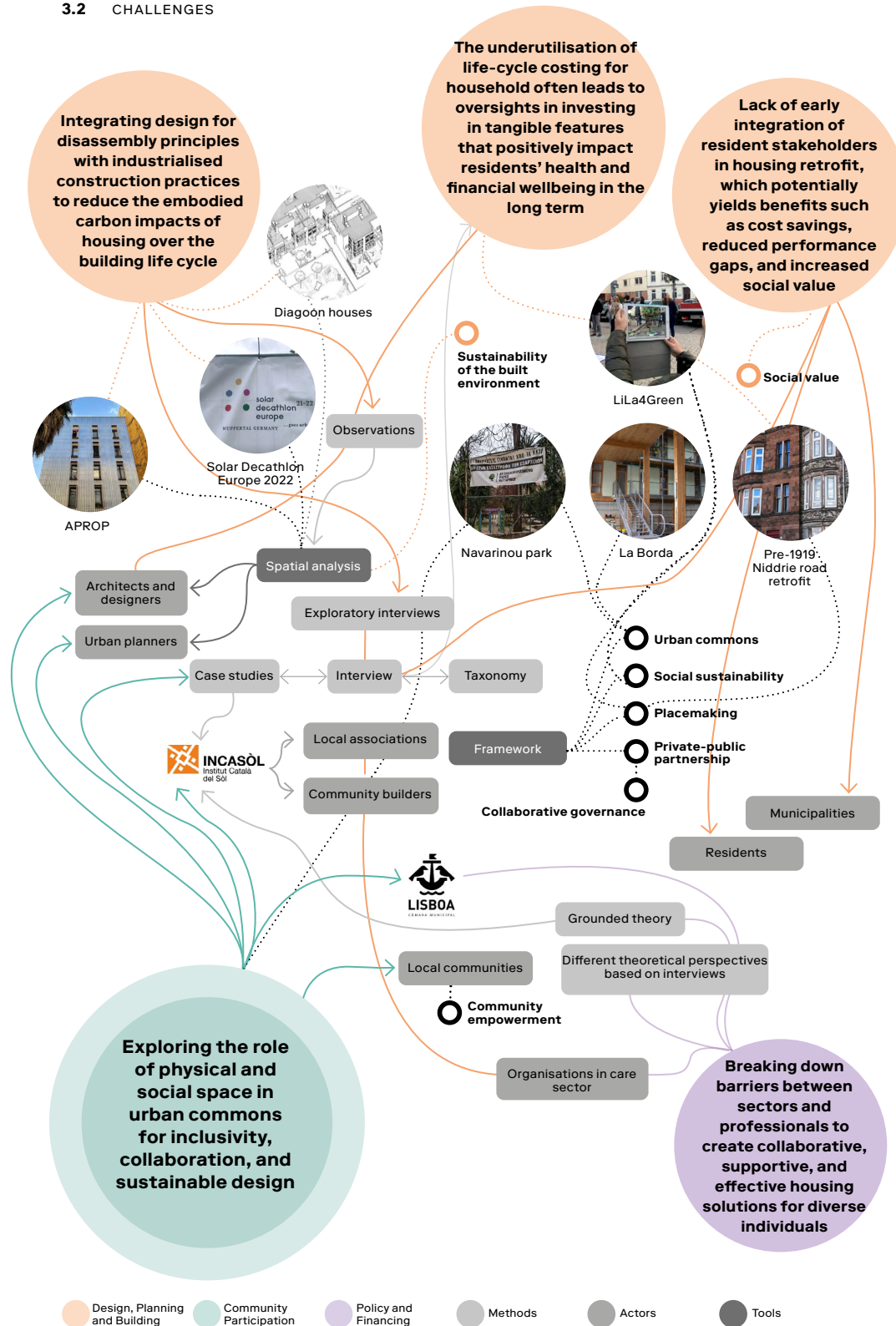
Supporting community engagement in community-led initiatives is a cross-cutting strategy that drives more relevant design outcomes, fosters lasting partnerships, and promotes inclusive policy-making. It acts as the connective tissue linking design, governance, and social equity goals in neighbourhood development. By involving residents directly in the design process, communities can articulate their real needs, preferences, and challenges—leading to solutions that are that are inclusive, cost-effective, and high-performing in terms of comfort and sustainability. Active community involvement ensures that housing and infrastructure projects reflect the lived experiences of those most affected, helping to promote equity and sustainability in urban environments. Moreover, engaged communities can influence political systems by raising awareness, advocating for change, and championing inclusive policies. Balancing community needs and desires with regulatory and financial constraints is a complex challenge, but one that holds the potential to transform neighbourhoods and empower residents to shape their living environments. However, a persistent lack of political will to invest in social and public housing continues to limit options for low- and middle-income earners.

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Supporting the **participation of residents** in the creation of **community-led housing projects** is a critical strategy for addressing deficiencies in the provision of affordable housing, which are exacerbated by a **lack of political will**. By collaborating with civic society organisations and **fostering capacity-building** initiatives, it is possible to empower vulnerable groups marginalised from adequate housing options. Community-led endeavours offer a conduit for repurposing vacant structures, thereby opening an important channel for collaborating with architects and designers to innovate through participatory workshops, such as those employing design for disassembly

principles. Citizen involvement can extend from the building to the neighbourhood scale, involving them in collaborative planning processes. Researchers can play an important role in supporting this pathway by actively engaging with local communities through **participatory action research**. Through **transdisciplinary collaboration** and the **co-creation of knowledge**, researchers can contribute to the collective effort of building more inclusive and resilient communities.”

Zoe Tzika



Exploring the role of physical and social space in urban commons for inclusivity, collaboration, and sustainable design

Urban commons—shared physical and social spaces managed collectively by communities—offer a valuable framework for reimagining housing and urban development. They embed inclusivity, collaboration, and sustainability into both the design and use of space, promoting a more participatory and resilient built environment. By encouraging long-term thinking and collective stewardship, urban commons align with principles like design for disassembly, which support adaptable, low-carbon construction practices. Framing housing as a shared resource also fosters early and meaningful resident involvement in retrofit processes, leading to better outcomes, reduced performance gaps, and increased long-term value. Commons-based approaches naturally support life-cycle thinking, as decisions are made with future adaptability, maintenance, and community wellbeing in mind—factors often neglected in conventional, profit-driven housing models. Establishing and maintaining urban commons requires teamwork across disciplines and sectors. Architects, planners, community groups, policymakers, and financiers must work together in co-creation and co-management processes. This collaborative model helps break down silos, making way for more integrated and responsive housing solutions that reflect the diverse needs of urban residents.

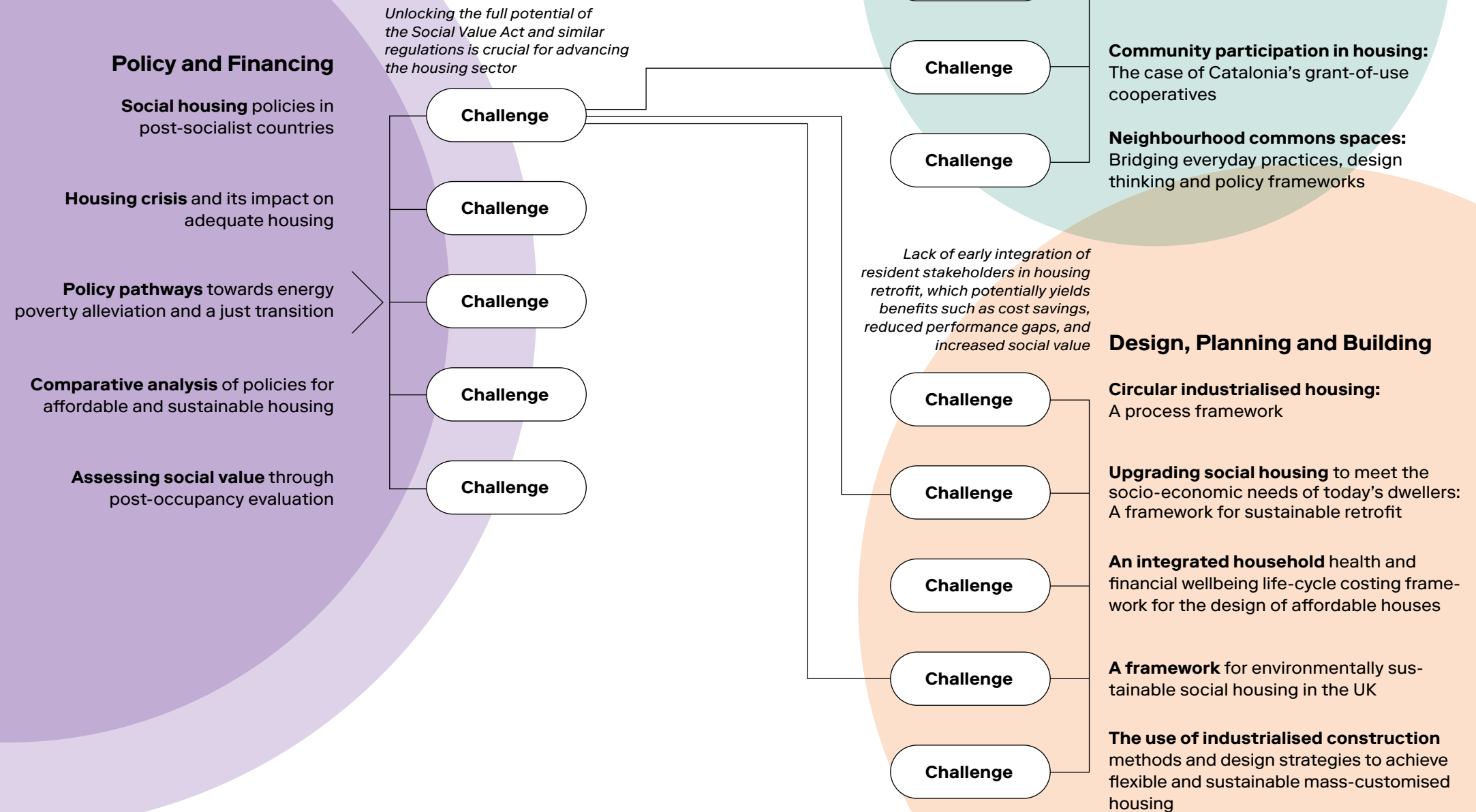
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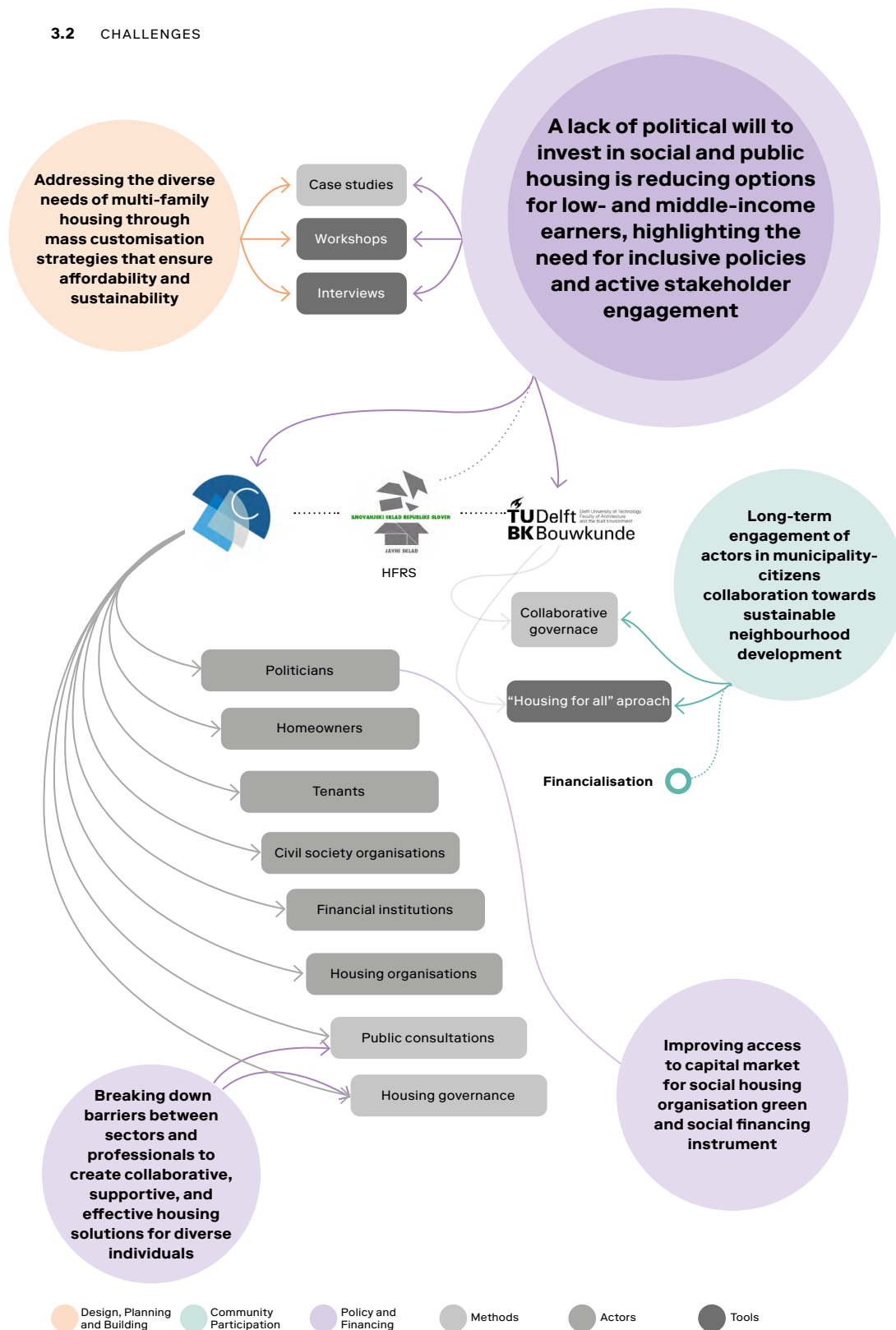
Exploring the importance of space in **urban commons** endeavours is crucial for a range of stakeholders, including community organisations, local associations, urban planners, designers, policymakers, and researchers striving for sustainable urban neighbourhoods. Understanding the **spatial dynamics** and design principles within these initiatives, such as flexibility and adaptability, necessitates various theoretical perspectives and grounded theory methods, including observation in exploratory case studies, spatial analysis, and interviews to gather primary data, which is then summarised in a taxonomy. By **involving the community** in data collection, we can gain insights into spatial requirements and design considerations that align with community **needs and preferences**, empowering

residents and creating **social value** through collaboration between residents, municipalities, and experts. Furthermore, understanding how spaces are designed and utilised can enhance **inclusivity** and **accessibility** for all community members and especially the most disadvantaged. In the context of urban commons initiatives, public-civic partnerships can bring together expertise from various fields, such as urban planning, architecture, sociology, and community development, to work towards common goals. Lastly, prioritising local communities and residents as the primary focus challenges architects and designers to enhance their design toolboxes with socially oriented, measurable qualities and place-based tools, such as **placemaking**.”

Androniki Pappa

MAPPING SOME POSSIBLE INTERCONNECTIONS BETWEEN CHALLENGES IN POLICY AND FINANCING AND CHALLENGES IN OTHER DOMAINS





A lack of political will to invest in social and public housing is reducing options for low- and middle-income earners, highlighting the need for inclusive policies and active stakeholder engagement

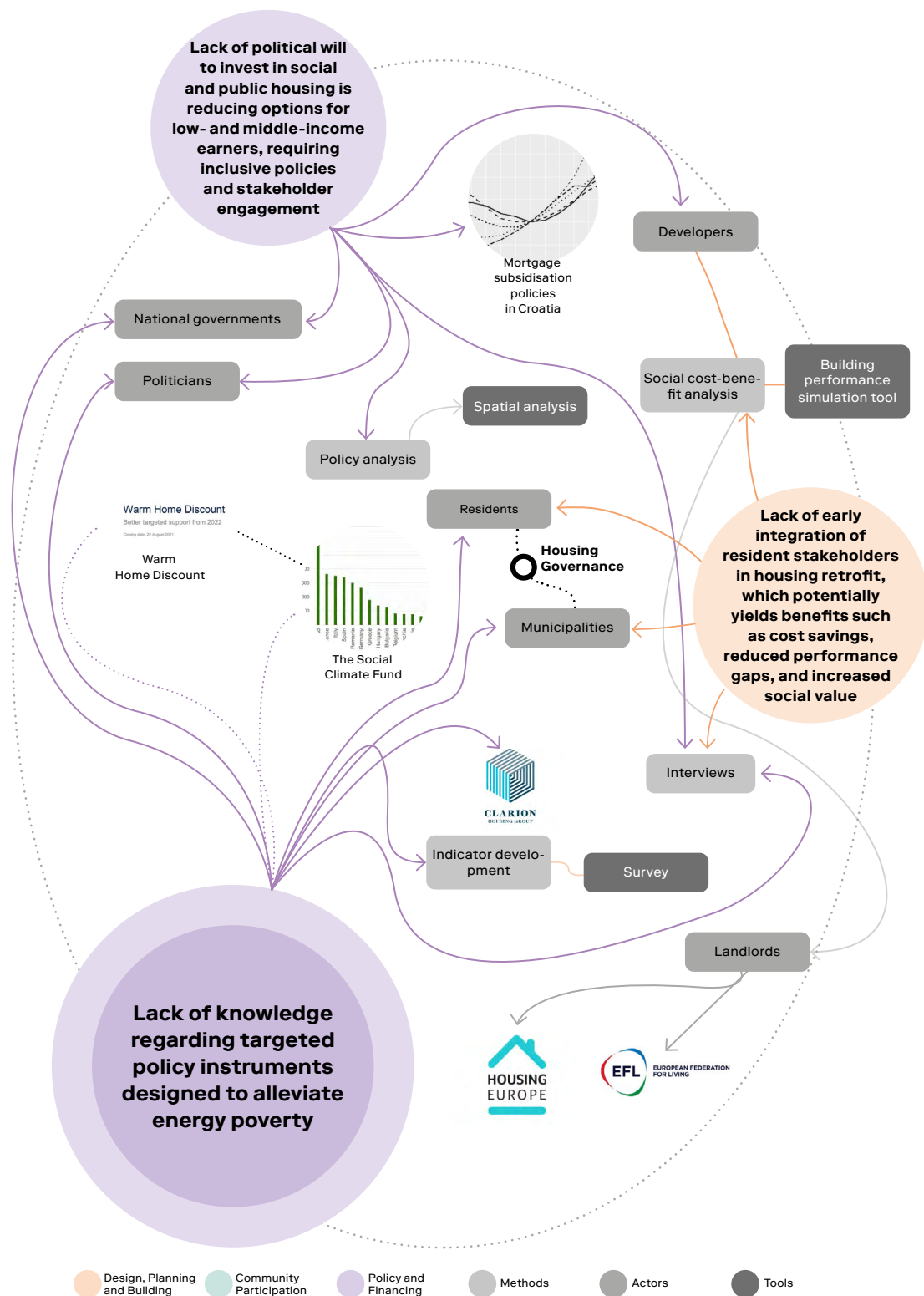
The lack of political will is a fundamental barrier to delivering innovative, inclusive, and sustainable housing. Without strong political support, sectors such as housing, finance, health, and social services remain siloed, hindering meaningful collaboration. This absence of commitment restricts funding, regulatory backing, and the sustained engagement necessary for effective community partnerships, cross-sector alignment, and scalable social housing models. For instance, mass customisation strategies require upfront investment and enabling policies, which are unlikely to materialise without political endorsement. Similarly, citizen-municipality collaborations often falter without continuous top-down support. Inaction also delays the creation of mechanisms that would enable housing providers to access green bonds and social impact financing, stalling progress toward sustainable neighbourhood development.

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Some of the most significant challenges persisting **across European countries** stem from the lack of political will to improve housing policy and implement measures that make housing more affordable. Meaningful progress could be achieved through the strong commitment and **advocacy of civil society organisations** and academia, particularly in promoting public dialogue. In post-socialist countries, in particular, housing policy should embrace the foundational principle of “**housing for all**”, incorporating inclusive strategies that address the needs of both the general population and vulnerable groups, such as the homeless. Adopting a holistic approach

to housing—as opposed to relying on narrowly targeted interventions—would attract broader public and political support. Long-term **national housing strategies** should prioritise improving access to capital markets for **social housing providers**. This includes removing financial barriers that currently hinder the uptake of **green and social finance** mechanisms. Lastly, sustained cooperation between municipalities and citizens is essential for the development of sustainable neighbourhoods.”

Marko Horvat



Lack of knowledge regarding targeted policy instruments designed to alleviate energy poverty

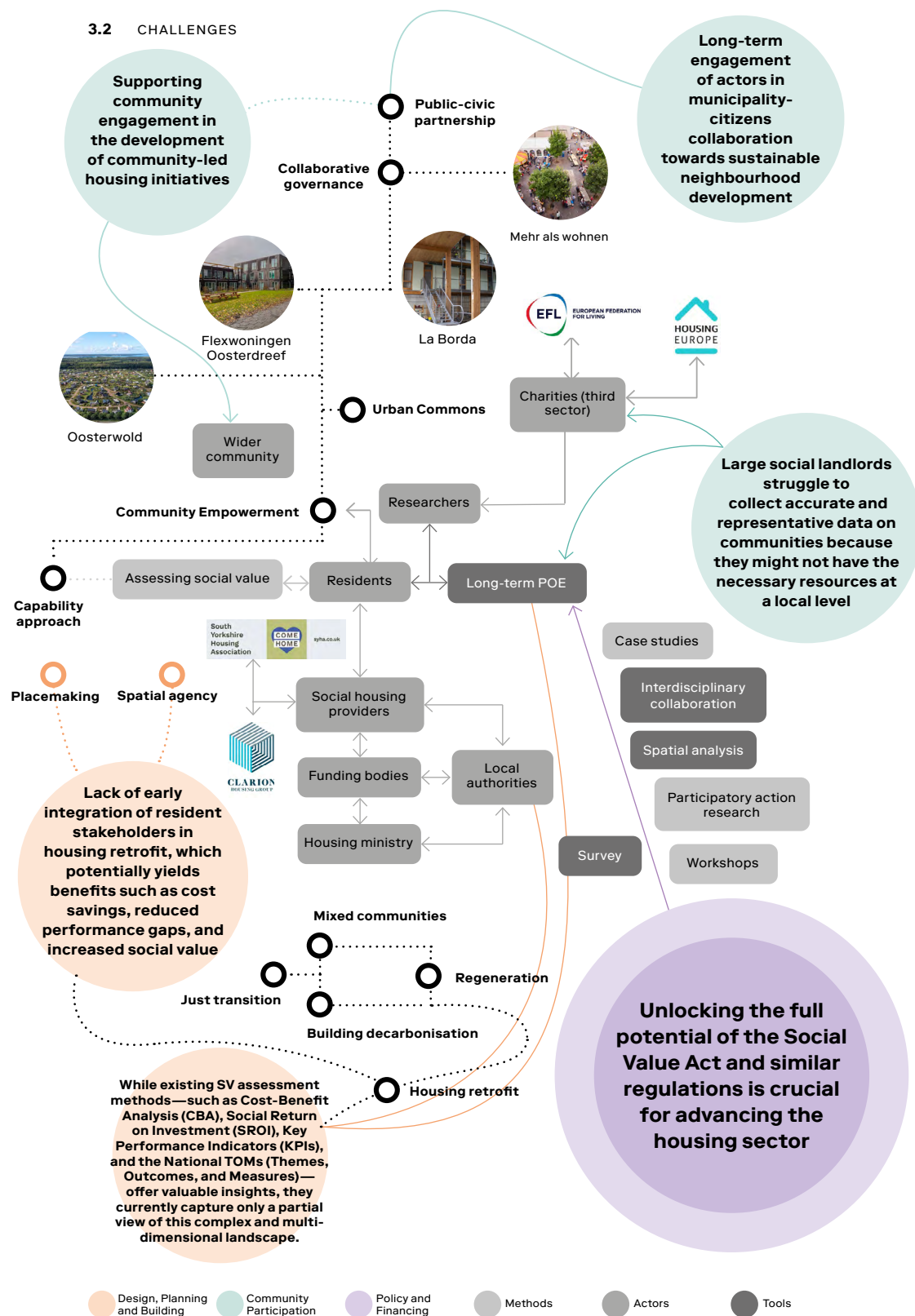
The lack of awareness about effective policy tools to address energy poverty limits the potential for systemic change. Targeted policies, such as energy-efficient building techniques, renewable energy incentives, and subsidies for low-income households, can reduce energy consumption and alleviate energy poverty. When properly integrated, these policies ensure retrofitting initiatives focus on low-income homes, delivering long-term cost savings and improved energy efficiency. Engaging residents in housing initiatives enables them to advocate for energy-efficient solutions that directly reduce their utility bills. However, a lack of political will can hinder the implementation of such policies, even when effective tools exist. Without government commitment, these policies may remain unfunded and unadopted, leaving low-income residents vulnerable to high energy costs and sub-standard housing conditions.

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These three key challenges in affordable and sustainable housing—**lack of political will** to address housing shortages, insufficient **resident involvement** in retrofitting, and inadequate tools to combat **energy poverty**—can be analysed through a justice lens. **Recognitional justice** is undermined by society's failure to fully acknowledge the struggles faced by disadvantaged groups; **procedural justice** falters in the absence of active resident participation in decision-making, and **distributional justice** suffers from a lack of effective policies to address systemic inequalities. Although these challenges may initially appear distinct, they share significant similarities. First,

there is considerable overlap among the key stakeholders identified and the methods used to study them. Second, while the case studies do not overlap, they are tailored to specific challenges and serve as examples of both best- and worst-in-class approaches. Third, secondments are closely aligned with particular actors, highlighting their critical role in the research process. Together, these challenges and their associated justice dimensions underscore the pressing need for an integrated and transdisciplinary approach to affordable and sustainable housing provision.”

Tijn Croon



Unlocking the full potential of the Social Value Act and similar regulations is crucial for advancing the housing sector

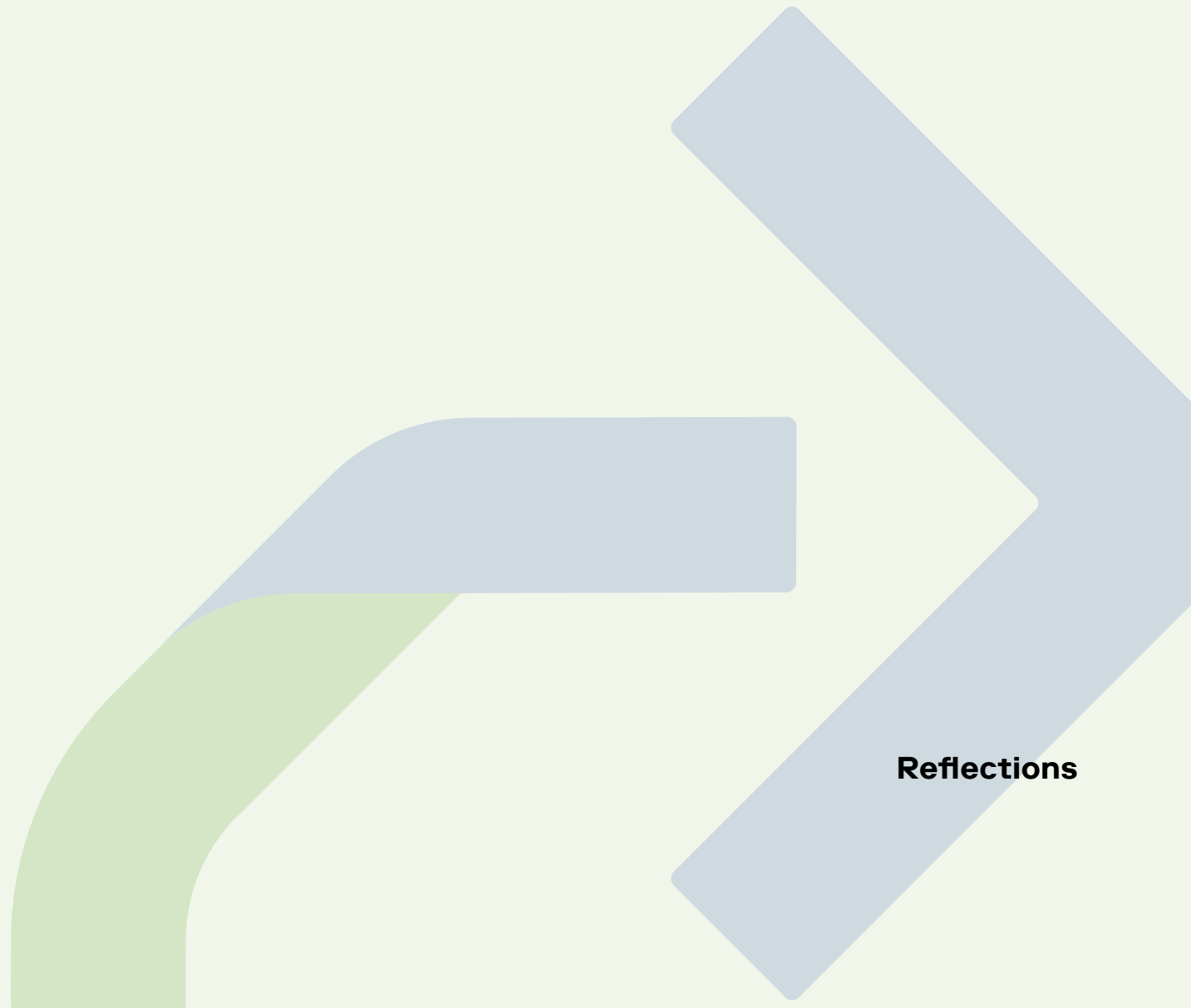
The Social Value Act, implemented in England and Wales, sits alongside the growing influence of ESG (Environmental, Social, and Governance) and social value agendas across Western Europe, marking a significant step toward integrating social value into the built environment. This ambiguity limits the effectiveness of the regulatory framework. Unlocking the Act's full potential in housing requires going beyond mere regulatory compliance. It involves aligning social outcomes with procurement, planning, and funding decisions to bridge the gap between policy and practice. The Act encourages early resident involvement, fosters long-term partnerships between municipalities and communities, and supports funding for community-led housing initiatives. By adopting social value principles, housing providers can build trust, close performance gaps, and deliver more responsive and cost-effective solutions. The Act also provides a framework to prioritise long-term outcomes such as wellbeing, sustainability, and inclusion, positioning collaboration as a measurable asset. For community-led projects, this framework helps demonstrate impact, gain legitimacy and secure funding within broader housing strategies.

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Residents should not be seen as passive recipients of housing projects, but as key participants in decision-making and the ongoing management of housing resources. They are the ones most profoundly impacted by the positive or negative outcomes of **regeneration**, **redevelopment**, and **retrofit** of buildings and neighbourhoods. Other challenges underscore the importance of not viewing residents and communities solely as passive recipients of projects, programmes, and policies. These include considering **community behaviour** and needs during home retrofitting, recognising the importance of **urban commons** and **spatial dynamics for community wellbeing**, and prioritising continuous

engagement with communities to foster a sense of belonging, ownership, and control. These challenges can be addressed by building partnerships with local organisations to gather comprehensive data for decision-making, which in turn will help determine the most appropriate approach to housing production—be it regeneration, infill solutions, retrofitting, or a combination of them. **Social value** and community needs are context-dependent; therefore, appropriate tools for engagement need to be developed, as solutions cannot be hastily replicated without careful consideration of the local **dynamics of places.”**

Leonardo Ricaurte



Reflections

Challenges translate complex research findings into a clear, accessible understanding of real-world housing issues. Formulating research findings as challenges helps ESRs move beyond disciplinary or technical perspectives, encouraging them to consider the broader social, environmental, economic, and institutional contexts in which housing issues arise. This process fosters critical reflection, knowledge synthesis, and awareness of interconnections among actors, methods, policies, and practices. By framing challenges in an accessible way, ESRs develop the skills to communicate effectively with non-academic stakeholders, support collaborative problem-solving, and ensure their research remains relevant and actionable.

Within the knowledge framework, vocabulary terms, cases, and challenges serve complementary but distinct functions: vocabulary terms define shared concepts and establish a common language, cases analyse specific examples, and challenges articulate cross-cutting issues that emerge across multiple disciplines, research areas, and projects.

Conceptual maps, which interrelate all components of the collaborative knowledge network, serve as tools for examining complex housing issues in participatory, multidisciplinary contexts. By visually linking actors, methods, tools, topics, partnerships, policies, and projects, these maps make complex relationships and interdependencies visible. They function as diagrams in the Deleuzian sense¹: generative tools that map relations of power and intensity, producing new social realities and subject positions, and thus constructing a “real that is yet to come, a new type of reality.”² Through this generative capacity, conceptual maps enable researchers, stakeholders, and non-academic participants to explore relationships, identify gaps or overlaps, and engage in informed, collaborative decision-making. In this way, they support dialogue, foster shared understanding, and facilitate the co-creation of affordable and sustainable housing initiatives.

The collaborative development of the vocabulary, case library, and challenges forms the core of RE-DWELL’s transdisciplinary knowledge framework on affordable and sustainable housing. Together, they constitute a rich, multidisciplinary body of knowledge, emerging not only from individual research trajectories of ESRs but also through exchanges with non-academic stakeholders, particularly during secondments. This collective knowledge encompasses conceptual definitions, empirical insights from real-world cases, and problem-focused reflections on housing challenges, embodying the open-ended and exploratory nature of transdisciplinary inquiry.

Beyond serving as repositories, these resources function as active components within the RE-DWELL research framework. The vocabulary structures and clarifies

key concepts, enabling shared understanding across disciplines. The case library documents and analyses practical examples, revealing patterns, interdependencies, and contextual drivers. Challenges translate research findings into accessible problem-based formulations, highlighting interconnections between actors, methods, and policies. In this way, each component functions as a research-supporting instrument, guiding inquiry, enabling reflection, and informing methodological choices while fostering expansive and critical thinking.

Crucially, these instruments are designed for engagement rather than passive reference. They support training, participatory activities, and stakeholder involvement, enabling researchers, practitioners, and community members to explore, test, and refine knowledge in real-world contexts. Through iterative use, the RE-DWELL knowledge framework becomes a living system, continuously evolving through dialogue, application, and co-production, and ultimately reflecting the adaptive, integrative and collaborative ethos of transdisciplinary research in affordable and sustainable housing.

1 “The diagram is no longer an auditory or visual archive but a map, a cartography that is coextensive with the whole social field. It is an abstract machine. It is defined by its informal functions and matter and in terms of form makes no distinction between content and expression, a discursive formation and a non-discursive formation. It is a machine that is almost blind and mute, even though it makes others see and speak.” Deleuze, G. (1988). *Foucault*, (S. Hand, Trans.). University of Minnesota Press, p.34.

2 Deleuze, G., & Guattari, F. (1987). *A thousand plateaus: Capitalism and schizophrenia* (B. Massumi, Trans.). University of Minnesota Press, p.142.

4

Exploring affordability and sustainability in housing: Policy, people, and learning

An examination of collaborative research and learning across policy, practice, and education, shaping housing and community outcomes.

4.1

A review of social housing sustainability in England

by Mahmoud Alsaeed, Karim Hadjri, and Krzysztof Nawratek

4.2

Resident engagement in sustainable housing retrofit: Applying the technical democracy model

by Saskia Furman and Adriana Diaconu

4.3

Advancing architectural education through experiential learning: Preparing future professionals to create sustainable urban dwelling

by Annette Davis, Effrosyni Roussou, and Nuria Martí

4.1

A review of social housing sustainability in England

Mahmoud Alsaeed, Karim Hadjri and Krzysztof Nawratek

England's social housing sector faces a dual challenge: addressing a persistent shortage of affordable homes while advancing toward a carbon-neutral future. In 2021, an estimated 8.5 million people were living in substandard accommodation, and over 1.1 million households remained on waiting lists for publicly supported housing. Despite governmental pledges to deliver 1.5 million new homes and revise the National Planning Policy Framework, questions persist concerning the practical feasibility of realising these ambitions while concurrently meeting the net-zero requirements by 2050.

Over the past decade, the sustainability of social housing in England has evolved across four interrelated themes: conceptualisations, challenges, future aspirations, and emerging environmental trends. We conducted an analysis of these themes using a mixed-methods approach, combining a review of policy and academic literature with descriptive analysis of housing and environmental datasets (2014 to 2024) and twenty semi-structured interviews with housing association representatives and industry professionals.

The findings underscore the urgent need for coordinated system-wide interventions to embed sustainability principles throughout the design, delivery, and management of social housing. By integrating insights from academic research and professional practice, this study provides a critical overview of the evolving landscape of sustainable social housing and offers practical guidance for policymakers, researchers, and practitioners striving to balance social needs with environmental responsibilities.

INTRODUCTION

The current state of social housing sustainability in England presents a multi-faceted challenge shaped by interrelated issues of supply and demand, policy development, and sustainability practices. In 2021, approximately 8.5 million people lived in inadequate housing conditions, while 1.1 million households remained on official social housing waiting lists (National Housing Federation [NHF], 2021). This

sustained demand, coupled with the progressive withdrawal of public funding for housing providers, particularly housing associations, has contributed to a long-term contraction of the social housing stock. The number of units declined from approximately 5.5 million in 1979 to 4.1 million in 2013, with only a slight recovery projected to reach around 4.2 million by 2023 (Cromarty & Barton, 2024). Despite this modest improvement, the supply continues to fall significantly short of meeting national housing needs. This ongoing contraction, amid escalating demand, has exacerbated the national housing crisis and intensified housing insecurity across England.

In response, in 2024 the UK government pledged to deliver 1.5 million new homes, release portions of the green belt for development, and revise the National Planning Policy Framework (Aref-Adib et al., 2024; Royal Institute of British Architects, 2024). Along with this, the government has introduced climate-focused initiatives aimed at reducing carbon emissions by tightening building regulations and embedding sustainability principles in planning and construction. Together, these actions reflect an evolving, but uncertain, policy landscape that seeks to reconcile social housing provision with the UK's broader environmental and net-zero goals.

However, these measures have faced considerable criticism for fragmentation and lack of coherence, particularly in relation to the 2050 vision for a carbon-neutral economy (Brader, 2023) and the partial rollback of energy performance certificate (EPC) requirements in 2023 (Alsaed et al., 2024). The growing complexity of sustainability and housing regulations, combined with frequent revisions of building standards, has further disrupted housing provision practices (Holmes et al., 2019). Collectively, these challenges have weakened the long-term integration of sustainable principles in social housing, leading to unstable supply chains, uncertainty over implementation strategies, and reluctance among developers to commit to sustainable practices.

We adopted a transdisciplinary approach that combines theoretical debates with practical perspectives. The analysis is structured around four key themes identified from both existing literature and recent data: conceptualisations of sustainable housing, challenges in provision, practitioner aspirations, and environmental performance trends, including energy efficiency, EPC ratings, and carbon emissions.

The study integrates three complementary methodological strands. First, it includes a review of academic and grey literature published between 2014 and 2024, drawing primarily on UK-level policy and regulatory documents that apply to England and, in some instances, to England and Wales. Second, it includes a descriptive analysis of housing and environmental statistics from the same period, providing empirical insights into sectoral trends, with the quantitative analysis explicitly focused on England. Third, twenty semi-structured interviews with housing association representatives, architects, and sustainability experts offer practice-based perspectives grounded in the English social housing context.

Insights from the literature informed the development of interview questions and guided the analysis of qualitative and quantitative data. Triangulation across all three strands ensured a comprehensive understanding of sustainability in the social housing sector, enabling integration of theoretical, statistical, and practitioner viewpoints.

The findings indicate that sustainable social housing in England is an evolving concept, shaped by the dual imperative of supporting vulnerable populations while meeting broader environmental objectives. Achieving sustainability in this sector requires balancing competing priorities; yet persistent challenges remain, including fragmented policy frameworks, divergent stakeholder perceptions, and systemic underfunding. Although social housing currently exhibits relatively strong energy performance, improvements across all housing tenures point to a broader transition toward environmental responsibility within the built environment.

1. SUSTAINABLE SOCIAL HOUSING NARRATIVES

This section explores the evolving discourse on sustainable social housing by synthesising insights across four interrelated themes: the conceptualisation of sustainable social housing, the challenges influencing its development and implementation, future aspirations, and emerging trends. These themes were identified through a combined analysis of interview data and the literature review, representing the most significant factors shaping sustainability practices within England's social housing sector.

1.1 Conceptualisation of sustainable social housing

Within the examined literature, it was observed that the conceptualisation of sustainable social housing draws on two overlapping domains: the discourse on sustainability and the framework of social housing. Although the term itself remains under-theorised, its foundations can be traced to the broader sustainability literature, which conceptualises sustainability as the dynamic integration of environmental, social, and economic dimensions (Kates et al., 2005; Mensah, 2019). From this perspective, sustainability constitutes a multidimensional framework aimed at maintaining ecological integrity, promoting social wellbeing, and ensuring economic resilience (Purvis et al., 2019). Within the housing context, this translates into the design, construction, and management of dwellings that minimise environmental impact while ensuring affordability, accessibility, and long-term viability (Attia, 2016; Berardi, 2012; Dempsey et al., 2011).

Following the Second World War, social housing expanded as part of the welfare state's effort to meet the population's basic needs through state-led provision (Stamsø, 2010). However, the neoliberal reforms of the 1980s under the Thatcher government redefined housing policy by promoting market-oriented mechanisms and reducing state responsibility (Malpass, 2005). Legally, social housing is defined

by Section 68 of the 2008 Housing and Regeneration Act as low-cost rental and homeownership accommodation provided at below-market rates to households whose needs are not met by the private sector (Hose of Commons, 2017). Academically, scholars such as Malpass (2014), Stephens (2013), and Scanlon et al. (2015) identify four interrelated dimensions of social housing: tenure (social rent, shared ownership), providers (local authorities, housing associations, and cooperatives), target groups (low-income or vulnerable households), and funding mechanisms (public, private, or hybrid).

Synthesising these perspectives with sustainability debates, the literature identifies three principal frameworks shaping the understanding of sustainable housing. The first emphasises environmental responsibility, focusing on minimising ecological footprints through low-impact or environmentally responsible buildings that balance efficiency with occupant wellbeing (Kruger & Seville, 2012; Tryggstad, 2013; Woolley, 2013). The second focuses on technical performance, highlighting energy efficiency and system optimisation as critical for reducing emissions and operational costs (Erhorn & Erhorn-Kluttig, 2011; Ionescu et al., 2015). The third emphasises design philosophy, where concepts such as Passivhaus and regenerative design seek to enhance environmental and social outcomes by promoting comfort, resilience, and ecological regeneration (Attia, 2016; Chen et al., 2015).

1.2 Challenges in achieving sustainable social housing

Sustainable social housing faces a range of interconnected challenges spanning conceptual, regulatory, and operational dimensions (Alsaeed, 2025).

Conceptual challenges arise from the fragmented understanding of both sustainability and social housing. Scholars argue that the absence of a shared definitional framework has produced disciplinary divergence and inconsistent interpretations across research and practice (Braga & Palvarini, 2013; Granath Hansson & Lundgren, 2019). Ruonavaara (2018) emphasises that such inconsistencies hinder comparative analysis and obstruct the development of coherent policy frameworks. The conceptual ambiguity of sustainability further complicates its integration into housing discourse, as competing paradigms—such as sustainable development, resilience, and environmental justice—prioritise distinct normative and practical objectives (Purvis et al., 2019).

Regulatory challenges stem from the complexity of governance structures and the shifting balance between public and private actors in housing delivery. Since the 1990s, UK housing policy has increasingly depended on hybrid delivery mechanisms involving housing associations and private developers, creating tensions between social objectives and market-oriented logics (Hallsworth et al., 2011; Harriott et al., 2004). This hybridisation has raised concerns about accountability, regulatory compliance, and the long-term sustainability of outcomes (Czischke, 2005; Mullins et al., 2012). Furthermore, the proliferation of building standards and policy instruments has

not consistently translated into effective practice, mainly due to fragmented oversight, uneven enforcement, and funding limitations (Oyebanji, 2014; Pickvance, 2009).

Operational challenges relate to the practical integration of sustainability principles within the planning, design, and management of social housing. The cost of sustainable technologies continues to be a significant constraint, particularly where affordability is the overriding objective (Hensel et al., 2013; Karatas & El-Rayes, 2015). In addition, the persistent tension between short-term financial feasibility and long-term environmental performance often leads to trade-offs that undermine the sustainability of housing provision (Coscia et al., 2020; Oyebanji, 2017).

Collectively, these challenges highlight the need for a holistic and multi-scalar approach that integrates conceptual clarity, policy coherence, and operational feasibility to advance sustainable social housing practice.

1.3 Future aspirations

The future aspirations for housing in the UK, as articulated across academic, governmental, and provider perspectives, reflect a shared ambition to establish an equitable, resilient, and sustainable housing system. From an academic standpoint, future aspirations focus on advancing the understanding of housing as an interdisciplinary, dynamic, and multi-scalar system. Crawford and McKee (2018) highlight that housing aspirations and outcomes are inseparable from broader perceptions of opportunity and constraint, which evolve in response to political, economic, social, and cultural change. Preece et al. (2020) further add the conceptual complexity that arises from the multiple dimensions of housing aspirations, including political-economic, societal, individual, and spatio-temporal dimensions. This perspective underscores the need for a systematic, cross-sectoral approach in which housing policy engages with research, education, and employment systems to promote social mobility and support sustainable, evidence-informed housing strategies.

From a governmental perspective, as outlined in *Delivering a Decade of Renewal for Social and Affordable Housing* (Ministry of Housing, Communities and Local Government, 2025), the objective is to implement a long-term, integrated housing strategy that ensures safety, decency, and energy efficiency across all tenures. The government aims to strengthen the social housing sector's capacity to achieve net-zero carbon targets, expand the supply of affordable homes, and address the needs of an ageing population. Central to this vision is the establishment of a stable policy and investment environment that positions housing as a driver of economic growth, public health, and social wellbeing.

For housing providers, particularly housing associations, the main aim is to reaffirm their social mission while adapting to emerging challenges and opportunities. The NHF (2025) strategic review identifies sector-wide priorities, including decarbonis-

ing homes, enhancing building safety, improving service quality, and restoring public trust. Housing associations increasingly view themselves as strategic partners in national renewal, working collaboratively with government, academia, and local communities to deliver sustainable, affordable, and high-quality homes.

Altogether, these ambitions have redefined housing not merely as a physical asset but as a foundational element of social justice, community wellbeing, and sustainable development. This integrated vision highlights the interdependence of knowledge, governance, and practice in shaping a fair and sustainable housing future.

1.4 Emerging trends

While social housing and sustainability have historically been treated as separate areas of inquiry, their conceptual and practical dimensions are increasingly recognised as interdependent within the framework of sustainable social housing (Alsaeed, 2025). Unlike in the private housing sector, where sustainability is frequently market-driven and aligned with consumer preferences or investment returns, social housing must reconcile environmental objectives with affordability, equity, and social need. In private housing, sustainability features are often implemented as value-added components to appeal to higher-end markets or meet regulatory incentives. In social housing, however, they are essential to ensure long-term liveability and cost-efficiency for vulnerable populations (Alsaeed, 2025; Enwin & Ikiriko, 2023).

Emerging literature identifies several trajectories shaping this evolving landscape. Regenerative and circular approaches to housing are gaining prominence, promoting models oriented towards ecological restoration and long-term balance (Attia, 2016; McLennan, 2004). Another key focus is the social and health dimension of sustainability. Housing is increasingly recognised as central to health, wellbeing, and social cohesion, with policy agendas such as the UK's Decent Homes Standards linking sustainability with equity, inclusion, and community empowerment (Dempsey et al., 2011; Department for Levelling Up, Housing & Communities [DLUHC], 2023b; Woodcraft et al., 2011).

Governance innovation and place-based approaches further support this agenda by fostering collaboration among local authorities, housing associations, and residents. Such partnerships facilitate co-production and contextual adaptation, ensuring that environmental objectives align with community priorities (Bulkeley & Betsill, 2005; Carter & Fortune, 2007).

Overall, these trends highlight an evolving understanding of sustainable social housing that integrates ecological, social, and governance dimensions, reflecting a shift toward holistic, future-oriented strategies.

2. METHODS

The study employed a mixed-methods approach, structured around three interrelated components: a conventional literature review, a descriptive analysis of housing and environmental statistics, and semi-structured interviews with practitioners.

2.1 Literature review

An exploratory literature review was undertaken to identify key theoretical, policy, and practice-based debates shaping the discourse on sustainable social housing. The review drew on peer-reviewed academic literature accessed through Scopus, Web of Science, and Google Scholar, alongside national and local policy documents and grey literature produced by UK government departments (including the Ministry of Housing, Communities and Local Government), housing regulators (notably the Regulator of Social Housing), and sector bodies, such as the National Housing Federation. Sources were identified using keyword searches combining terms such as social housing, sustainability, affordable housing, and sustainable social housing.

Selection criteria ensured analytical rigour, evaluating sources across three dimensions: (1) relevance to the research objectives, (2) authority of the source, determined by the author's expertise and institutional affiliation, and (3) currency, assessed through citation frequency and publication recency. This process yielded 40 sources that provided a balanced representation of theoretical and empirical perspectives. The literature review served both as a conceptual foundation and as a guide for formulating interview questions and structuring subsequent data analysis.

2.2 Statistical review

A descriptive review of secondary statistical data was conducted to contextualise patterns and performance trends within England's social housing sector. Data were drawn primarily from the Office for National Statistics (2024) and the English housing survey series (DLUHC, 2023a, 2023b, 2024), covering the period 2014-2024. The analysis focused on three indicators: (1) changes in housing stock composition, (2) energy performance metrics, and (3) carbon dioxide emissions. Key measures included standard assessment procedure (SAP) ratings and EPC classifications.

This stage aimed to identify longitudinal trends rather than to test causal relationships. The review examined developments in the environmental and operational performance of social housing, assessing how policy shifts and funding mechanisms may have influenced progress toward sustainability objectives. Findings from this analysis are integrated into the discussion section to illustrate the sector's evolving environmental performance.

2.3 Semi-structured interviews

To complement the literature and statistical analyses, twenty semi-structured interviews were conducted with professionals involved in the design, management, and delivery of social housing. Interviews aimed to capture practitioners' perspectives on the conceptualisation of sustainable social housing, operational challenges encountered, and future development aspirations.

Participants were selected via purposive sampling to ensure representation from key stakeholder groups. The first group comprised eight housing associations representatives, reflecting their central role as principal providers of social housing. The second group included twelve practitioners, primarily architects and sustainability specialists, actively engaged in planning, design, and implementation of housing projects across England.

The interview protocol, informed by the literature review, was structured around three topics: definitions and conceptual understandings of sustainable social housing, practice-based challenges, and future aspirations for integrating sustainability. Interviews were conducted either in person or online, lasting 45-90 minutes each. All interviews were transcribed verbatim and anonymised to ensure confidentiality. Institutional ethical approval was also obtained prior to data collection.

2.4 Data analysis

Qualitative data from the interviews were analysed using thematic analysis, following the framework outlined by Neuendorf (2018). Initial codes were developed manually through iterative reading and refinement to identify recurrent patterns and themes. Coding was then supported by NVivo 13 software to enhance consistency and traceability.

A cross-comparison between housing association and architectural practitioner responses revealed both convergences and divergences in perception, strategy, and policy implications, which were triangulated across all three methods to strengthen the validity of the findings. Insights from the literature review informed the interpretation of statistical data and guided the thematic coding of interview transcripts, while quantitative trends provided contextual depth to practitioner perspectives.

3. RESULTS AND DISCUSSIONS

This section presents the research findings according to four central themes: conceptualisation, challenges, aspirations, and emerging trends. These themes were derived through a thematic analysis of interview data and were subsequently triangulated using the same analytical lenses applied to the literature review, as outlined in Sections 1.1 through 1.4.

3.1 Conceptualisation of sustainable social housing

The conceptualisation and perception of sustainable social housing varied across participant groups, reflecting their professional orientations and areas of expertise. Among housing association representatives, the term sustainable social housing was not consistently recognised as a distinct concept. Rather, it was understood through practice-based interpretations embedded within the management and delivery of housing. This perspective aligns with the academic debates that conceptualise sustainability within social housing as a multidimensional framework integrating environmental responsibility with social and economic objectives (Mensah, 2019; Oyebanji, 2017). Participants described sustainability as the practical application of principles such as resource efficiency, affordability, and long-term resilience within housing provision. They frequently associated the concept with operational and financial sustainability, encompassing rent levels, maintenance, energy consumption, and life cycle performance. This interpretation corresponds with Stephens (2019) and Malpass (2014), who argue that social housing must balance efficiency and social equity to remain viable for both providers and residents.

A recurring theme among housing association representatives was that affordability should not be achieved at the expense of quality. Participants emphasised that cost-reduction measures should not compromise structural integrity, liveability, or design standards. Instead, they advocated for durable, well-constructed housing that supports occupant health and wellbeing. This perspective aligns with literature identifying social sustainability as a core dimension of sustainable development (Dempsey et al., 2011). By linking affordability with durability and comfort, participants reinforced the notion that sustainability extends beyond environmental performance to encompass long-term value creation and social benefit, echoing Tryggestad (2013) argument that environmentally responsible design should also deliver social and economic benefits.

Practitioners, particularly architects, articulated a more explicit, technically informed understanding, closely aligned with the building performance dimension prevalent in sustainability scholarship. Their conceptualisation centred on two interrelated perspectives: technical performance and human-centred design.

From a technical standpoint, participants emphasised the importance of reducing resource consumption, particularly energy use and carbon emissions, as key strategies for achieving sustainability. This aligns with Erhorn and Erhorn-Kluttig (2011) and Ionescu et al. (2015), who identify energy efficiency, system optimisation, and technological innovation as defining features of sustainable housing. Participants cited standards such as Passivhaus and highlighted the use of renewable energy systems, high-performance insulation, and durable materials as essential strategies for reducing carbon emissions and long-term operational costs. These findings correspond with scholarship conceptualising sustainable housing as a performance-oriented, technology-driven process designed to minimise environmental impact while enhancing building efficiency (Kruger & Seville, 2012).

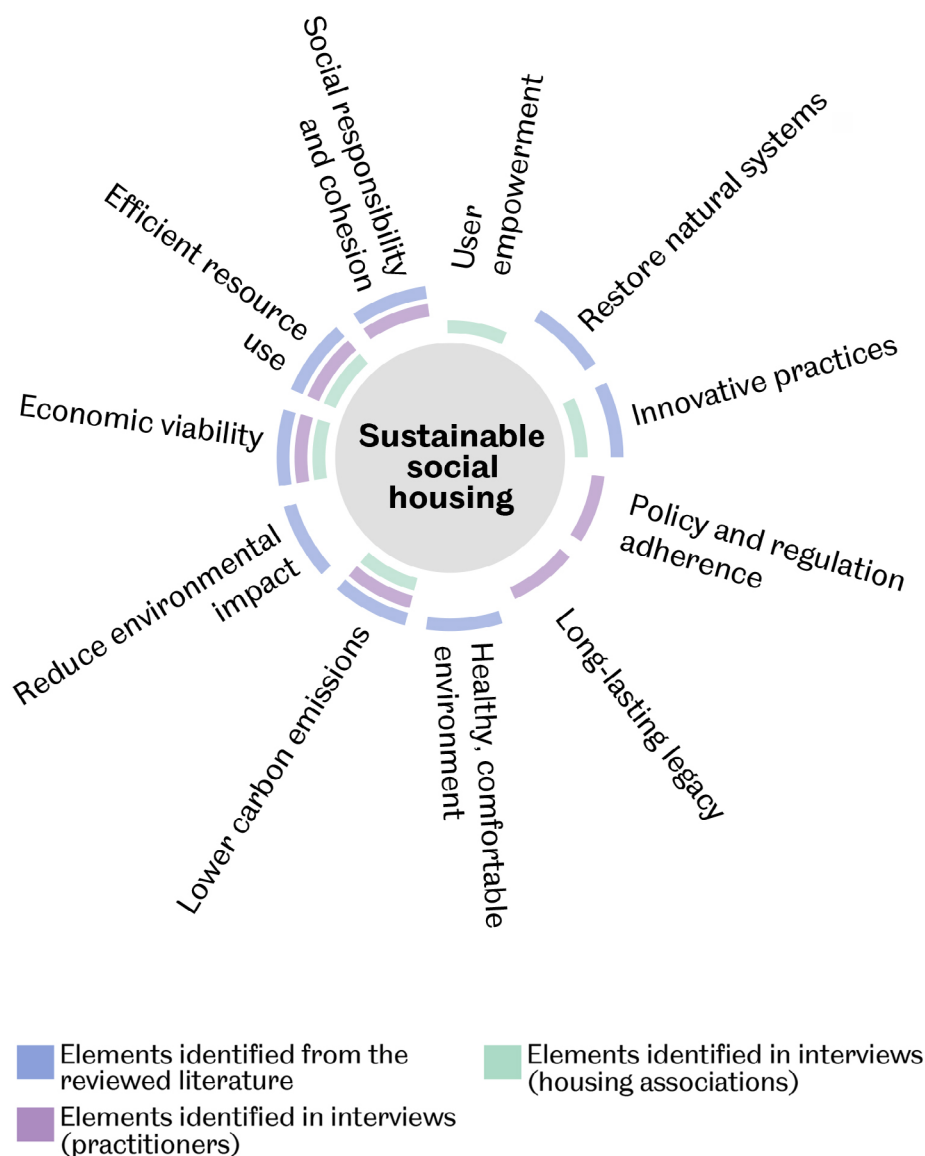


FIGURE 4.1.1: Sustainable social housing conceptualisation.
Source: Authors, 2025.

Equally significant was the human-centred perspective of sustainability, which participants regarded as essential to the long-term success of social housing. Sustainable housing was described as a process that enhances user autonomy and comfort by empowering residents to actively manage their living environments. Participants emphasised the importance of designing adaptable homes capable of accommodating changing occupant needs while maintaining accessibility, safety, and comfort. User empowerment emerged as a defining feature of this approach, with participants noting that providing residents with greater control fosters a sense of ownership and encourages more sustainable patterns of living. Figure 4.1.1 illustrates the primary elements that define the perception of sustainable social housing.

Taken together, these dimensions indicate that the conceptualisation of sustainable social housing among practitioners and housing providers reflects a convergence between technical innovation and social value. Housing associations tend to prioritise the economic and managerial aspects of sustainability, emphasising affordability, durability, and operational efficiency. In contrast, architects and sustainability specialists focus more on environmental performance, technological innovation, and the lived experience of residents. Despite these differing emphases, both groups concur that sustainability in social housing should extend beyond mere compliance with environmental or regulatory standards to encompass inclusivity, resilience, and long-term liveability.

3.2 Challenges in achieving sustainable social housing

Financial, regulatory, and governance-related challenges emerged as dominant themes from the interviews. Participants identified financial and structural barriers as particularly critical, describing the “Freeze–Flood” funding cycle that characterises social housing investment in England. This cycle, marked by periods of limited funding followed by short bursts of activity, was perceived as undermining long-term strategic planning, delaying project delivery, and discouraging innovation. Housing association representatives argued that this instability restricts their capacity to plan beyond immediate budgetary cycles, echoing broader concerns in the literature regarding the volatility of public investment in the housing sector. Scholars such as (2009) Mulliner and Maliene (2015) and Czischke (2005) similarly note that short-term funding mechanisms limit housing providers’ capacity to embed sustainability into core operations, particularly when return-on-investment timelines exceed conventional grant periods.

Participants also highlighted the competitive nature of funding allocation as a significant barrier. Small-scale housing associations, in particular, were seen as disadvantaged within current funding frameworks, often lacking the administrative capacity and financial reserves necessary to compete with larger organisations. This aligns with Pickvance (2009), who argues that policy structures tend to favour scale over innovation, constraining smaller actors’ ability to implement progressive sustainability measures. The absence of consistent long-term financing was also

identified as a structural constraint that perpetuates reliance on reactive rather than strategic responses to sustainability challenges.

Supply chain and regulatory challenges were similarly prominent. Both housing providers and design practitioners referred to recurring material shortages and delays in obtaining key building systems, such as heat pumps, photovoltaic panels, and high-efficiency boilers. These disruptions often resulted in design alterations and led to project cost escalations, acting as obstacles to scaling sustainable housing. Participants also emphasised the destabilising effects of regulatory volatility, noting that frequent revisions to building standards and sustainability assessment frameworks create uncertainty, inflate costs, and discourage innovation.

Practitioners expressed particular dissatisfaction with sustainability accreditation systems, such as environmental rating schemes, which they perceived as overly commercialised and insufficiently reflective of real-world practice. Architects argued that sustainability metrics often prioritise quantifiable performance indicators while neglecting social and contextual dimensions of housing design. These findings suggest a disconnect between the regulatory aspirations of sustainability frameworks and their operational application within the social housing sector.

Finally, governance and coordination shortcomings were recurrent across participant groups. Participants highlighted the lack of coherent national direction on sustainable social housing, compounded by fragmented responsibilities across government departments and limited coordination between central, regional, and local authorities. This fragmentation was seen to hinder the development of integrated strategies and restrict opportunities for knowledge exchange between housing providers and policymakers. These concerns echo academic critiques of the UK's multi-level governance system, long characterised by policy fragmentation and inconsistent accountability mechanisms (Alsaed, 2025; Pickvance, 2009).

3.3 Future aspirations

Despite the challenges identified, participants expressed a shared, forward-looking vision of sustainability that extends beyond environmental efficiency to encompass social inclusion, technological innovation, and long-term resilience. Across both housing associations and professional practitioners, there was broad agreement that progress depends on establishing regulatory stability and clarity. Participants emphasised the need for consistent, transparent sustainability frameworks that enable strategic planning, long-term investment, and accountability for delivery. Stable and equitable funding mechanisms were also viewed as fundamental to achieving meaningful change, particularly in ensuring that smaller housing associations are not disadvantaged in their capacity to implement sustainable practices.

Technological and digital innovation emerged as a key theme. Participants discussed the potential of tools such as Building Information Modelling (BIM), smart

energy systems, and digital monitoring platforms to enhance the precision and efficiency of housing design and management. Digital systems were also seen as enabling greater transparency and facilitating more effective evaluation of sustainability outcomes.

Another notable trend was the increasing focus on design and community-oriented approaches. Practitioners and housing providers highlighted the importance of human-centred and regenerative design strategies that integrate social, environmental, and spatial objectives. They advocated for housing that not only reduces environmental impact but also enhances occupants' wellbeing, fosters community interaction, and contributes to a positive surrounding environment. This approach was regarded as integral to creating housing that is both sustainable and socially meaningful.

3.4 Emerging trends

Between 2014 and 2024, the number of social housing units owned by housing associations increased from 2.27 million to 2.5 million. In contrast, local authority social housing stock declined from 1.65 million in 2014 to 1.54 million in 2024 (Figure 4.1.2, Chart A). During the same period, the private rented sector grew by 6.41%. In the owner-occupied sector, the number of outright homeowners rose by 17.89%, while households purchasing through mortgages increased by 5.34% (Figure 4.1.2, Chart B).

These trends highlight a gradual shift in the composition of housing tenure in England, with housing associations expanding their role in social housing provision as local authority stock continues to decline. The data also indicate steady growth in private renting and owner-occupation, reflecting broader structural changes in the housing market over the decade.

From an environmental perspective, social housing achieved the highest median energy efficiency score, with an average SAP rating of 71 over the five financial years ending in 2024. In contrast, privately owned housing showed more modest improvements, with SAP scores increasing from 62 in 2014-2019 to 67 in the 2024 (Figure 4.1.3, Chart A). Similarly, the proportion of dwellings with an EPC rating of band C or higher rose from 56.8% in 2014 to 65.7% in 2024 (Figure 4.1.3, Chart B).

Improvements in EPC ratings were inversely correlated with carbon emissions. Privately owned housing recorded the largest reduction, decreasing from 4.1 tonnes per year in 2014 to 3.6 tonnes per year in 2024. Social housing, while already exhibiting lower emissions, experienced a more modest reduction from 2.5 tonnes in 2014 to 2.4 tonnes in 2024 (Figure 4.1.3, Chart C).

These findings suggest that social housing has maintained comparatively high energy performance levels while reductions in private housing emissions reflect

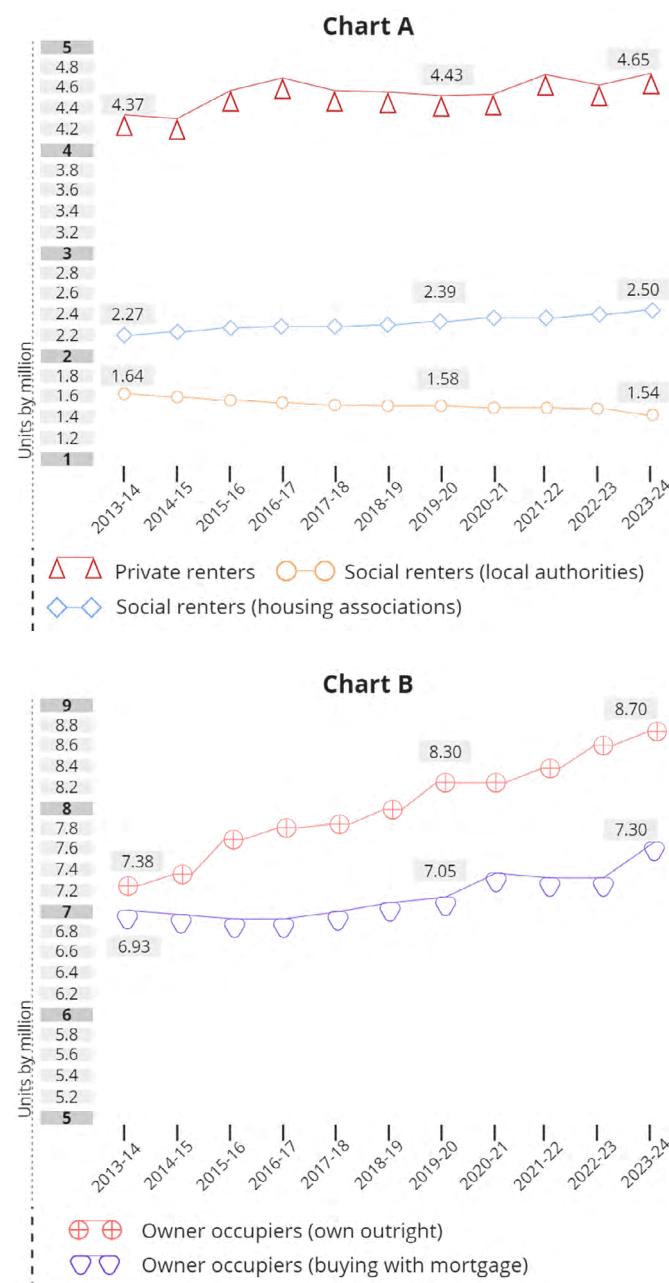


FIGURE 4.1.2: Housing stock profile. Source: Authors, adapted from *English Housing Survey 2022 to 2023: Headline report* (Annex Table 1.1; DLUHC; 2023a, 2024).

broader sectoral improvements. The data highlight the continuing importance of targeted sustainability interventions in social housing, alongside policies supporting energy efficiency across all tenure types.

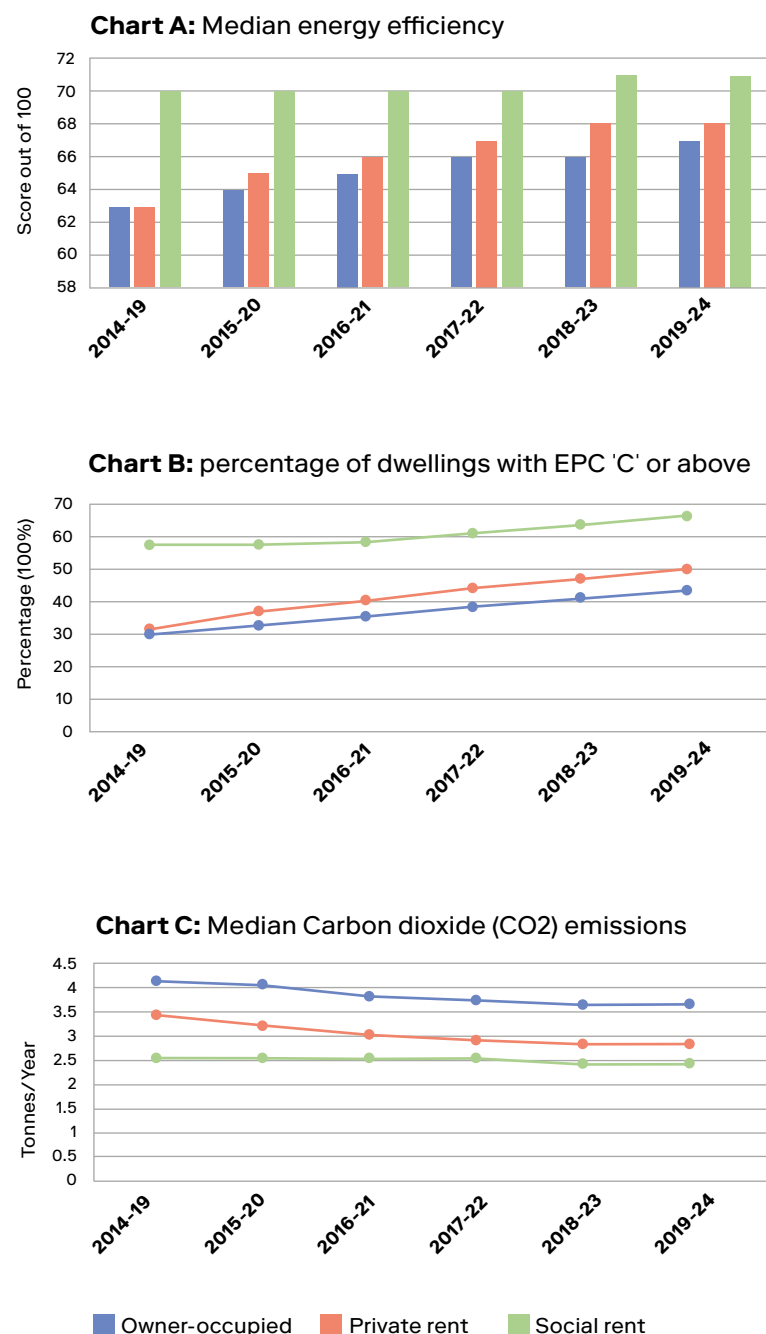
4. CONCLUSIONS

Sustainable social housing in England is a multidimensional endeavour aimed at providing safe, affordable, and high-quality homes for vulnerable populations while integrating environmental, social, and economic sustainability principles to enhance the long-term resilience and stability of the housing sector. It seeks to balance affordability with quality, ensuring that housing contributes to health, well-being, and community cohesion. Beyond meeting immediate needs, sustainable social housing aspires to create inclusive and resilient environments that support both current and future generations.

Our analysis indicates that the challenges to achieving sustainability in social housing are extensive, multifaceted, and deeply embedded within the broader structural and policy landscape. These challenges primarily stem from differing perceptions of what constitutes sustainable social housing, the growing complexity of housing and environmental regulations, and persistent systemic underfunding faced by housing providers. The lack of conceptual clarity often results in fragmented policy responses and inconsistent implementation across the sector, while financial constraints continue to limit innovation and long-term planning capacity. Addressing these barriers requires immediate and large-scale policy interventions that establish a coherent vision and structured pathways toward sustainability objectives. This includes developing stable and equitable funding streams, strengthening supply chains for sustainable materials and technologies, and promoting innovation in both policy design and practical implementation to ensure that sustainability becomes an achievable and measurable outcome across all levels of housing provision.

Practitioner aspirations emerged as a central theme in our analysis. Housing associations and industry professionals emphasised the need for regulatory clarity, stable and predictable funding mechanisms, and the integration of innovative design and management practices to achieve long-term sustainability. They underscored the importance of moving beyond short-term targets to embed sustainability principles throughout the entire housing life cycle, from planning and construction to operation and maintenance. Practitioners' motivation extended beyond regulatory compliance, reflecting a genuine ambition to create environmentally responsible, socially inclusive, and economically resilient communities. Their vision centres on delivering housing that not only meets immediate needs but also contributes to wider societal wellbeing, environmental regeneration, and intergenerational equity.

In terms of housing stock trends, owner-occupation remains the dominant tenure in England, comprising 16.01 million units and accounting for 65% of households. The social rented sector represents the smallest proportion, with 4.05 million units (16% of households), while the private rented sector has remained relatively stable at 4.65 million units (19%) since 2013-2014.



From an environmental performance perspective, the housing stock has demonstrated notable improvements in energy efficiency over the past decade. The proportion of homes in the highest energy efficiency bands (A to C) increased from 23% to 52%, while properties in the lowest efficiency bands (E to G) declined from 26% to 9%. These trends indicate a sustained shift toward enhanced energy efficiency performance across all tenures, with social housing exhibiting the highest overall energy performance. However, privately owned housing achieved the most significant reductions in carbon emissions, highlighting sector-wide progress in environmental responsibility.

The underlying reasons for these trends remain somewhat uncertain. The comparatively higher environmental performance of social housing may be influenced by competitive public funding mechanisms, which often require providers to demonstrate strong sustainability commitments. It may also reflect the evolving role of housing associations, which have increasingly adopted innovative practices that meet or exceed national sustainability targets. These efforts appear motivated by a desire to create enduring, environmentally responsible communities over short-term market gains. Nevertheless, these interpretations remain tentative, and further empirical research is required to critically examine and substantiate these assumptions.

FIGURE 4.1.3: English housing environmental profile. Source: Authors, adapted from *Energy efficiency of housing in England and Wales: 2024* (Tables 1C, 2C, and 1F; Office for National Statistics [ONS], 2024).

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4.2

Resident engagement in sustainable housing retrofit: Applying the technical democracy model

Saskia Furman and Adriana Diaconu

The transition to a low-carbon housing stock remains a key policy objective across Europe, yet large-scale retrofit programmes often struggle to align technical solutions with residents' everyday practices and governance contexts. This chapter examines how the principles of “technical democracy” can enable us to better understand and reconsider participation and decision-making in sustainable housing retrofit. Drawing on five publicly funded projects in Spain, England, the Netherlands, and France, this investigation applies an analytical framework integrating architectural and social science perspectives. The study highlights how embedding engagement within existing organisational structures—such as cooperatives, housing associations, and resident groups—can strengthen social cohesion, technical performance, and long-term sustainability. Conversely, tokenistic or top-down participation tends to undermine project outcomes and erode user trust. The findings suggest that democratising sustainable housing retrofit governance is essential to bridging the gap between technical innovation and lived experience.

INTRODUCTION

The objectives of the 2019-2021 EU Green Deal (European Council, n.d.), Fit for 55 strategy (European Council, n.d.), Renovation Wave (European Commission, 2020), and the UK's Net Zero Strategy (BEIS & DESNZ, 2021) have brought new urgency to large scale retrofit of existing housing stock across the European Union and the UK. These policy frameworks translate into two principal challenges: scaling up the annual number of homes retrofitted and improving their energy performance. A persistent obstacle, however, lies in the interaction between retrofit initiatives and residents' everyday practices. Projected performance targets cannot be met without changes in consumption behaviours, correct adoption of new technologies and shifts in how people manage their homes. A significant part of the performance gap—the discrepancy between predicted and actual energy savings in

retrofitted buildings—stems from the difficulty of aligning technical solutions with residents' expectations and habits. Since energy use is shaped by daily routines rather than design assumptions, actual consumption can be considerably higher than expected, reaching up to five times the predictions (Traynor, 2019).

Social practice theory (Shove, 2004; Shove, Pantzar, & Watson, 2012) seeks to understand the causes of discrepancies between observed behaviours, expressed needs, resident satisfaction and policy-driven sustainable solutions, as well as the drivers of change. In line with this sociological approach, this study examines how the outcomes of energy retrofit can be enhanced through resident engagement in decision-making and retrofit design processes. The research focuses on the collective level, referring to formal and informal resident organisations that enable opportunities for meaningful engagement.

1. CONCEPTUAL AND METHODOLOGICAL FRAMEWORK

This study builds on existing retrofit governance literature while highlighting the importance of involving residents as active participants in shaping interventions. Governance refers to how organisations, groups, networks and sub-systems coordinate to make public action possible (Le Galès, 1995). Previous studies (De Feijter et al., 2019; Dowling et al., 2014) show that housing retrofit is largely driven by technical criteria and top-down financing mechanisms. Funding arrangements are particularly influential, since property owners in collective housing estates—whether homeowners, institutional or private landlords—seldom cover the entire cost without public support. Consequently, retrofit governance is characterised as multi-level. Higher tiers of government, such as federal and state levels, often determine the structure, provision, and conditions of local retrofitting initiatives through “at-a-distance” techniques (Dowling et al., 2014). Financial incentives further constrain retrofit solutions by prescribing predetermined packages that leave little scope for resident input (De Feijter et al., 2019).

Unlike these studies, this research distinguishes between the governance of housing production and management and the governance of retrofit, while recognising their interplay. Resident engagement is dependent on existing housing governance structures, such as social housing tenants' associations, cooperatives, or owners' associations in private apartment buildings. These collective forms of organisation are often embedded in long-standing housing governance arrangements but may also emerge during the retrofit processes.

1.1 Research questions and objectives

The organisation and practice of collective resident engagement in housing retrofit remain underexplored, particularly in publicly funded projects with a social and collective dimension. Most sociological and political science studies overlook decision-making processes in retrofit projects, limiting understanding of the roles played by tenants and homeowners and the extent to which they participate alongside other stakeholders in design and implementation. This study proposes a new analytical perspective that combines an examination of architectural design processes with social science insights on social practice and governance.

The study objective is to examine the conditions that enable residents and their organisations to participate meaningfully in retrofit governance, and how their lived experiences are (not) taken into account. To guide this investigation, we pose two research questions:

1. How does the governance of retrofit facilitate—or hinder—the integration of residents' expertise?
2. How are residents' individual and collective living experiences considered when making decisions about retrofit interventions?

To address these research questions, a conceptual model for analysing resident engagement was developed and applied to five publicly funded retrofit projects aligned with policy targets. Each project received European, national or regional subsidies or grants, complemented by funds from non-profit organisations, such as housing associations, or private owners, including homeowners and landlords. All projects have a strong social component, primarily housing low-income populations, and involve affordable rental or ownership schemes, including social or cooperative housing models. They all represent collective housing typologies with shared indoor and outdoor spaces. Leading stakeholders are committed to achieving high energy performance and developing experimental or innovative retrofit strategies for increasing energy efficiency and, in some cases, social innovation.

The importance of local and national specificities within housing systems was highlighted by De Feijter et al. (2019) in their analysis of retrofit governance and resident engagement. Building on their work, this study considers how both existing social and affordable housing governance models and housing retrofit-specific governance structures influence resident engagement. Examining these processes through the lens of collective decision-making enables exploration and assessment of these influences.

1.2 Technical democracy: An analytical framework

This study proposes an analytical tool to evaluate, compare, and guide participatory processes in housing transformation, with the aim of enhancing user influence. The tool builds on the “technical democracy” framework developed by Callon, Lascombes, and Barthe (2001). Technical democracy outlines principles for organising assemblages and debates that integrate expert knowledge—technical, professional, or scientific—with citizen knowledge. It emphasises the value of first-hand “experiential knowledge” (Callon et al., 2001) from laypersons affected by technical, scientific or political decisions related to experimental projects, and specifies the conditions for incorporating this knowledge into deliberative decision-making processes. The organising principles and structures of these participatory settings are conceptualised as “hybrid forums” (Callon et al., 2001). In this study, the concepts of technical democracy and of hybrid forums are applied to the process of housing retrofit in order to analyse the scale and quality of resident engagement.

1.3 Methodology and structure

This study critically examines resident participation across five publicly funded projects in different European contexts: Spain, England, the Netherlands, and France. Fieldwork for these cases was conducted separately by the two authors, with four projects as part of a PhD research and one through pedagogic activities. The fieldwork combined on-site observations, interviews with institutional stakeholders, focus groups with residents, desktop research, and analysis of project data. The research methodology integrates social science and architectural perspectives, addressing both governance and design aspects of retrofit, and linking theoretical and analytical standpoints to practical recommendations.

The analysis presentation is structured as follows. First, the literature review further explores the concepts of retrofit governance and technical democracy. The technical democracy model is adapted to housing retrofit and distilled into three key principles forming the conceptual framework. Second, the five retrofit case studies are briefly introduced. Third, the analytical method based on the technical democracy framework, developed for comparing and assessing resident engagement across the cases, is presented. The results are then examined, with insights drawn from each case, focusing on factors that explain differences in the intensity and quality of resident engagement. Finally, the discussion and conclusions section set out the advantages and limitations of the analytical model, both as a heuristic tool and its potential to contribute to the transformation of practices.

2. LITERATURE REVIEW

The review begins by examining literature on retrofit governance, which has evolved from primarily technical and policy-oriented perspectives to recognising the role of residents and communities. It then introduces the concept of technical democracy as a theoretical lens for analysing participatory decision-making in socio-technical contexts.

2.1 Retrofit governance and resident engagement

Several studies (Karvonen, 2013; Maller et al., 2012) highlight that conventional housing retrofit approaches, which focus on regulations, economic incentives, and information provision, are insufficient to address the environmental and social challenges posed by climate change. Research on retrofit governance (De Feijter et al., 2019; Dowling et al., 2014) further suggests that the assemblage of institutions and mechanisms tends to separate technological and social aspects, resulting in a limited “capacity to govern the imbrication of technologies into the fabric of daily life” (Dowling et al., 2014, p. 23). Public engagement programmes have frequently struggled to generate householder interest and build trust (Putnam & Brown, 2021). De Feijter et al. (2019) emphasise the role of resident committees in long-term governance, supervision and management, particularly when financial constraints limit public resources, which can be supplemented by homeowners or residents’ committee activities. Similarly, Karvonen (2013) positions resident communities at the centre of retrofit governance, advocating for “community-based partnerships” that prioritise socio-technical over purely technical innovation. Karvonen also highlights the importance of intermediaries—such as government agencies, non-profits, community organisations, or private companies—that can bridge knowledge gaps between institutions and residents, ensuring resident input is informed and influential. While Putnam and Brown (2021) also support the use of intermediaries, they caution that the reliability of advisors in these roles can vary.

2.2 Technical democracy and hybrid forums

To analyse the characteristics, origins, and conditions of resident engagement processes, this study draws on the sociological theory of technical democracy and the concept of hybrid forums, framing housing as a socio-technical reality (Callon et al., 2011). Hybrid forums operationalise technical democracy and have gained traction as a model for the democratisation of expertise, contrasting with technocratic policy approaches. However, when applied to urban transformation projects, the hybrid forum approach has been criticised for its performative effect, which can reinforce the authority of traditional institutional decision-makers (Farias, 2016; Lolive, 2006). These critiques suggest that emphasis should extend beyond “symmetrisation”—the alignment of participants’ expertise—to include the collective exploration of uncertainty and the uncovering of new problems and solutions (Farias, 2016). From this critical perspective, hybrid forums should also integrate diverse forms of resident input, including attachment to place, individual

and collective memories, and everyday practices (Lolive, 2006). Incorporating these considerations, technical democracy serves as the foundation for the conceptual model developed in this study, with hybrid forums serving as an analogue for decision-making processes in housing retrofit projects.

Several key principles of technical democracy have been distilled from the literature and adapted to the context of housing retrofit:

1. **The intensity and timing of stakeholder engagement** are considered decisive for the transformation of the original asymmetric decision-making relations between institutional and resident stakeholders. Additionally, the relevance of outcomes depends on the diversity of participants beyond the representatives of dominant social groups.
2. **The hybrid forum process** is crucial in unveiling uncertainties and consequently revealing new problems to explore within technology-driven retrofit priorities. According to Callon, Lascoumes and Barthe (2001) these problems, referred to as “socio-technical controversies”, can serve as powerful tools for collective learning. They allow participants, beyond traditional decision-makers and experts, to bring into discussion new challenges, highlight previously overlooked aspects, and propose new objectives for the collective process.
3. **New identities**, both collective and individual, emerge from hybrid forum processes through the aggregation of groups concerned with common problems and through the adoption of new values and ways of living. These outcomes can be interpreted as social outputs that enhance resident engagement capacities, ultimately leading to long-term sustainable social practices.

3. CASE STUDIES

To apply the analytical framework of technical democracy, five cases were selected and their characteristics listed. In the initial phase of the study, which focused on documenting each retrofit project, data was collected on each buildings' history, typology, tenure, ownership, and main refurbishment objectives. These case descriptions are summarised in Table 4.2.1, which allows for initial comparison across projects, followed by an overview highlighting key characteristics relevant to understanding resident engagement and governance dynamics.

TABLE 4.2.1: Characteristics of the selected case studies of housing retrofit. Source: Authors.

CASE STUDY	1. HOUSEFUL, BLOC DELS MESTRES	2. THE SUTTON ESTATE	3. LIV INN, HILVERSUM	4. CLAU MESTRA	5. N°100 ARLEQUIN
LOCATION	Sabadell, Spain	Ixworth Place, London, England	Vaartweg, Hilversum, The Netherlands	Sant Cugat del Vallès, Spain	100, Galerie de l'Arlequin, Grenoble, France
ORIGINAL CONSTRUCTION PERIOD	≈ 1956	1913	1970	1969	1970-1972
BUILDING OWNER	Public: Agència de l'Habitatge de Catalunya (AHC)	Third sector: Clarion Housing Association	Third Sector: Habion (senior housing)	Public: Sant Cugat del Vallès city council with resident right-for-use (facilitated by Sostre Civic cooperative housing association)	Private: Owners' association (French law)
BUILDING TYPOLOGY	Nine-storey apartment building	Complex of 15 five-storey apartment buildings with shared gardens	Six-storey residential care with central community modules. (The plot contains two other 3-5 storey residential buildings with shared garden)	Two-storey apartment building with community space	5 to 15 storey apartment building within a complex of 17 attached buildings, originally 1,5 km long
RETROFIT PERIOD	2018-2023	2014-2024	2018 – 2022	2015-2023	Preparation (2016-2019), retrofit (2020-2024), design (on-going)
NUMBER OF APARTMENTS	16 apartments	384 apartments across the 15 buildings	88 apartments in a single building	12 apartments (11 permanent homes and one shared)	145 apartments in a single building
TENURE	Social rental housing	Social rental housing	Social rental housing (85% homes for older people with diverse health needs and 15% homes for younger people)	Social housing under a lease-for-use (with capital contributions from each household)	Private housing for low-income groups in a complex with a majority of social housing including public amenities
PROJECT MANAGEMENT	EU HOUSEFUL and AHC	Clarion HA	Habion	Sostre Civic	Metropolitan administration and State agency
PRIMARY ENERGY CONSUMPTION*	Baseline: 209.46 kWh/m ² /y Prediction: ≈ 105 kWh/m ² /y Actual: 123.73 kWh/m ² /y	Baseline: 208 kWh/m ² /y Prediction: 111 kWh/m ² /y Actual: Not available	Baseline: Not available Prediction: Not available Actual: ≤ 160 kWh/m ² /y	Baseline: Not available Prediction: 21.22 kWh/m ² /y Actual: 14.59 kWh/m ² /y	Baseline: 215 kWh/m ² /y Prediction: 77 kWh/m ² /y Actual: Not available

* Available primary energy consumption data has been estimated using different calculation methods and includes varying energy services. These figures are provided for context only and are not meant to be compared between the different case studies.

The selected case studies pursue multiple sustainability objectives. The HOUSEFUL project, for instance, focuses on innovative circular solutions targeting a 50% reduction in non-renewable primary energy consumption. Where data is available, other projects show energy reduction targets ranging from 38% (Sutton Estate) to 64% (n°100 Arlequin). Most of the buildings date from the post-WWII period (1950s – 1970s), with the exception of the Sutton Estate, which was built in 1913. This estate was initially proposed for partial demolition and privatisation by its managing housing association. After a successful preservation campaign led by residents, Clarion Housing Group implemented a retrofit project that emphasised greater collaboration with residents.

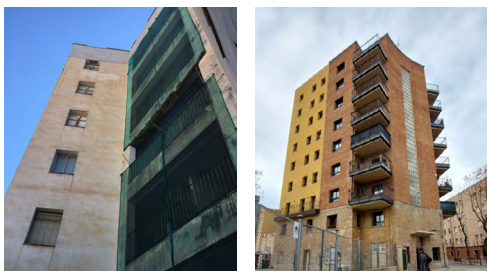


FIGURE 4.2.1: (left) Bloc dels mestres, pre-retrofit. Source: *Projecte HOUSEFUL*, Agència de l'Habitatge de Catalunya, 2022; (right) Post-retrofit. Source: First author, 2024.

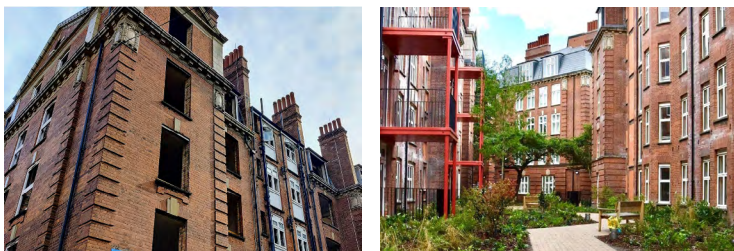


FIGURE 4.2.2: (left) The Sutton Estate, pre-retrofit. Source: *Sutton Estate, Chelsea Design and Access Statement*, HTA Design LLP, 2020; (right) Post-retrofit. Source: *Case study: Central London retrofit*, Kensa, 2024.

In all cases, retrofit governance is closely linked to building ownership and management. In the first three cases, social housing is managed by housing organisations, but they do not lead the retrofit process in the same way. In Bloc dels mestres (Figure 4.2.1), decision-making was top-down, involving only industry professionals and technical stakeholders through systematic consultation. Resident participation was limited to post-completion activities focused on learning to use new energy systems. At the Sutton Estate, Clarion Housing (Figure 4.2.2) retained central decision-making power but established a Resident Steering Group to gather input on specific design aspects, creating a somewhat consultative approach throughout the project. In the case of Liv Inn (Figure 4.2.3), participatory processes were embedded in the philosophy of the Habion organisation, which aims to pro-

mote community building. Habion employed their specific participatory process, the Røring method (van Hoof & Boerenfijn, 2018), resulting in a hybrid governance structure that balanced institutional oversight with significant input from different stakeholders, including tenants, care organisations, local government representatives and cultural organisations.



FIGURE 4.2.3: (left) De Boomberg (Liv Inn, Hilversum) pre retrofit. Source: *HilversumsNieuws*, 2018; (right) Post-retrofit, west-facing façade. Source: First author, 2024.



FIGURE 4.2.4: (left) Clau Mestra pre retrofit. Source: Sostre Cívica, n.d.-a. *CLAU MESTRA: UN PROJECTE FRUIT DE LA LLUITA COL·LECTIVA*; (right) Post-retrofit west-facing façade. Source: *Divisare*, 2024, Zaga Arquitectura.

The fourth case, Clau Mestra (Figure 4.2.4), is a housing cooperative owned by the Sant Cugat del Vallès city council and managed by residents who hold right-for-use. The retrofit process was coordinated by the Sostre Cívica cooperative, which provided administrative, financial, and technical support while fostering a bottom-up governance model involving future resident households. Organised into resident working groups, participants oversaw specific aspects of the project through consensus-based decision-making. They also contributed to construction, demolition and site management phases under professional guidance.

Finally, n° 100 d'Arlequin (Figure 4.2.5) is a privately-owned property comprising of both private rental and owner-occupied apartments. It is part of the larger La Villeneuve housing estate, which accommodates low-income populations and has been designated a “priority regeneration area” under French national policy. Consequently, the estate has benefited from increased public funding and project engineering for retrofit, with strategic coordination and implementation overseen by the State Agency and Metropolitan administration. However, the owners' association retains legal authority to adopt retrofit decisions through simple majority

voting. In this case, statutory resident engagement applies only to owners, who represent 40% of units, and specifically to their elected representatives. Nevertheless, a more inclusive consultation process was conducted before the design phase by a specialised office, which organised workshops to engage all residents, including tenants and owners.



FIGURE 4.2.5: N°100, part of Galerie de l'Arlequin housing estate, Grenoble, pre-retrofit. Source: Grégory Busquet, 2025.

4. RESIDENT ENGAGEMENT ANALYSIS USING THE TECHNICAL DEMOCRACY FRAMEWORK

The characteristics of resident involvement in each case were documented and synthesised into a descriptive table (not included here), based on the theoretical principles of technical democracy revisited and adapted to housing retrofit (presented in Section 2.2). A comparative assessment of the cases was then conducted using nine criteria, grouped into three categories derived from the theoretical principles (Table 4.2.2) set out by Callon et al. (2001). The category “degree of democratisation” corresponds to the intensity and timing of stakeholder engagement; “openness to socio-technical controversies” reflects hybrid forum processes; and “social outputs” capture the emergence of new identities. Adjectives similar to those used by Callon et al. were applied, alongside a colour-coding scheme (weak/red – limited/yellow – strong/green). The table can be read horizontally to compare cases across criteria, or vertically to assess how each case performs in relation to the principles of technical democracy. In cases where engagement strategies differed between social groups, these groups are identified separately to reflect uneven participation.

TABLE 4.2.2: Assessment of social groups engagement in housing retrofit using the technical democracy framework. Source: Authors.

	1. HOUSEFUL, BLOC DELS MESTRES	2. THE SUTTON ESTATE	3. LIV INN, HILVERSUM	4. CLAU MESTRA	5. N°100 ARLEQUIN
Degree of democratisation: Earliness of stakeholder involvement and iteration; transformation of asymmetric relations; diversity and inclusivity of resident participation.					
EARLINESS	Professionals and authorities				Representatives of owners
	Tenants				Residents
SYMMETRY		Anti-demolition movement			Representatives of owners
		Resident Steering Group			Residents
DIVERSITY AND INCLUSIVITY	Professionals and authorities				Representatives of owners
	Tenants				Residents
Openness to socio-technical controversies: New issues/controversies taken on board; needs and wishes of residents considered; tailor-made solutions to local specificities.					
CONTROVERSIES		Anti-demolition movement			Representatives of owners
		Resident Steering Group			Residents
NEEDS AND WISHES					Representatives of owners
					Residents
TAILOR-MADE SOLUTIONS					
Social outputs: Aggregation of social groups concerned by common problems; empowerment of residents; development of new collective and individual practices.					
AGGREGATION OF SOCIAL GROUPS					Representatives of owners
					Residents
EMPOWERMENT					Representatives of owners
					Residents
NEW PRACTICES	Professionals and authorities				N/A
	Tenants				

Legend:
■ Criterion implementation in case study: Weak
■ Criterion implementation in case study: Limited
■ Criterion implementation in case study: Strong

When no specific social group is mentioned, the criterion applies to all residents

4.1 Criteria explanation

The first criterion, “degree of democratisation”, examines the intensity of democratic resident engagement across key phases: problem definition, retrofit design, implementation, and long-term building management. Meaningful engagement hinges on early inclusion, iterative feedback mechanisms that align resident input with design development while navigating regulatory constraints, and the transformation of power asymmetries between residents and dominant stakeholders. Group diversity and end-user representation are also evaluated, with specific focus on the inclusion (or exclusion) of marginalised participants.

“Openness to socio-technical controversies” refers to the extent to which users can reveal uncertainties and engage in debates about new and potentially contentious aspects of the project. This openness allows unforeseen concerns to be included in the overall spatial transformation, responding to the needs and wishes of residents and improving their quality of life. It also fosters the creation of customised solutions that leverage local resources rather than relying only on standardised practices.

Lastly, “social outputs” considers both intended and emergent social outcomes of the retrofit process, focusing on how collective recognition of shared challenges transforms group identities. These processes can generate new social groups and drive social and behavioural changes, including enhanced community activities and increased climate change awareness. A key aspect is residents’ socio-technical empowerment after retrofit, encompassing both technical competency with new systems and strategic management of complex building-related costs.

4.2 Comparative assessment of resident engagement processes

The comparative assessment reveals notable differences across cases. The first case stands out as scoring lowest on most criteria, while a dualistic pattern is evident in the second and fifth cases, indicating stronger engagement with certain social groups.

In the case of HOUSEFUL, this group primarily includes design, construction, and development professionals and authorities who were consulted early and remained closely involved throughout the process. Although the resident group was diverse and included vulnerable participants, such as low-income Catalan locals and temporarily placed young migrants, their involvement was limited to voluntary energy training workshops aimed at operationalising their homes after hand-over.

In the case of the Sutton Estate, dualism arises from the contrast between the bottom-up resident movement opposing demolition—which successfully challenged asymmetric power dynamics and secured the preservation of the estate—and the Resident Steering Group established by Clarion. This group provided a structured channel to collect resident contributions on minor design choices (e.g. landscape elements, finishes) and voice concerns, while ultimate decision-making authority remained with the housing association.

In n°100 Arlequin, the process exhibits dualism stemming from unequal statutory rights between owners (residents and landlords) and tenants in the retrofit decision-making. A small group of owners’ representatives enhanced their negotiation capacities, successfully pushing through claims regarding financial contributions, technical solutions (e.g. a self-cleaning façade), supervised design elements, and anticipated future management hurdles. Tenants and other homeowners participated through a public consultation facilitated by the architect and conducted by a firm specialising in participatory methods prior to the design phase. However, regulatory and technical constraints, unknown at that stage, limited the actual impact of their input.

Social outputs concern long-term retrofit impacts, such as resident empowerment, development of sustainable energy consumption, and building management practices. Across the three criteria, social outputs appear the least realised in three of the five cases, particularly for tenants. This reflects structural challenges, as tenants’ statutory rights are typically limited compared to property owners. The cases suggest that meaningful social outputs are most successfully achieved when residents hold formal decision-making roles (as in Clau Mestra’s cooperative structure) or when participatory methods are systematically embedded (such as Liv Inn’s Røring method). Conversely, weaker cases confine resident involvement to post-completion phases, disconnecting participation from actual retrofit decisions.

5. DISCUSSION AND CONCLUSIONS

The analytical framework enabled a systematic comparison of resident engagement processes across diverse retrofit contexts. The proposed criteria respond to the research objective by facilitating reflection on the recognition and integration of residents and their organisations alongside other stakeholders in publicly-funded retrofit projects. This framework examines how resident engagement can integrate existing social relations within the production and management of housing. It emphasises three main aspects derived from the technical democracy conceptual framework: the structural and institutional foundations for engagement, the quality of participatory processes, and the potential long-term social effects of retrofit processes.

The comparative analysis highlights opportunities for strengthening resident engagement. Regarding the first research question—how retrofit governance can better integrate resident expertise—findings indicate that engagement is more robust when resident involvement is embedded within statutory decision-making procedures and pre-existing collective organisations; this is demonstrated in the Clau Mestra cooperative and the owners’ association at n°100 Arlequin. Alternatively, engagement can stem from the underlying philosophy of the organisation (Liv Inn), or through successful social movements (Sutton Estate). However, the inclusion of groups with the most precarious financial and housing situations, such as migrant tenants in HOUSEFUL or tenants at n°100 Arlequin, is typically limited

to isolated phases (e.g. participatory design workshops or training sessions) and remains disconnected from substantive decision-making.

Processes demonstrating the strongest resident engagement overall (Liv Inn and Clau Mestra) employ well-established participatory methods developed by specialists in co-design and collaborative decision-making (van Hoof & Boerenfijn, 2018). Addressing the second research question—how residents' experiences are considered in retrofit decision-making—the analysis both confirms and extends existing literature. While Karvonen (2013) and Putnam and Brown (2021) identify the value of intermediaries in financial and technical aspects, our findings highlight a broader role, including intermediaries as methodological frameworks or intermediary organisations specialising in collective deliberation and participatory processes. These intermediaries effectively bridge residents' experiential expertise, rooted in their everyday use of homes and communal spaces, with the specialised knowledge of retrofit professionals and housing managers, translating and integrating multiple forms of knowledge into retrofit decision-making processes.

Preliminary observations suggest correlations between resident engagement intensity and multidimensional retrofit success. However, the analytical framework has inherent limitations in fully capturing both energy performance outcomes and long-term social transformations. For example, available energy consumption data for Clau Mestra exceeded expectations that higher resident engagement may contribute to improved retrofit performance and help avoid common performance gaps, an area warranting further investigation. Additionally, community cohesion and social value emerge as important long-term co-benefits. Participatory design of communal spaces at the Liv Inn enhanced social cohesion among residents, while the formation of newly aggregated social groups and their growing capacity for autonomous sustainable building management can lead to long-term resident empowerment.

In conclusion, the proposed analytical framework illustrates how institutional housing governance structures and power relations shape resident engagement and influence retrofit outcomes. It provides a tool for critically assessing experimental practices by evaluating residents' collective experiences of involvement, applicable not only in housing contexts but also in other environments, such as public spaces or workplaces. Furthermore, the framework opens avenues for research into the long-term impacts of collective efforts and public investments, aimed at upgrading existing housing, emphasising the role of diverse expertise in defining and creating sustainable homes and communities.

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4.3

Advancing architectural education through experiential learning: Preparing future professionals to create sustainable urban dwelling

Annette Davis, Effrosyni Roussou and Núria Martí Audí

As sustainability and social equity increasingly shape architectural and urban agendas, education plays a crucial role in equipping future practitioners with the competences to engage with these complex challenges. This chapter examines how experiential learning can foster transdisciplinary collaboration and context-sensitive design through three case studies: DARE to Build (Chalmers University of Technology, Sweden), Solar Decathlon Europe, and Tectonic Design (La Salle School of Architecture, Barcelona). In each, students engage with communities, materials, and stakeholders, bridging theory and practice through participatory, design-build, and reflective processes. A comparative analysis of these initiatives identifies shared pedagogical strategies that promote systems thinking, reflexivity, and collective problem-solving. While institutional and logistical constraints persist, the findings indicate that embedding experiential, community-oriented learning in architectural curricula enhances students' capacity to co-produce sustainable, inclusive, and contextually grounded dwelling environments—reframing architectural education as a site of collaborative transformation.

INTRODUCTION

As the climate crisis intensifies, dwelling environments across the globe are facing increasingly pressing and complex challenges. Against this backdrop, it is imperative that sustainable design and construction approaches become standard practice across the various stages of the building life cycle. This calls not only for shifts in professional and policy frameworks, but also for a transformation in how learning takes place across the disciplines involved in shaping the spaces we inhabit.

Meeting the demands of contemporary living environments goes beyond theoretical understanding. It calls for learners—both professionals and community mem-

bers—to engage collaboratively with the complexities of practice, participating in cross- and transdisciplinary processes that connect lived experience with an integrated understanding of social, spatial, and environmental considerations. For architectural education, this means reimagining curricula to prioritise hands-on, collaborative, and context-sensitive learning experiences that represent with the complexities of real-world practice. By embedding practice-based learning into both educational systems and communities, future architects and spatial practitioners can critically reflect on pressing issues, co-develop innovative solutions, and test them in real-world settings. In doing so, they cultivate the adaptive expertise essential for creating more just, resilient, and sustainable living environments.

As defined by Kolb (1984, p. 38), experiential learning—often associated with the concept of “learning by doing”—is “the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience”. This process unfolds in a cyclical sequence consisting of four stages: (1) active experimentation, in which learners apply prior knowledge and theory; (2) concrete experience, involving direct, hands-on engagement; (3) reflective observation of that experience; and (4) abstract conceptualisation, where insights are integrated into new understanding.

In architectural education, live studio pedagogies,—particularly participatory design and design-build formats—offer a concrete application of experiential learning. These learning environments immerse students in real-world projects, engage them with actual stakeholders and foster cross- and transdisciplinary collaboration. Within these settings, students not only acquire technical skills but also develop a critical awareness of social and contextual dynamics. Learning occurs through iterative, problem-based, and community-oriented practices situated in real time and real space (Senbel, 2012). This integration of action and reflection supports both the development of professional competencies and the formation of professional identity (Harriss & Widder, 2014; Pak & De Smet, 2023).

1. DWELLING AND SUSTAINABLE URBAN DEVELOPMENT

Sustainable urban development encompasses more than the efficient design of buildings and infrastructure—it requires the creation of inclusive, socially responsive environments that nurture long-term ecological and human wellbeing. As Rapoport (1982, p. 6) observed, “it then seems reasonable to consider the ‘dwelling’ as that setting, or system of settings, in which a particular set of activities occur”. This definition broadens the concept of dwelling to include not only indoor living spaces but also outdoor and transitional areas, as well as the social frameworks that connect individuals to their communities. Expanding on this view, Indra and Sasidhar (2022) emphasise the importance of socio-cultural dynamics in shaping dwellings within the context of urbanisation and modernisation. This perspective underscores that dwelling goes beyond the material aspects of housing to encompass spatial, social, cultural, and experiential dimensions of inhabiting (Coolen & Meesters, 2012). By adopting a human-centred understanding of dwelling, sustain-

ability in urban development can be reframed to reflect how individuals inhabit and engage with their environments—integrating everyday routines, local traditions, cultural identities, and the diverse needs of urban populations.

By integrating the concept of dwelling into educational practices, students move beyond acquiring technical competencies and develop a holistic understanding of space as dynamic and lived—shaped by context-specific cultural practices and social relations. An experiential approach to learning encourages future architects and built environment professionals to critically reflect on the social and ecological implications of their design decisions. By engaging with how people inhabit and relate to their surroundings, students are better equipped to create environments that are inclusive, resilient, and deeply connected to the communities they serve.

2. THREE EXAMPLES OF EXPERIENTIAL LEARNING IN ARCHITECTURAL EDUCATION

Three case studies exemplify cross- and transdisciplinary experiential learning in real-world settings, addressing the urgent demands of sustainable urban development. These examples illustrate how live studio formats enable students to engage deeply with the social, environmental, economic, political, and cultural dimensions of contemporary urban dwelling.

They are drawn from:

1. Effrosyni Roussou's experience with **DARE to Build**, a summer course (2018–2021) at Chalmers University of Technology, Sweden.
2. Annette Davis' insights from in-depth interviews and observations of 15 student teams at the 2022 **Solar Decathlon Europe** competition.
3. Núria Martí's public space interventions in L'Hospitalet, Barcelona, as part of the **Tectonic Design** course at La Salle School of Architecture (2022–2023).

Each case integrates multiple dimensions of sustainability in higher education—including environmental, economic, political, cultural, and social factors—that shape contemporary forms of urban dwelling. Together, they provide multidimensional and multi-scalar perspectives on sustainable dwelling practices.

A mapping exercise was employed as a reflective tool to analyse the three cases, focusing on the key elements that supported their respective learning objectives. These objectives are outlined within each case study and compared in the discussion section, where their contributions to knowledge on sustainable and affordable living are examined. The exercise was structured around a shared framework addressing the ‘What’ (experiential pedagogies), ‘Why’ (learning objectives and skills) and ‘How’ (pedagogical tools) of experiential learning. This retrospective analysis proved fruitful in identifying commonalities and differences across contexts, enabling the sharing of actionable lessons to help address critical challenges and skills gaps in education going forward.

2.1 DARE to Build

DARE to Build began in 2018 as a design-build summer course at Chalmers University of Technology in Gothenburg, Sweden, targeting master's students from architecture and civil engineering backgrounds (Viana et al., 2023). The course emerged as the design-build follow-up to the Design and Planning for Social Inclusion (DPSI) studio, where architecture students co-design spatial interventions with local stakeholders. Each academic year, one of the DPSI projects is selected to move on to a detailed design and construction phase, based on feasibility and contextual relevance related criteria, as well as on stakeholder interest and financing capacity. DARE to Build and DPSI studio aim to establish a sustained, positive presence in these areas by fostering solidarity with local communities. By developing design-build projects that respond to local needs while enhancing existing socio-spatial assets, these initiatives foster meaningful engagement between students and communities.

Grounded in the idea that change and learning can occur simultaneously (Brandão et al., 2021), DARE to Build responds to the increasing demand for collaborative approaches in the Architecture, Engineering and Construction (AEC) sector (McGlohn et al., 2014). The course aims to dissolve disciplinary silos by fostering multidisciplinary teamwork, bringing together architecture and engineering students through problem- and project-based learning (PPBL), in close collaboration with local communities and non-academic partners.

The learning objectives of DARE to Build are organised into three broad categories: (1) knowledge and understanding; (2) competence, abilities and skills; and (3) judgement, approach and attitude (Figure 4.3.1). These encompass both technical skills—such as the capacity to develop and evaluate design proposals—and transferable competencies, including communication, ethical reflection, and social responsibility. Through hands-on engagement, students confront real-world uncertainties, interdependencies and socio-environmental dynamics. As they navigate the complexities and fluidity of collaborative, community-based work, guided by the cycle of experiential learning, each student cultivates a unique combination of technical proficiency, critical awareness, and embodied experience. This learning is shaped by their prior knowledge and deepened through the immediate challenges and insights of the project environment.

Partners include local government bodies, housing companies, AEC professionals, local residents, and community associations. Projects typically focus on public and in-between spaces within residential areas. Stakeholder involvement varies by project phase: initiators such as housing companies or municipal departments usually provide funding, while residents, students, mentors, and associations co-lead the design phase through participatory workshops, open forums, and public exhibitions. During construction, local youth are engaged through summer employment schemes supported by the project funders and/or local government.

Students are exposed to real-world conditions through a diverse, multidisciplinary, and multi-stakeholder environment, where mutual learning emerges in response to

	learning objectives for ARCHITECTS	shared learning objectives	learning objectives for ENGINEERS
KNOWLEDGE AND UNDERSTANDING	<p>Describe and refer to different methods for communication, and decision-making</p> <p>Identify and explain the different practical implications of applied architectural design</p>	<p>Identify and explain the structure of a project life cycle</p>	<p>Identify, model and plan the relevant demands and design situations of a structure</p> <p>Develop a conceptual design and critically review, develop and implement technical solutions to solve engineering tasks in a multi-disciplinary team</p> <p>Identify, describe, and formulate strategies for the monitoring and maintenance of a structure</p>
COMPETENCE, ABILITIES & SKILLS	<p>Apply architectural design tools and methods from previous coursework into a real-world project.</p> <p>Design, assess and construct concrete proposals and solutions for local sustainable development and circularity in a multi-disciplinary team</p> <p>Visualise and communicate design proposals in a professional way to diverse audiences</p>	<p>Develop strategies and conditions for effective teamwork</p> <p>Work in multidisciplinary project teams lead project work and present results</p> <p>Motivate different proposals with reference to scientific, or experience-based, knowledge and value-based arguments</p>	<p>Examine and judge the performance of a structure against planned situations and uses.</p>
JUDGEMENT, APPROACH AND ATTITUDE	<p>Combine knowledge from different disciplines and sectors in architectural design proposals</p>	<p>Explore the role of architects/engineers in collaboration with/ contrast to each other</p> <p>Reflect on the professional role of architects and engineers, including critical thinking, professional ethics and the needs for life-long learning</p>	

FIGURE 4.3.1: DARE to Build 2020: Learning objectives. Source: Author's adaptation from the course syllabus (Brandao et al., 2021).



FIGURE 4.3.2: DARE to Build 2022: Project initiation. Source: Bruno Gonçalves.



FIGURE 4.3.3: DARE to Build 2020: Construction phase. Source: Effrosyni Roussou.

pressing contemporary challenges in suburban Gothenburg. These neighbourhoods, originally developed as part of the Million Homes Programme (MHP), a Swedish government initiative from the 1960–1970s to deliver affordable, high-quality housing (Baeten et al., 2017; Hall & Vidén, 2005), are now predominantly inhabited by low-income migrants and refugees. Often stigmatised in crime, these communities face increasing displacement and social isolation due to welfare cuts and the gradual neoliberalisation of Sweden's housing policies. In this context, initiatives such as DARE to Build and the DPSI studio seek to foster a sustained, positive, and solidaristic presence by developing projects that respond to local needs and reinforce the socio-spatial assets already present in these areas.

Participation in the course often leads to a noticeable increase in self-confidence, encouraging students to be more vocal, proactive, and appreciative of collaborative contributions. These qualities, which are often underdeveloped in classroom-based settings where learning is more individually focused and narrowly defined, emerge more fully in the context of live, collective work (Figures 4.3.2 and 4.3.3). Notably, several female students reported that engaging with practical work for the first time through this course helped them gain confidence and assertiveness in a field that remains predominantly male.

However, the pedagogic programme is not without its limitations. Since it relies financially on project initiators and their commitment to carry projects through to completion, both students and community members have limited agency in determining which projects are ultimately realised. Furthermore, the final built outcome may diverge from the students' original designs, as projects are reshaped by mentors to meet feasibility, budgetary, and pedagogical requirements during the interim period between the DPSI studio and DARE to Build. This restructuring can disrupt the continuity of engagement, affecting both students and local stakeholders.

Despite these challenges, DARE to Build remains an important gateway for students to engage critically with contemporary spatial issues related to community and neighbourhood development. It not only fosters hands-on learning but also promotes reflection on future professional roles and responsibilities, while supporting mutually beneficial collaborations with local communities.

2.2 Solar Decathlon Europe

The Solar Decathlon Europe (SDE) is an international competition challenging university teams to design and construct novel, housing-scale prototypes that embody climate resilience, integrate social responsibility, and apply innovative energy-efficient technologies (Voss & Simon, 2022). Comprised primarily of undergraduate and master's students from various disciplines (e.g. sustainability, building services and structural engineers), these interdisciplinary teams collaborate with industry partners and are guided by faculty and researchers to realise their designs as full-scale (1:1) housing demonstration units (HDUs).

Experiential Learning and design-build pedagogies lie at the heart of the SDE, providing an intensive yet highly rewarding educational experience. Typically planned and executed within one academic year, the 2022 edition, hosted by the University of Wuppertal in Germany, was extended due to the COVID-19 pandemic.

SDE 2022 adopted the theme 'Goes Urban!', calling for teams to respond to one of three specific urban scenarios: horizontal extensions, additional storeys, or infill solutions. A detailed rulebook guided participants towards a comprehensive approach to sustainability, requiring the integration of life cycle environmental strategies alongside a commitment to improve the quality of life for the residents and solve specific urban issues (Bergische Universität Wuppertal, 2022). In doing so, the competition embedded community participation and a challenge-based learning approach at its core.

The prefabricated HDUs are assembled under considerable time pressure, within only 14 days on-site, before being evaluated across ten holistic contests (Figures 4.3.4 and 4.3.5). The resulting fully operational homes ranged from approximately 50 to 100 m², an impressive achievement, particularly for student-led teams that had to strategically plan and manage the process. Far from being an afterthought, the competition's pedagogical dimension is assessed through the Communication, Education and Social Awareness contest.

While the rulebook allows flexibility in curricular design, learning outcomes must explicitly demonstrate the integration of resource-responsibility, innovation, and energy literacy. Beyond environmentally focused learning, socially orientated objectives are embedded within its communication remit, requiring teams to foster local stakeholder motivation and effective public engagement. As evidenced in the team manuals available on the online open-access Competition & Living Lab Knowledge Platform (Solar



FIGURE 4.3.4: Solar Decathlon Europe 2022: Team Azalea from Spain mid-disassembly in Valencia. Source: Annette Davis.

Decathlon, n.d.), many institutions actively adopted an Experiential Learning model. This was succinctly expressed by Team AuRA from the École Nationale Supérieure d'Architecture de Grenoble: "Students don't want to study, they want to learn."



FIGURE 4.3.5: Solar Decathlon Europe 2022: Team AuRA from France mid-assembly in Wuppertal. Source: Annette Davis.

Teams were tasked with securing sufficient funds and attracting sponsors as part of their proposed business plan, requiring cost estimates and proactive financing. Sponsorship from governmental actors and industry partners, such as local councils, contractors, and product suppliers was therefore vital. This cross-sector participation extended learning beyond academic spheres, presenting opportunities for real-world partnerships. Projects were based on real sites, either locally or as

a renovation response for Café Ada in Wuppertal. Several teams actively engaged with local residents and housing associations to inform their design, while others also aimed to realise their solutions with local partners after the competition.

SDE shows promise in fostering stronger industry-academia partnerships to facilitate the joint testing of sustainable housing systems, while ensuring students are prepared to drive innovation in construction practices. The public tours post-assembly in Wuppertal (Figure 4.3.6) provided a crucial opportunity to showcase the prototype homes to broader audiences, enthusiastically attended by collaborating project partners who had travelled for the occasion, including off-site construction companies, local authorities and housing associations. Long-term learning is planned through post-occupancy evaluation (POE), where selected teams' HDUs remain on-site for several years as participatory living labs.

The competition also revealed significant gaps in students' theoretical understanding of key sustainability concepts, such as the circular economy and life cycle thinking, prior to their involvement in the practical aspects. Feedback received in interviews with students at the mid-assembly point in Wuppertal, revealed that architecture students in particular were concerned that traditional education meth-



FIGURE 4.3.6: Solar Decathlon Europe 2022: Team SUM tour at the post-assembly public event. Source: Bergische Universität Wuppertal.

odologies were not preparing them sufficiently for the multifaceted challenges of the SDE contests (Davis et al., 2025). This led some teams to focus disproportionately on aesthetics rather than sustainability, for instance. Although students were motivated to develop solutions addressing real local needs, tackling housing affordability proved to be a significant challenge. This highlights the need for greater collaboration between students specialising in building systems and those with expertise in economics, social sciences, and policy within experiential learning initiatives.

2.3 Tectonic Design: Public space interventions

Tectonic Design is a course embedded within the first three years of the undergraduate programme at La Salle School of Architecture, Ramon Llull University, Barcelona. Conceived as an interdisciplinary framework, the course fosters sustained dialogue between architectural design and its technical dimensions. The first-year module focuses on cultivating the students' ability to integrate conceptual design and construction processes. To achieve this, the Tectonic Design course is structured around three categories of learning outcomes: (1) knowledge and understanding, (2) technical and professional competence, and (3) transversal skills and capacities.

Adopting a project-based learning methodology, students design and construct micro-scale spatial interventions. These serve not only as a technical training exercise but also as a platform for experiential learning, encouraging critical thinking, learner autonomy, and a strong sense of authorship. The course incorporates role-based learning, where students assume stakeholder roles reflective of real-world construction processes. These roles are explicitly defined to simulate industry practices, including stakeholder coordination, sequencing of construction activities, and the integration of building constraints within the design workflow.

A distinctive feature of the course is the implementation of vertical learning, whereby senior students mentor and collaborate with junior peers. This fosters a culture of peer-to-peer knowledge transfer and reinforces collaborative learning and collective problem-solving.

Occasionally, the curriculum includes participation in international design competitions, enabling students to engage in public space interventions and explore the design challenges that simulate aspects of real-world practice, including construction constraints and stakeholder dynamics.

In the 2022–2023 academic year, students took part in an open competition within the ES_CULTURA Public Art Festival, organised by the A-Place (2022) project in Plaça de la Cultura, located in the Bellvitge neighbourhood of L'Hospitalet, a city within the Barcelona metropolitan area. The competition invited artists, students, and collectives to create public space interventions that explored the concept of place—examining how it is shaped by memory, overlooked urban spaces, and the symbolic presence of objects—while also addressing pressing social issues such as climate change and multi-culturalism.



FIGURE 4.3.7: Tectonic Design 2022–2023: Urban installation in L'Hospitalet de Llobregat, A-Place ES_CULTURA competition. Community members engaging with the completed construction. Source: Marc Salvador.



FIGURE 4.3.8: Tectonic Design 2022–2023: Urban installation in L'Hospitalet de Llobregat, A-Place ES_CULTURA competition. Community members interacting with the completed construction. Source: Joan Espinás.

Students responded by reinterpreting existing urban furniture, transforming it into interactive micro-spaces attuned to their socio-spatial contexts (Figures 4.3.7 and 4.3.8). The design process unfolded through a series of structured phases, with a strong emphasis on concept development and material selection. Design schemes were iteratively refined through scaled models and evaluated against criteria such as design intent, material behaviour, detailing strategies, structural integrity, assembly and disassembly feasibility, material reuse, and overall environmental sustainability. The penultimate phase involved submission and public presentation of competition panels, followed by the final phase: physical construction of the selected designs.

Despite meeting academic and conceptual criteria, students encountered significant challenges during the construction phase. Economic limitations arose due to underestimated material costs. Social challenges became apparent through insufficient anticipation of user behaviour and local dynamics. Technical obstacles included limited access to materials and restricted fabrication capacities, especially for custom components. Moreover, logistical constraints mandated that construction be completed within a single morning, a timeline that proved overly ambitious for some teams.

These real-world constraints required substantial adaptation. Students were compelled to modify their designs in response to emerging limitations. In some instances, this led to simplification and a loss of design resolution; in others, it resulted in notable improvements in clarity, feasibility, and contextual responsiveness.

Ultimately, learning outcomes in all three categories exceeded initial expectations. Beyond acquiring technical proficiency, students exhibited marked growth in interdisciplinary collaboration, critical reflection, ethical responsibility, and resilience, which are increasingly vital competencies in contemporary architectural practice.

Following the experience with this competition, the Tectonic Design course has been restructured to incorporate more intentional phases of critical reflection, particularly concerning problem-solving within real-world conditions. Future editions will continue to integrate participation in public competitions, thereby reinforcing the course's dual aims: enabling full-scale prototyping (1:1 construction) and equipping students with the skills needed to navigate the complex realities of professional architectural practice.

3. DISCUSSION

Experiential learning emerges as a powerful pedagogical approach for bridging the gap between theoretical design and real-world application. The DARE to Build, Solar Decathlon Europe and Tectonic Design cases highlight how immersive, hands-on, experiential learning fosters not only technical competencies but also socio-cultural awareness and ethical engagement. By working directly with materials, living and built environments, stakeholders, and real constraints, students navigate the complexities of spatial practice, developing a more holistic understanding of sustainable urban dwelling beyond the physical domain. This corresponds to the first two stages of Kolb's experiential learning cycle: concrete experience and active experimentation.

The latter two stages, reflective observation and abstract conceptualisation, are addressed through the collaborative mapping exercise carried out by the authors and the resultant diagram, shown in Figure 4.3.9. This diagram provides a consolidated overview of pedagogical approaches, intended learning outcomes, tools, and challenges identified through the authors' engagement with the case studies. It also maps the interconnections among these elements, capturing reflections emerging from a transdisciplinary dialogue. The analysis reveals insights and challenges that can inform future applications of experiential learning in architectural education. While many aspects are common across the case studies, not every method, tool, or approach could be elaborated in detail; nonetheless, all are represented within the diagram.

Each case study engaged with the concept of dwelling in a distinct way:

- **DARE to Build** frames dwelling as an evolving, community-embedded process, with interventions in public and in-between spaces, aimed at strengthening social ties and addressing the lived realities of marginalised residents in MHP neighbourhoods.
- **Solar Decathlon Europe** approaches dwelling from a life cycle and systems-thinking perspective, emphasising the need for scalable resource- and energy-efficient solutions at the housing and neighbourhood scale and across international contexts.
- **Tectonic Design** explores dwelling at a micro-scale, using site-specific public space interventions to investigate how context, interaction, and everyday use shape spatial experience in residential communities.

A common thread across all three cases is the alignment of hands-on learning with clearly defined educational goals. In DARE to Build, these are structured around knowledge, skills, and attitudes, supporting a balance between cognitive, practical, and ethical development. Solar Decathlon Europe simulates professional conditions, demanding strategic thinking and interdisciplinary collaboration, while encouraging students to evaluate their own preparedness. Tectonic Design focuses on iterative, material-based experimentation, enhancing both conceptual clarity and technical execution, with external competitions linking studio work to broader design ecosystems.

Soft skills, often overlooked in normative architectural education, emerge as central outcomes for these experiential learning models. Collaboration, communication, empathy and resilience are developed through direct engagement, whether through direct participation with residents and community stakeholders or with stakeholder actors with varied technical expertise throughout the design and build process. These initiatives also contribute to shifting gender norms in the construction sector. In each of the presented case studies, female students took on leadership roles in practical and leadership aspects of project delivery, pointing to a changing culture within architectural practice.

Nonetheless, each initiative faced institutional and logistical challenges. Academic calendars can limit long-term community engagement and post-occupancy evaluation. Participatory, democratic processes—while pedagogically valuable—may be

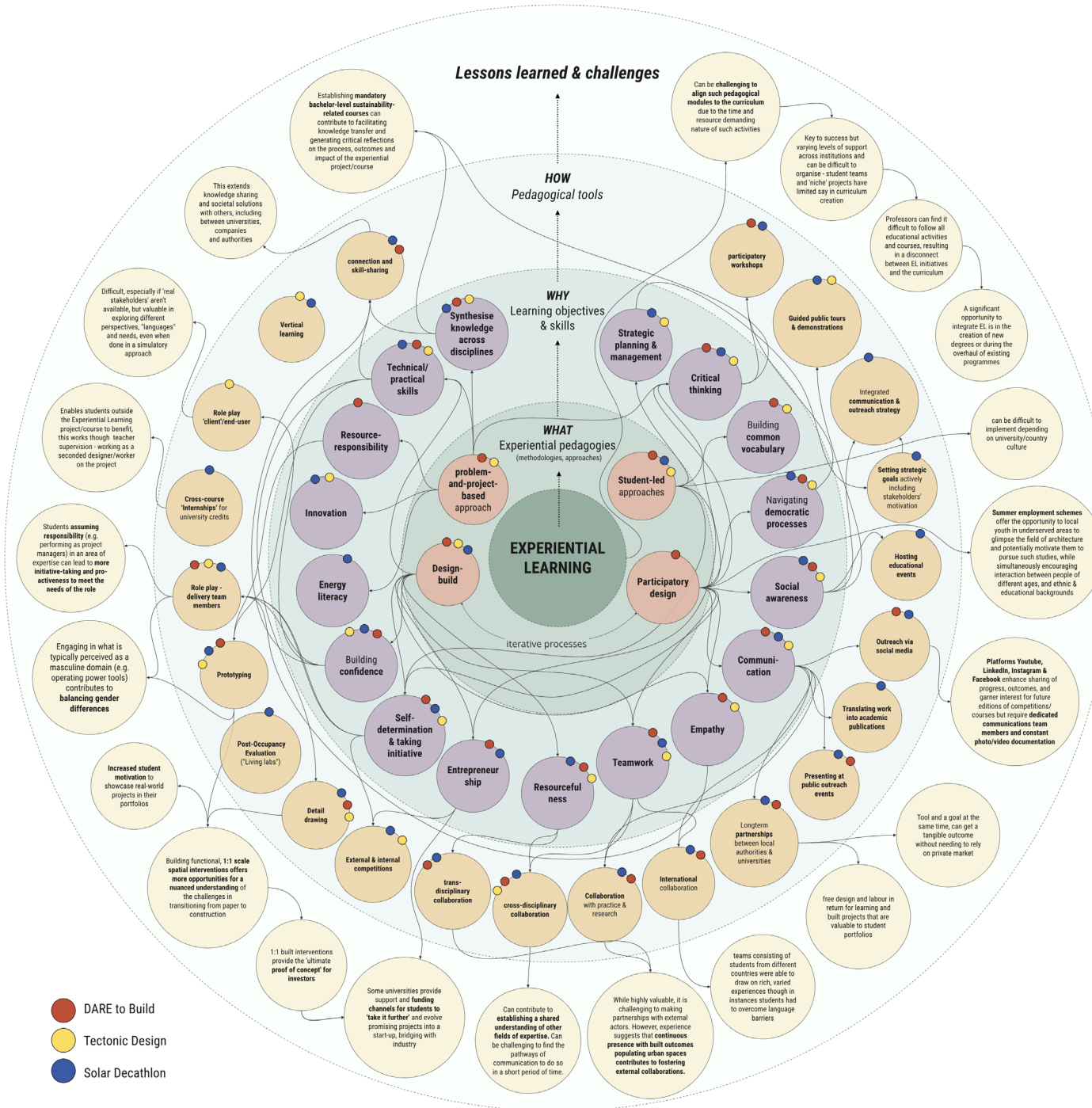


FIGURE 4.3.9. Mapping analysis comparing Experiential Learning methods, learning outcomes, tools and lessons learned across the three case studies. Source: Authors.

difficult to balance against conflicting stakeholder priorities. Above all, the long-term success of these approaches depends on strong institutional support and robust external partnerships, which remain inconsistent across different educational and geographic settings.

4. CONCLUSIONS

In all three cases, students had the opportunity to immerse themselves in and engage with the built and lived environments, collaborating with communities to co-create not just physical structures, but meaningful social and spatial dwelling environments. The three case studies illustrate how experiential learning can equip students with the critical skills, confidence, and ethical grounding needed to address the complex challenges of dwelling today. This hands-on approach proved both effective and impactful, as reflected in the students' engagement and in the educators' commitment to pursuing future iterations.

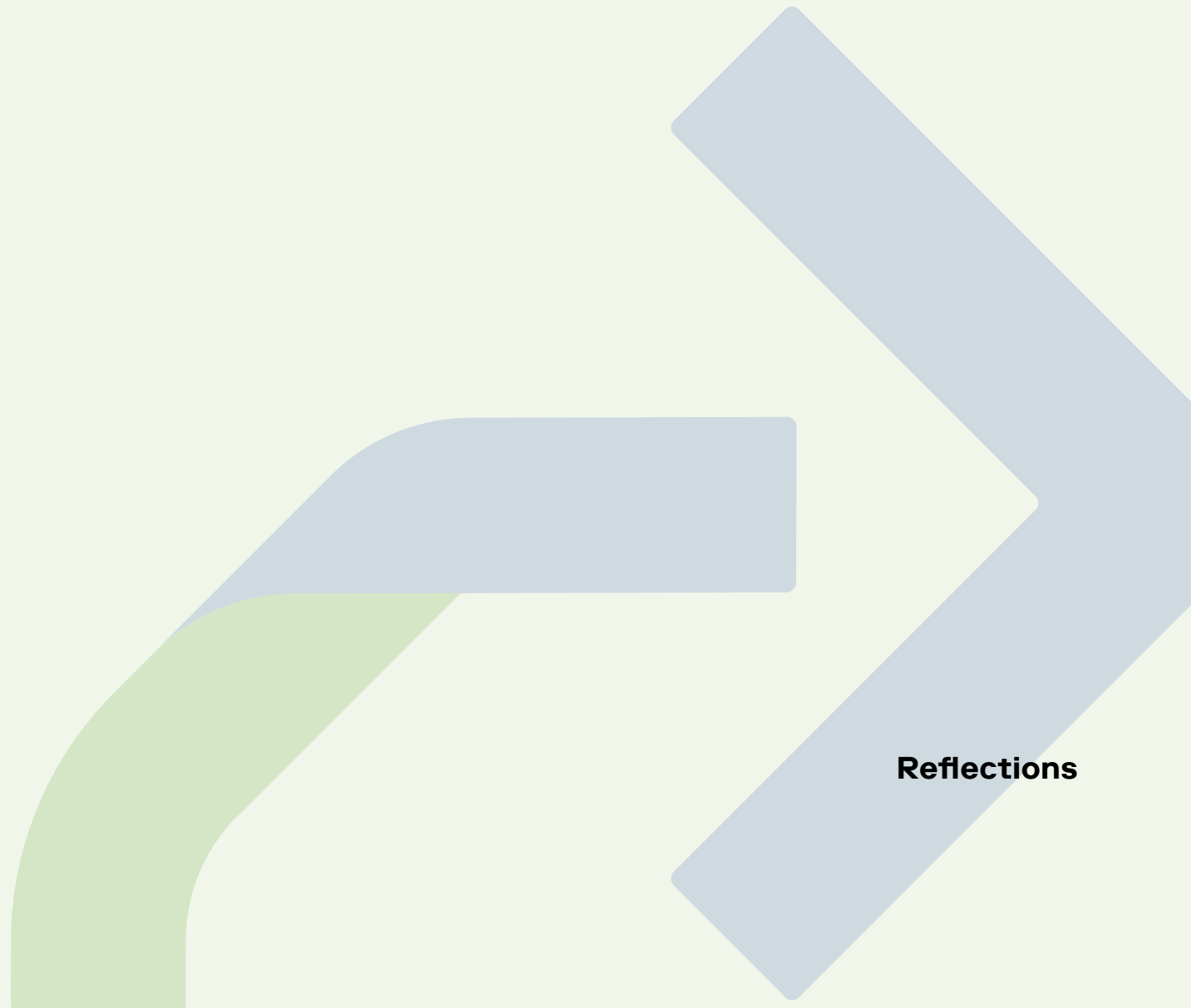
The mapping exercise, inspired by the work carried out during the RE-DWELL project, facilitated a transdisciplinary dialogue and knowledge exchange. Such a tool is particularly valuable for early-stage engagement among educators, enabling deeper insights into how experiential learning can be cross-pollinated and enhanced by comparing diverse case studies and experiences. With further development, this mapping approach has potential as a robust analytical framework.

To ensure the development and scalability of such pedagogical approaches, universities must strategically integrate them into the core of their academic programmes rather than treating them as supplementary experiences. This requires strong institutional support, curricular flexibility, and long-term partnerships with local authorities, industry actors, and community organisations. These collaborations can unlock mutual benefits: enriching student learning, enhancing the quality of urban environments, and contributing to more inclusive, community-driven urban transformation. Policymakers also play a key role by enabling cross-sector collaboration in support of a sustainable built environment. Targeted funding and policy incentives can encourage stronger ties between academic institutions and public agencies, ultimately advancing inclusivity and public engagement.

While experiential learning poses logistical and pedagogical challenges, its benefits are clear: it fosters student agency, cross-disciplinary understanding, critical thinking, and a deep sensitivity to context. Based on the authors' experiences, higher education institutions are encouraged to embed these approaches to better prepare a new generation of spatial practitioners capable of combining technical expertise with ethical, cultural, and ecological awareness in support of sustainable urban dwelling.

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Reflections

The chapters approach affordable and sustainable housing through three lenses: policy, community engagement, and experiential learning, highlighting how transdisciplinary and participatory approaches address social, environmental, and technical challenges.

Alsaeed, Hadjri, and Nawratek focus on policy, examining sustainable social housing in England as a response to social needs and environmental imperatives. Their transdisciplinary, evidence-driven approach—combining literature review, statistical analysis, and interviews with housing practitioners—identifies key challenges such as fragmented policy, unstable funding, and conceptual ambiguity. The findings reveal that sustainable housing outcomes require not only adherence to technical and environmental standards but also regulatory clarity and sustained institutional support. In this way, policy shapes the frameworks, incentives, and governance mechanisms that enable affordable and environmentally responsible housing.

Furman and Diaconu analyse the role of residents in retrofit projects across Spain, England, the Netherlands, and France. Using social practice theory and applying a technical democracy framework, they demonstrate that residents' participation in governance structures—such as cooperatives, tenant associations, or owners' groups—directly influences the success of energy retrofits. Daily routines, behaviours, and local knowledge bridge the gap between technical solutions and everyday life, indicating that effective retrofitting requires embedding stakeholders in decision-making processes. Projects featuring tokenistic or late-stage participation often fail to meet energy, social, or behavioural goals, underscoring the critical importance of meaningful engagement.

Davis, Roussou, and Martí show how experiential learning equips architecture students to tackle the complex social, spatial, and environmental challenges of urban dwelling. Through initiatives such as DARE to Build, Solar Decathlon Europe, and Tectonic Design, students engage with real communities, confront constraints, and collaborate across disciplines. Interaction with communities is central to this learning process, as it exposes students to real-world experiences and feedback that shape their ability to develop context-sensitive, sustainable, and inclusive design solutions. Guided by Kolb's experiential learning cycle, students link concrete experience with reflection, abstract conceptualisation, and active experimentation, developing technical skills, ethical awareness, empathy, and adaptive expertise.

Altogether, the three chapters highlight the interdependence of policy, people, and learning. Policy frameworks and funding mechanisms shape social housing provision, while the actions of housing associations, architects, and residents mediate the translation of policy into practice. Engagement in retrofit projects enhances social cohesion, technical performance, and long-term sustainability, with learning emerging through participatory processes that align everyday practices with

technical solutions. Experiential learning equips students to design sustainable and socially responsive dwellings; here, people—students, communities, and interdisciplinary teams—drive knowledge generation, while institutional structures in policy and academia both frame and delimit the scope of action. Collectively, these findings reveal a dynamic cycle in which policy guides action, people enact and adapt to frameworks, and learning fosters reflection and capacity development.

5

Integrating research domains with community engagement and co-creation

An examination of the connections between research domains, community engagement, and co-creation, highlighting how collaboration with communities enhances transdisciplinary learning and research.

5.1

Interlinking domains: Research insights and emerging directions in affordable and sustainable housing
by Nadia Charalambous, Adrienne Csizmady and Gojko Bežovan

5.2

Beyond housing provision: Community engagement as a driver of affordable and sustainable dwelling
by Carla Sentieri, Nadia Charalambous, and Alexandra Paio

5.3

Co-creating housing solutions: A participatory toolbox for transdisciplinary research
by Alexandra Paio, Androniki Pappa, and Marja Elsinga

5.1

Interlinking domains: Research insights and emerging directions in affordable and sustainable housing

Nadia Charalambous, Adrienne Csizmady and Gojko Bežovan

This chapter presents a synthesis of findings generated by the early-stage researchers (ESRs) through their individual doctoral projects. These projects were carried out within the three core areas of the RE-DWELL research framework. The interconnections between the findings derived from the research projects revealed a series of cross-cutting challenges that need to be addressed to advance the provision of affordable and sustainable housing. These challenges also suggest key directions for future housing research, particularly approaches that integrate insights from design, community engagement, policy, and financing to effectively address the complexity of housing provision.

INTRODUCTION

At the midpoint of their doctoral research, the ESRs consolidated insights from their individual projects and reflected on their contribution to RE-DWELL's core objective: addressing affordable and sustainable housing as a combined and interdependent challenge through transdisciplinary inquiry (Charalambous et al., 2024; Csizmady et al., 2024; Bežovan et al., 2024). This reflection took place within a learning and research environment which brought together doctoral research, collective inquiry, and engagement with real-world contexts within a shared transdisciplinary setting.

The doctoral projects were situated within a research framework structured around three interlinked areas—Design, Planning and Building, Community Participation, and Policy and Financing—developed to support an integrated understanding of housing provision. Reflection at this stage considered how research across these areas contributes to, intersects with, or questions established knowledge and practices related to affordable and sustainable housing.

Through a collaborative process of comparison, dialogue, and synthesis, a set of recurring challenges was identified that cut across all three research areas. These challenges function as shared analytical reference points that articulate key tensions shaping the production of affordable and sustainable housing and support collective sense-making across disciplinary and thematic boundaries (→ see 3.2).

This chapter synthesises research insights generated at a specific stage of the doctoral research trajectory across the three areas to examine how these challenges interrelate. These insights are necessarily provisional, reflecting ongoing inquiry rather than final conclusions. They nevertheless highlight emerging directions for housing research that respond to the entanglement of design, participation, policy, and financing, and that support more integrated, socially responsive, and sustainable approaches to housing provision.

1. COLLABORATIVE RESEARCH IN AFFORDABLE AND SUSTAINABLE HOUSING

1.1 Research insights in Design, Planning, and Building

Recent studies reveal a complex set of interconnected challenges in delivering affordable and sustainable housing, spanning design, planning, building, environmental, social, economic, and regulatory dimensions and requiring coordinated, multi-stakeholder responses.

Key themes identified by ESRs whose research projects focus on Design, Planning and Building include:

- Misconceptions and conflicting definitions of social housing and sustainability.
- Need for collaboration among architects, engineers, planners, and communities to balance functionality, cost, and environmental impact in housing delivery.
- Challenges in reducing the ecological footprint of construction while designing adaptable solutions within complex regulatory frameworks.
- Benefits of early and meaningful resident engagement in housing retrofit and development for cost efficiency, social value, and improved performance outcomes.
- Limited consideration of design for disassembly and reuse in industrialised construction, highlighting gaps in long-term life-cycle planning.
- Underutilisation or inconsistent application of life-cycle costing, encouraging short-term decision-making over long-term affordability, health, and sustainability.
- Potential of mass customisation and open building principles to support flexible, adaptable housing solutions.

Persistent misconceptions about social housing and sustainability result in conflicting perspectives among stakeholders and hinder the integration of sustainability principles in housing provision practices. Social housing is often narrowly understood as government-subsidised rental provision, which constrains how sustainability ambitions are framed and implemented within this sector. At the same time, definitions of affordability and sustainability vary across countries, cultures, and stakeholder groups, shaped by differing needs, traditions, and resource constraints (Stone, 2006; Gan, 2009). While such variation influences how housing challenges are framed and which solutions are prioritised, sustainability is frequently reduced to environmental performance alone, marginalising social and economic dimensions. This conceptual narrowing complicates the assessment of housing outcomes, where long-term social effects, health impacts, and affordability trajectories are integral but difficult to capture.

A related challenge arises in translating sustainability ambitions into design and delivery practices. Delivering affordable and sustainable housing depends on shared responsibility among architects, engineers, urban planners, and communities to balance functionality, cost-efficiency, and environmental performance. However, minimising the ecological footprint of construction while designing adaptable and inclusive spaces often requires navigating complex and restrictive regulatory frameworks that can limit innovation and constrain project viability.

Regulatory environments governing sustainable social housing remain particularly demanding. Developers and housing professionals face extensive compliance requirements that can discourage the adoption of sustainable practices, especially in contexts where cost constraints are severe (Hackitt, 2018). Simplifying and clarifying regulatory frameworks, alongside clearer communication of policy objectives, would reduce administrative burdens and strengthen sector-wide support. More accessible and actionable sustainability requirements could better enable the delivery of housing that meets both environmental and social objectives.

Resident engagement represents a critical but unevenly addressed issue in housing development and retrofit processes. Insufficient early resident involvement limits opportunities to align housing solutions with lived needs, everyday practices, and long-term use and adaptation. Evidence indicates that effective engagement can support more resource-efficient solutions, reduce performance gaps—particularly in retrofit contexts—and enhance social value (Mjörnell et al., 2022; Ambrosio-Albala et al., 2020). However, dominant housing market structures and private property models often marginalise collective ownership or shared-use arrangements, while prevailing housing typologies restrict opportunities for social interaction. Strengthening participation from the earliest project stages can help counter these tendencies and support more inclusive and socially responsive housing outcomes (Boess, 2022).

Material and construction practices introduce further long-term challenges. Although industrialised construction methods are attracting increasing interest, they frequently prioritise initial assembly over future disassembly, reuse, or material

recovery. This reflects a broader lack of strategic life-cycle planning and limits the potential to reduce embodied carbon over time. Integrating design for disassembly principles into industrialised construction therefore remains a key challenge for advancing circular approaches to housing (zu Ermgassen et al., 2022).

Similarly, the limited application of life-cycle costing constrains long-term affordability and sustainability. Incomplete parameter selection—such as excluding future energy savings or health-related costs—often leads to decisions driven by short-term cost reductions, despite evidence of long-term economic and environmental benefits from measures such as photovoltaic systems (Seminara et al., 2022). More consistent and comprehensive use of life-cycle costing would support design decisions that balance upfront affordability with long-term operational and social outcomes.

Finally, mass customisation offers promising pathways for addressing the diversity of needs in multi-family housing, supporting flexible and adaptable solutions that can respond to changing household requirements over time. However, the fragmented structure of the construction sector and limited interdisciplinary collaboration continue to constrain its wider adoption, particularly in affordable housing contexts. Integrating open building principles (Kendall, 2021) with industrialised construction techniques can enable adaptable yet standardised product platforms, balancing efficiency with long-term flexibility. Active user involvement, supported through digital tools and participatory processes, can further enhance resource efficiency, reduce waste, and improve resident satisfaction.

1.2 Research insights in Community Participation

Community participation plays a central role in shaping housing environments that respond to residents' needs, foster a sense of ownership, and support long-term sustainability. Participatory planning and design processes not only strengthen social relations within communities but also influence professional practices and policymaking by foregrounding lived experience and local knowledge.

Insights from ESR research on Community Participation point to a number of recurring challenges and concerns:

- Challenges in sustaining long-term engagement between municipalities, communities, and stakeholders in collaborative neighbourhood development.
- Tensions between community-led housing aspirations and formal regulatory, financial, and governance frameworks.
- Importance of spatial factors for the success of urban commons, particularly design quality, integration, and accessibility of shared spaces.
- Need to integrate diverse forms of knowledge—lived experience, professional expertise, and institutional perspectives—within participatory decision-making processes.

- Weak institutional embedding of participatory processes limits their continuity and influence on decision-making outcomes.
- Potential of innovative governance models and participatory action research to support more equitable and cohesive urban environments.
- Gaps between architectural education and real-world housing challenges, highlighting the need for practice-oriented and socially responsive learning environments.

Sustaining long-term engagement between municipalities, communities, and other stakeholders remains a persistent challenge in collaborative neighbourhood development processes. Participation is often initiated through time-limited funding schemes or pilot projects but weakens as political priorities shift, institutional capacity diminishes, or power imbalances remain unresolved. Municipal actors may struggle to embed participatory processes within existing governance structures, while communities experience fatigue when engagement does not translate into tangible outcomes. Conflicting temporalities—short political cycles versus the long-term nature of neighbourhood change—further complicate the maintenance of collaborative arrangements. Addressing these challenges requires governance arrangements that move beyond episodic consultation toward co-created structures, ongoing capacity building, and shared accountability mechanisms.

Community-led housing initiatives illustrate both the potential and the constraints of participatory approaches. Active resident involvement can generate housing solutions that better reflect local needs, strengthen social cohesion, and support long-term sustainability (Höflehner & Zimmermann, 2016). Practices such as community-led planning and urban commons introduce alternative governance arrangements that redistribute decision-making power and foster social innovation (Czischke, 2018). At the same time, regulatory rigidity, financial limitations, and complex governance requirements frequently constrain community aspirations and limit the scalability of such initiatives (Bell & Reed, 2021; Eversole, 2012, 2014). Developing inclusive governance models that integrate institutional and community knowledge is therefore critical to negotiating bottom-up initiatives with formal regulatory frameworks.

Spatial considerations are central to the success of urban commons and community-managed housing environments. The design, integration, and accessibility of shared spaces—such as gardens, courtyards, and community centres—shape everyday use, social interaction, and long-term stewardship. While these spaces play a crucial role in fostering social cohesion and resilience, the ways in which spatial configuration shapes participation remain underexplored in urban planning and housing research. Greater attention to how layouts, thresholds, and connectivity enable or constrain engagement is therefore needed to support inclusive, accessible, and sustainable commons-based housing practices.

Equitable participatory decision-making depends on the effective integration of diverse forms of knowledge, including residents' lived experience, professional expertise, and institutional perspectives (Eversole, 2012, 2014). Although partici-

participatory processes are often promoted as vehicles for transparency and inclusion, they frequently fall short in practice due to uneven power relations, knowledge asymmetries, and limited institutional commitment (Bell & Reed, 2021). Where participatory processes are weakly embedded within governance structures or lack clear pathways into decision-making, their continuity and capacity to influence outcomes are constrained. Meaningful participation therefore requires deliberate strategies to mediate power, bridge knowledge gaps, and institutionally embed participatory practices so that diverse perspectives inform both design and policy outcomes.

Balancing regulatory and financial constraints with community-led housing efforts remains a core challenge for sustainable urban development. Community-driven initiatives often rely on resident engagement across initiation, co-creation, rehabilitation, and long-term management phases. While such involvement can generate innovative and socially grounded housing solutions, reconciling community priorities with formal planning requirements and limited financial resources remains complex. Successfully navigating these tensions is essential to strengthening neighbourhood resilience, reinforcing social cohesion, building social capital, and enabling durable forms of collective housing provision.

Innovative governance models and participatory action research offer promising pathways for addressing these challenges by decentralising decision-making and supporting collaborative learning. However, sustaining collaboration between municipalities and communities over time remains difficult, particularly where institutional frameworks are inflexible or historical mistrust persists. Urban living labs exemplify both the opportunities and limitations of such approaches, highlighting the importance of trust-building, reflexivity, and attention to power relations in participatory governance arrangements.

Finally, community participation raises important implications for architectural education and professional training. Conventional design studio models often isolate students from social realities, encouraging individualised design approaches that overlook affordability and sustainability concerns. Practice-oriented pedagogies—such as live studios and commons-based knowledge production—create opportunities for residents, practitioners, and academics to collaborate in real-world contexts. Strengthening these educational approaches is essential to equip future professionals with the skills, reflexivity, and social awareness required to engage meaningfully with participatory and community-led housing processes.

1.3 Research insights in Policy and Financing

The interlinking of policy and financing is crucial for the effective provision of affordable and sustainable housing because policy frameworks set the rules, standards, and incentives that guide housing development, while financing mechanisms determine the availability and allocation of resources needed to implement these policies.

Core topics highlighted by researchers focusing on Policy and Financing include:

- Democratically structured policy and financing frameworks that support social and environmental objectives in housing provision.
- Transdisciplinary collaboration and stakeholder mobilisation as foundations for resilient and equitable housing governance.
- Political inertia in housing policy, highlighting the need for inclusive strategies, broad-based consensus, and long-term commitments to expand affordable housing access.
- Challenges in integrating housing, health, and care sectors to address the complex needs of vulnerable and marginalised populations.
- Limitations of broad energy policy measures and the need for more targeted and equitable approaches to addressing energy poverty and supporting fair energy transitions.
- Barriers to expanding access to ESG-aligned financing for social housing, including regulatory complexity, data limitations, and difficulties in scaling socially oriented investment models.
- Lack of clear and standardised social value metrics, constraining the capacity of housing policy frameworks to capture long-term social and community benefits.

Democratically structured policy and financing frameworks shape the capacity of housing systems to pursue social and environmental objectives by influencing how priorities are defined, resources allocated, and accountability exercised. Such frameworks can enable more transparent and participatory decision-making, allowing residents, municipalities, and private actors to engage in shaping housing outcomes. However, these arrangements operate within broader political-economic conditions that continue to produce residualisation of social housing, unequal access, and the financialisation of housing markets, often undermining social objectives (MacLennan & Miao, 2017; Reisenbichler, 2020; Wijburg, 2021). These tensions highlight the difficulty of reconciling democratic governance ambitions with market-driven investment logics.

Addressing policy and financing challenges increasingly depends on forms of transdisciplinary collaboration that bring together academic knowledge, institutional expertise, and collective action. Stakeholder mobilisation, including through social movements and advocacy coalitions, has demonstrated the capacity to reshape housing agendas and influence institutional politics. Such mobilisation can support more inclusive and resilient governance arrangements by challenging dominant policy narratives and expanding the range of actors involved in decision-making (Berfelde & Heeg, 2024). At the same time, sustaining these collaborations over time remains difficult, particularly where institutional openness and political receptivity are limited.

Political inertia remains a significant constraint on the expansion of affordable and social housing, particularly in post-socialist and market-oriented housing systems.

Limited public investment in social and public rental housing has contributed to growing pressure on private rental markets, disproportionately affecting low- and middle-income households (Hegedüs, 2020). Policy responses often favour indirect subsidies or market-based instruments, which tend to benefit higher-income groups and reinforce existing inequalities. These dynamics underline the structural challenges involved in generating sustained political commitment to housing provision oriented toward long-term social objectives.

Fragmentation between housing, health, and care sectors continues to limit the effectiveness of policy and financing responses aimed at supporting vulnerable and marginalised populations. While evidence consistently highlights the influence of housing conditions on physical, emotional, and mental wellbeing, institutional separation across policy domains constrains coordinated investment and service delivery. Addressing these challenges requires the integration of expertise from housing, health, technology, design, and social care, yet disciplinary silos and weak communication between researchers, practitioners, and policymakers often impede such collaboration. These structural barriers limit the development of coherent policy and financing mechanisms capable of aligning long-term social and health objectives with housing provision.

Targeted and equitable energy policies are central to addressing energy poverty while supporting a fair and sustainable energy transition. Across Europe, however, policy responses have frequently relied on broad, untargeted measures that place disproportionate financial burdens on vulnerable households, weaken incentives for higher-income groups to reduce energy consumption, and generate regressive redistribution effects, including inflationary pressures. Efforts to shift towards more targeted interventions are constrained by outdated welfare systems, limited administrative capacity, and political resistance to narrowly focused support mechanisms. Despite these barriers, there is increasing recognition that precise, government-led energy policies are essential to protect those most at risk, reduce structural inequalities, and align social protection with long-term climate objectives.

Expanding access to environmental, social, and governance (ESG) financing for social housing is increasingly seen as a means of supporting sustainability while maintaining affordability and social equity. In practice, however, social housing organisations face several obstacles, including investor preferences for higher-return sectors, complex and evolving ESG regulatory requirements, challenges related to data availability and impact measurement, and difficulties in scaling socially oriented projects. Addressing these barriers requires closer collaboration between governments, investors, housing providers, and communities to develop financing models better aligned with the characteristics of social housing. Transparent and proportionate impact assessment tools are particularly important for demonstrating value, managing risk, and building investor confidence. Balancing affordability objectives with ESG requirements therefore depends on targeted capacity building, regulatory clarity, and financing approaches that recognise the long-term social and environmental returns of social housing investment.

Defining and standardising social value metrics remains a significant challenge for housing policy and financing frameworks. In the absence of clear definitions and consistent evaluation methods, instruments such as the Social Value Act risk limited effectiveness, as long-term and intangible benefits—such as community wellbeing, social cohesion, and improved quality of life—are difficult to capture and compare. This lack of clarity weakens accountability and constrains the ability of policymakers and funders to assess the full impact of housing interventions. Addressing these limitations requires a transdisciplinary approach that brings together policymakers, housing providers, financiers, and communities to develop shared understandings and robust, multidimensional metrics. Although this discussion is grounded in the UK context, the challenges identified are widely relevant, offering lessons for other settings where social value is increasingly central to housing policy and investment decisions.

2. LINKING RESEARCH INSIGHTS ACROSS DOMAINS

Drawing on the research findings from the ESR projects across three domains—Design, Planning and Building; Community Participation; and Policy and Financing—this section synthesises key cross-cutting challenges, underscoring the need for a more cohesive and integrated framework for affordable and sustainable housing (→ see Table 5.1.1).

TABLE 5.1.1: Key challenges in affordable and sustainable housing across domains

Design, Planning and Building	Community Participation	Policy and Financing	Cross-cutting challenges
Misconceptions and conflicting definitions of social housing and sustainability.	Long-term engagement of stakeholders is crucial for effective municipality–citizen collaboration in sustainable neighbourhood development.	Democratically structured policy and financing frameworks strengthen housing projects’ capacity to achieve social and environmental objectives.	Overcoming power imbalances and building trust among diverse stakeholders to enable meaningful, inclusive collaboration across sectors and scales.
Delivering affordable, sustainable housing requires collaboration among architects, engineers, planners, and communities to balance functionality, cost, and environmental impact.	Supporting community engagement is essential for the successful development of community-led housing initiatives.	Transdisciplinary collaboration and stakeholder mobilisation are essential for equitable and resilient housing governance.	Bridging gaps between theory and practice through effective knowledge sharing and capacity building across disciplines and communities.
Reducing the ecological footprint of housing while enabling adaptable solutions remains challenging within complex regulatory frameworks.	Exploring the role of physical and social space in urban commons for inclusivity, collaboration, and sustainable design.	A lack of political will to invest in social and public housing is reducing options for low- and middle-income earners, highlighting the need for inclusive policies and active stakeholder engagement.	Aligning regulatory frameworks with innovative sustainable design and community needs to enable flexible and scalable housing solutions.
Lack of early integration of resident stakeholders in housing retrofit projects can hinder potential benefits such as cost savings, reduced performance gaps, and increased social value.	Need to balance lived experience, professional expertise, and institutional perspectives within participatory decision-making frameworks.	Integrating housing, health, and care sectors is crucial to effectively address the complex needs of vulnerable and marginalised populations.	Ensuring that multi-sectoral approaches address intersecting social, economic, and environmental dimensions of housing sustainably.
Integrating design for disassembly principles with industrialised construction practices to reduce embodied carbon impacts across the housing life cycle.	Balancing regulatory and financial constraints with community-led housing initiatives is essential for sustainable urban development.	Limitations in energy policy design and targeting hinder responses to energy poverty and just energy transitions.	Incorporating long-term environmental and social impacts into financing and policy decisions to support circular economy principles.
Limited use of life-cycle costing in housing often results in missed opportunities to invest in tangible features that support residents’ long-term health and financial wellbeing.	Innovative governance models and participatory action research can contribute to more equitable, cohesive urban environments.	Expanding access to ESG-aligned financing for social housing requires regulatory clarity, adequate data, and scalable impact assessment frameworks.	Creating adaptable governance and financing mechanisms that support continuous community involvement and sustainable housing outcomes.
Addressing the diverse needs of multi-family housing through mass customisation strategies that ensure affordability and sustainability.	Bridging the gap between architecture studios and the real-world challenges of sustainable, affordable housing requires embracing a commons-oriented approach.	Unlocking the full potential of the Social Value Act and similar regulations is crucial for advancing the housing sector.	Enhancing interdisciplinary education and professional training to equip stakeholders with the skills to navigate complex housing challenges.

Overcoming power imbalances and building trust among diverse stakeholders to enable meaningful, inclusive collaboration across sectors and scales

Power imbalances between local authorities, developers, community members, and other stakeholders often limit equitable participation in housing projects. These disparities can lead to mistrust, marginalisation of vulnerable groups, and tokenistic engagement. To foster meaningful collaboration, it is essential to create transparent decision-making processes and ensure all voices—especially those historically excluded—are genuinely heard and valued. Building trust requires long-term commitment, accountability mechanisms, and conflict resolution strategies that recognise different stakeholders' interests and expertise. Effective collaboration across scales—from neighbourhood to municipal and national levels—strengthens social cohesion and ensures housing solutions are responsive to diverse needs.

Bridging gaps between theory and practice through effective knowledge sharing and capacity building across disciplines and communities

There is often a disconnection between academic research, policy frameworks, and on-the-ground housing realities. To address this, mechanisms that facilitate two-way knowledge exchanges between researchers, practitioners, policymakers, and community members are needed. Capacity building initiatives—such as workshops, participatory action research, and co-creation platforms—enable stakeholders to apply theoretical insights in practical contexts. This integration helps refine policies and design approaches, making them more adaptable and contextually relevant. Emphasising accessible communication and fostering mutual learning contribute to closing the gap, ultimately improving project outcomes and sustainability.

Aligning regulatory frameworks with innovative sustainable design and community needs to enable flexible and scalable housing solutions

Regulatory environments often lag behind advances in sustainable building technologies and evolving community aspirations, which can stifle innovation. To promote adaptable and scalable housing solutions, policies must be flexible enough to accommodate alternative building methods, mixed-use developments, and participatory design approaches. This alignment requires revisiting zoning laws, building codes, and approval processes to reduce bureaucratic barriers while maintaining safety and quality standards. Incorporating community input into regulatory reforms ensures that frameworks reflect lived experiences and prioritise social equity alongside environmental sustainability.

Ensuring that multi-sectoral approaches address intersecting social, economic, and environmental dimensions of housing sustainably

Affordable and sustainable housing challenges cannot be tackled in isolation; they intersect with health, education, employment, and environmental sectors. Effective solutions require integrated policies and collaborative efforts across these fields to address the root causes of housing insecurity and environmental degradation. Multi-sectoral approaches promote holistic community wellbeing by considering access to social services, economic opportunities, and ecological resilience. This comprehensive perspective supports vulnerable populations more effectively and fosters equitable urban development that balances human needs with planetary boundaries.

Incorporating long-term environmental and social impacts into financing and policy decisions to support circular economy principles

Traditional housing financing often prioritises short-term returns over sustainability, overlooking the full life cycle costs and benefits of buildings. Embedding long-term environmental and social criteria—such as energy efficiency, material reuse, community health, and social inclusion—into investment and policy decisions encourages circular economy practices. This shift incentivises designers, developers, and financiers to adopt regenerative strategies like modular construction, renewable energy integration, and participatory governance models. Consequently, housing becomes more resilient, affordable, and aligned with broader sustainability goals.

Creating adaptable governance and financing mechanisms that support continuous community involvement and sustainable housing outcomes

Sustainable housing requires governance models and funding structures that can evolve alongside changing community needs and environmental conditions. Adaptable mechanisms allow for ongoing stakeholder engagement, transparent resource allocation, and flexible project management. This dynamic approach helps build long-term partnerships between municipalities, developers, financiers, and residents. Financing models that incorporate social and environmental impact bonds, public-private partnerships, or community investment trusts can provide sustainable capital flows while empowering residents to take ownership and participate in decision-making throughout the housing life cycle.

Enhancing interdisciplinary education and professional training to equip stakeholders with the skills to navigate complex housing challenges

The multifaceted nature of affordable and sustainable housing demands professionals who understand technical, social, economic, and environmental dimensions. Interdisciplinary education and training programmes prepare architects, planners, policymakers, and community leaders to collaborate effectively across

sectors. Curricula that integrate urban planning, environmental science, sociology, public policy, and finance foster critical thinking and problem-solving skills. Hands-on learning through live projects, co-design workshops, and community engagement cultivates empathy and practical expertise. This holistic educational approach ensures future professionals can design and implement housing solutions that are inclusive, innovative, and responsive to evolving urban realities.

3. DIRECTIONS FOR FUTURE RESEARCH

Future research on affordable and sustainable housing must address intersecting challenges posed by rapid urbanisation, growing socio-economic disparities, and escalating environmental pressures, while ensuring social inclusivity and safeguarding access for the most vulnerable populations. Innovative financial and policy mechanisms are critical to supporting social housing in an increasingly globalised and speculative housing market.

More specifically, future research must deepen the integration of design flexibility, user engagement, and life-cycle thinking. Investigating how design for disassembly can be aligned with industrialised construction offers significant potential to promote circular economy principles within the housing sector. Research should address how disassembly can be considered at early design stages, co-developed with multiple stakeholders, and evaluated in terms of long-term social and environmental benefits. Developing digital design tools that combine BIM with life-cycle costing is essential to provide the evidence base needed to justify upfront investments while accommodating local supply chains and regulatory contexts.

In parallel, future research should strengthen the transdisciplinary and participatory dimensions of housing design, particularly through mass customisation and open building strategies. Investigations are needed into how digital platforms, participatory workshops, and design tools can enable resident-led customisation, enhancing social sustainability and wellbeing in multi-family housing. Emphasis should be placed on understanding the social value generated by flexible housing typologies, and on developing governance structures that support community co-design, shared ownership, and long-term stewardship.

Institutional and regulatory fragmentation presents a significant barrier to housing innovation and must be addressed as a central research challenge. Future studies should focus on how shared vocabularies, interoperable data frameworks, and inclusive policy instruments can bridge the gap between design intentions and built outcomes, facilitating more cohesive and climate-resilient housing strategies.

At the governance and policy level, future research should examine how national, metropolitan, and local strategies can be effectively aligned to deliver integrated housing policies. Identifying the key stakeholders, resources, and governance networks involved at each level will be critical to developing scalable policies that support both climate resilience and social equity. Strengthening cross-sector gov-

ernance is especially important: active collaboration among public, private, civil society, and academic actors can stimulate investment in affordable housing, enhance policy coherence, and foster meaningful community participation.

The empowerment of communities as active partners in housing governance is another essential area for further inquiry. Research should explore how participatory design and planning methodologies, particularly those derived from pilot projects, can be scaled up while remaining sensitive to diverse socio-cultural contexts. This can ensure that sustainable housing solutions are both scalable and socially responsive.

Social inclusion and equitable access to housing remain pressing concerns in light of widening housing inequalities. Future research should adopt holistic, needs-based approaches, particularly in relation to vulnerable groups such as low-income households, ageing populations, and the homeless. For example, the asset-based welfare model warrants further investigation to understand how housing assets can support ageing populations through integrated social and health services, promoting both financial stability and intergenerational housing security. Similarly, research into homelessness should prioritise preventive, community-based strategies that emphasise social reintegration and long-term support.

Digital innovation and participatory technologies can further enhance housing accessibility and inclusivity. Future research should explore how digital platforms can facilitate real-time feedback, expand public engagement, and address the digital divide, especially among underserved communities. Developing scalable, technology-enabled participation mechanisms is key to ensuring that housing solutions are co-created with all societal groups, including the most marginalised.

Another important research direction involves community-driven housing strategies and social entrepreneurship. The growing significance of resident-owned cooperatives, community land trusts, and other grassroots initiatives highlights their potential to deliver sustainable, affordable housing at the neighbourhood level. Research should examine the long-term viability, inclusiveness, and adaptability of these models, as well as the governance and financing mechanisms that support them under changing socio-economic conditions.

Financial and policy innovation remains a critical priority, particularly in the context of an increasingly financialised global housing market. Further research is required to develop models that allow social housing organisations to access capital markets in ways that protect against the negative effects of speculative investment and touristification. Identifying financial instruments and policy frameworks that align social housing objectives with long-term social and environmental goals will be essential to ensuring affordability and resilience.

A transdisciplinary research approach is central to addressing these interconnected challenges. Integrating knowledge from architecture, urban planning, economics, sociology, policy studies, and beyond will enable the development of adaptable,

context-sensitive housing solutions. The RE-DWELL project has demonstrated the transformative potential of collaborative, cross-sectoral knowledge production in fostering innovation, promoting policy coherence, and advancing housing strategies that respond effectively to environmental, social, and economic imperatives.

Future research and practice should continue to emphasise interdisciplinary collaboration, bridging gaps between academic and non-academic actors with skills to facilitate public debate on this complex topic. By advancing this integrated agenda, we can move beyond fragmented interventions toward comprehensive, equitable, and resilient housing systems capable of addressing current and future urban challenges.

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5.2

Beyond housing provision: Community engagement as a driver of affordable and sustainable dwelling

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Community engagement is central to achieving affordable and sustainable housing, serving as a transformative practice shaping both the built and lived environments. Drawing on the work carried out in RE-DWELL, this chapter presents community-led housing and public space initiatives—including cohousing, cooperatives, and neighbourhood commons—as examples of how residents co-produce social, spatial, and ecological infrastructures. Through the project’s activities, transdisciplinary engagement was operationalised via iterative co-creation, shared vocabularies, case libraries, and participatory tools. These methods enabled researchers and stakeholders to navigate diverse knowledge systems, negotiate values, and address complex socio-spatial challenges. Participatory and situated learning frameworks equipped early-stage researchers with boundary-spanning competences such as systems thinking, reflexivity, and ethical responsiveness, preparing them to co-produce knowledge with communities. Ultimately, sustainable and just dwelling arises from the integration of housing, public space, social relations, and learning processes—where engagement is not a supplementary practice, but the foundational infrastructure of research, education, and urban practice.

INTRODUCTION

The pursuit of affordable and sustainable housing is a complex, multilayered challenge rooted in contemporary socio-economic inequalities and urban development dynamics (Madden & Marcuse, 2016; UN-Habitat, 2020). Addressing it requires more than technical innovation or policy reforms; it calls for inclusive and sustained community engagement that redefines housing not merely as shelter, but as an issue of social justice, public space, collective agency, and education (Pareja-Eastaway & Winston, 2017). Community engagement, in this sense, is not a one-time

consultation but a transformative and ongoing process through which the built and lived environment are shaped, governed, and sustained (Innes, 2004; Sendra & Fitzpatrick, 2020; Maptionnaire, n.d.).

Over recent decades, a growing number of community-led housing models have emerged across Europe, offering alternatives to conventional top-down planning and market-driven development. From cohousing and housing cooperatives to community land trusts and neighbourhood commons, these models promote shared ownership, mutual support, and ecological responsibility (Foster & Iaione, 2022; Stavrides & Travlou, 2022; Czischke et al., 2023). However, the escalating housing crisis—driven by financialisation and speculation—continues to displace communities and exacerbate socio-spatial inequalities. Against this backdrop, community-led initiatives operate simultaneously as spatial interventions and socio-political acts of resistance and innovation (Petrescu & Trogal, 2017; Cook, 2023).

Similarly, community-led public space initiatives—such as shared spaces between houses and within neighbourhoods—create accessible environments for social interaction, cultural exchange, and civic engagement. Through placemaking practices, communities co-produce spaces that reflect local needs and promote collective wellbeing (Stevens & Dovey, 2023). These bottom-up spatial interventions foster not only material transformation but also a reconfiguration of social relations, identity, and governance in urban life (Charalambous, Panayi & Roussou, 2022). Taken together, housing and public space illustrate how community engagement operates across multiple scales of urban life—from the household to the neighbourhood and beyond—reclaiming the right to shape space and redefining the role of citizens in the stewardship of the built and lived environment.

Community engagement can therefore be understood as the constitutive infrastructure through which urban life is reproduced, contested, and transformed. Analytically, it traces multi-scalar relations through which practices such as cohousing, commoning, and everyday maintenance produce, distribute, and contest capabilities across dwellings, infrastructures, and the public realm. Methodologically, it calls for a transdisciplinary engagement approach that is both multi-scalar and multi-sectoral, linking household routines, governance arrangements, and spatial configurations across interconnected contexts (Renn, 2021). Practically, it involves convening residents, practitioners, policymakers, and researchers whose interests and knowledge systems may diverge; navigating ambiguity and value conflicts; and building shared purpose around goals that may initially be abstract or contested. Structured spaces for negotiation, joint problem-framing, iterative co-design, and continuous reflexivity are essential, as transdisciplinarity deliberately disrupts conventional academic and institutional silos, integrating diverse people, knowledge systems, and norms into collaborative protocols (Lawrence, 2015).

Operationalising transdisciplinary engagement in built and lived environments also demands a reconfiguration of professional education. The skills required to analyse, engage with, and transform complex socio-spatial environments are

the same ones used to materialise them in practice. Curricula must cultivate boundary-spanning practitioners capable of co-producing knowledge with communities, mediating conflicts and values, and engaging the built environment as a site of lived experience, negotiation, and transformation (Oldfield, 2015). Pedagogies that pair analytical rigour with experiential and reflexive learning—including studio-labs, service-learning with community partners, iterative co-design, facilitation, and ethical frameworks of care—prepare students to navigate these complexities. The RE-DWELL project exemplifies this approach by treating research training as a living laboratory, in which early-stage researchers learn to navigate divergent epistemologies, institutional norms, and stakeholder priorities while sustaining collaborative purpose.

Within this context, participatory and situated learning offers valuable pedagogical frameworks that enable students to engage meaningfully with communities and real-world environments. Participatory learning emphasises co-creation of knowledge between learners and communities (Sanoff, 2000; Gonçalves, 2017), while situated learning, first conceptualised by Lave and Wenger (1991), frames learning as a process embedded in social practice and authentic contexts, rather than abstract knowledge acquisition. Recent scholarship highlights its relevance for spatial disciplines, fostering experiential, reflective, and relational modes of learning that respond to the complexity of real-world environments (Steen & van Bueren, 2017; Mulvihill & Swaminathan, 2022; Tomasini Giannini & Mulder, 2022).

In this chapter, we present community engagement as the constitutive infrastructure of affordable and sustainable housing—a relational, multi-scalar assemblage through which material and social infrastructures are co-produced. We examine three key facets of community engagement in this context:

- **Community-led housing and public space as foundations of dwelling.** Collaborative approaches that treat housing and public space as co-constitutive elements are presented as relevant for addressing affordability, sustainability, and inequality.
- **Transdisciplinary engagement: Aligning research and practice in sustainable living.** Findings from the RE-DWELL collective research provide the basis for an account of architectural, social, and pedagogical dimensions of transdisciplinary, community-led practices.
- **Community-engaged pedagogy: Towards participatory and situated learning.** A reconfiguration of educational frameworks enables the meaningful involvement of future practitioners and researchers in the co-production of sustainable, just, and inclusive living environments, with situated, participatory, and reflexive learning processes identified as key components of this transformation.

All three perspectives share a commitment to community engagement as a core principle rather than a supplementary practice, positioning it at the heart of dwelling and its education. They emphasise the integration of practice, research, and learning, showing how collaborative and participatory processes are essential for

addressing challenges of affordability, inequality, and sustainability. Across these approaches, housing and public space are understood as co-produced environments, shaped not only by professional expertise but also by the lived experiences and collective agency of communities.

1. COMMUNITY-LED HOUSING AND PUBLIC SPACE AS FOUNDATIONS OF DWELLING

In this section we explore the intersection of community-led housing and public space initiatives as foundational elements of just and sustainable dwelling. Building on the chapter's central argument that community engagement is both a methodological tool and a transformative practice, we examine how these initiatives reshape not only physical environments, but also governance, social relations, and collective agency.

1.1 Community-led housing and public space as interconnected practices

Community-led housing encompasses a range of non-profit models—such as housing cooperatives, cohousing, community land trusts, and self-managed housing—in which residents actively participate in planning, design, financing, and management. These models foster long-term affordability, shared responsibility, and social resilience (Bliss, 2009; Gulliver et al., 2013; Mullins & Moore, 2018). By embedding participatory governance in the production of housing, they respond directly to the lived realities of communities and redistribute decision-making power.

Community-led public space initiatives—such as neighbourhood commons, community gardens, and cultural centres—similarly create inclusive environments for interaction, civic participation, and cultural expression. Enabled through practices of placemaking, these spaces are co-produced by residents to reflect local needs and aspirations, while fostering wellbeing, identity, and relational infrastructures (Sanoff, 2000; Stevens & Dovey, 2023). Together, community-led housing and public space initiatives challenge institutional norms and reconfigure the power relations that structure urban life (Charalambous, Panayi & Roussou, 2022).

Within the RE-DWELL project, these interlinked practices were examined through secondments, fieldwork, and collaborative workshops. Case studies highlight the diversity of approaches, ranging from cooperative housing to municipal partnerships and self-organised commons. Across contexts, researchers examined existing conceptual tools—including **COMMUNITY EMPOWERMENT, PARTICIPATORY APPROACHES, THIRD PLACES, DESIGN ACTIVISM, and URBAN COMMONS**—to interrogate the evolving meanings of community-led. This analysis highlights the conceptual elasticity of these approaches: locally specific, yet consistently underpinned by an ethic of care, accessibility, and collective imagination.

1.2 Learning from practice: Case studies

Examining specific cases through the RE-DWELL project illustrates the diversity and transformative potential of community-led approaches. In Barcelona, the *cooperativa d'habitatge en cessió d'ús* [grant-of-use housing cooperative] model, exemplified by *La Borda*, challenges dominant housing logics. Residents reclaim agency through collective organisation, ethical financing, and participatory design, while shared domestic spaces—communal kitchens, terraces, and laundries—foster daily interaction, mutual care, and sustainable living (Tzika et al., 2024). In Lisbon, where housing cooperatives are less established, municipal programmes such as BIP/ZIP support neighbourhood commons, cultural centres, and micro-scale public interventions. Participatory budgeting and grassroots organising transform benches, repurposed squares, and open spaces into civic anchors that cultivate belonging and neighbourhood regeneration (Pappa & Paio, 2024).

Beyond these contexts, RE-DWELL researchers examined a range of approaches across Europe and the United States. In *Križevci*, Croatia, a former military site has been transformed into cooperative housing supported by crowdfunding and municipal backing. *Flexwoningen Oosterdreef* experiments with temporary prefabricated housing and community-building. In Zurich, *Mehr als Wohnen* scales cooperative housing to the neighbourhood level, integrating mixed uses with long-term governance, while *Navarinou Park* in Athens exemplifies a grassroots urban commons managed through solidarity networks. In Alabama, USA, the *Rural Studio* combines architectural education with socially responsive design.

Taken together, these cases reveal four key lessons. First, enabling ecosystems are essential: land, tenure, municipal support, solidaristic finance, and long-term frameworks all interact with grassroots self-management. Second, design functions as social infrastructure: shared spaces and micro-interventions cultivate care, reciprocity, and civic engagement. Third, temporalities shape impact: short-term projects, insurgent commons, and long-duration cooperatives each carry distinct opportunities and risks for continuity and scale. Finally, principles are transferable, but models are context-specific: effective translation requires transdisciplinary engagement linking spatial configuration, governance, and community practice.

2. TRANSDISCIPLINARY ENGAGEMENT: ALIGNING RESEARCH AND PRACTICE IN SUSTAINABLE LIVING

Building on the previous discussion of community-led dwelling, this section explores how such engagement is cultivated and sustained in both practice and research. It frames engagement both as a methodological stance and as a shared commitment to addressing societal challenges collectively (Tryon & Madden, 2019; Hemström et al., 2021), encompassing not only physical dwellings but also the broader social, spatial, and ecological systems of everyday life.

In sustainable and affordable housing, engagement involves working with diverse actors—residents, professionals, policymakers, and researchers—whose knowl-

edge, interests, and priorities may differ or conflict. It requires navigating ambiguity, negotiating values, and building shared purpose. At this point, two key questions arise: How can meaningful collaboration be achieved? And how can communities coalesce around goals that may initially seem abstract or contested?

RE-DWELL addressed these questions from two interrelated angles. First, it sought to build a transdisciplinary research community—across universities, partner organisations and other stakeholders participating in the research—capable of addressing the “wicked problems” of housing and sustainability. By including researchers from architecture, urban planning, sociology, engineering, economics, and law alongside local stakeholders, the project mirrored the collaborative dynamics of community-led housing, where collective transformation depends on integrating diverse knowledge and agendas. Although differing in origin, both community-led housing initiatives and transdisciplinary research communities share a concern with how knowledge, agency, and spatial practices intersect, revealing tensions and synergies between bottom-up experience and structured collaborative investigation.

This alignment between practice and research also highlights the inherent challenges of transdisciplinarity. Integrating diverse epistemologies, terminologies, and institutional norms disrupts conventional academic logics (Montuori, 2013; Augsburg, 2014; Lawrence et al., 2022). Within RE-DWELL, such integration was treated not as a one-off methodological choice, but as a continuous process of shared learning, shaped by dialogue, co-creation, and reflexivity. In line with Nicolescu (2002, 2014), transdisciplinarity was approached both as method and as ethos—an embodied practice that mirrors the collaborative, negotiated, and iterative nature of community-led engagement itself.

2.1 Operationalising transdisciplinary engagement

To operationalise this ethos, RE-DWELL researchers co-developed a range of tools and platforms that supported dialogue and mutual understanding. One of the earliest and most essential steps was the creation of a shared vocabulary. Researchers collectively developed a glossary of key concepts, including housing **AFFORDABILITY**, **COMMUNITY EMPOWERMENT**, **PUBLIC-CIVIC PARTNERSHIP** and **SOCIAL VALUE**, highlighting how disciplinary backgrounds shaped interpretation. By negotiating these definitions across perspectives, the process lays the groundwork for a shared language, helping to bridge viewpoints, prevent misalignment, and foster collaborative analysis.

In parallel, the development of a case library offered a second methodological anchor. Cases were selected not for their individual significance but for their value as shared points of observation and discussion, enabling researchers to explore, compare, and debate real-world practices across contexts. As Bovill et al. (2016) note, such engagement cultivates mutual appreciation, collaborative knowledge production, and a more inclusive epistemic environment. Together, these tools established what Holley (2015) calls epistemic inclusivity: a space where discipli-

nary difference becomes an asset rather than an obstacle, allowing multiple ways of knowing to coexist and inform one another.

2.2 Reframing dwelling through transdisciplinary engagement

At its core, the RE-DWELL transdisciplinary environment does not focus solely on technical or spatial questions, but on the broader, lived meaning of dwelling—not as static built form but as a dynamic socio-spatial system. Dwelling here encompasses the interconnected domains of housing and public space, shaped by collective agency, social relations, and material practices. It includes the right to inhabit with dignity, the co-production of shared living environments, and the ongoing negotiation of identity, inclusion, and care.

This relational and social understanding of dwelling was elaborated through the work of RE-DWELL researchers supervised by the authors:

- **Urban scale and public space:** Andreas Panagidis investigated how urban living labs (ULLs) facilitate the co-production of social infrastructures, identifying shared values, interaction, and solidarity as core conditions for inclusive urban habitats (Panagidis & Charalambous, 2023). In Southern Europe, ULLs are adapted to local socio-cultural and political contexts, bridging top-down governance and grassroots initiatives to support more democratic and equitable urban development. ULLs function as experimental governance frameworks, encouraging collaboration among municipalities, citizens, and other stakeholders to co-create solutions and foster self-organisation in communities.
- **Neighbourhoods and commons:** Androniki Pappa’s research on urban commons in Lisbon’s priority neighbourhoods demonstrated how everyday interactions in collectively managed spaces contribute to equitable forms of dwelling (Pappa & Paio, 2024). Practices fostering togetherness, intercultural exchange, and intergenerational solidarity were most frequent, while efforts to expand cross-neighbourhood connections were less common. The study found strong correlations between solidarity practices and spatial interventions, underscoring participatory budgeting as a tool to enhance community engagement and highlighting the state’s role in supporting these initiatives.
- **Collaborative housing:** Zoe Tzika explored engagement in cooperative housing throughout its full life cycle—from initiation and design to long-term governance—reshaping housing as a form of dwelling grounded in adaptability, care, and shared responsibility (Tzika et al., 2024). In Barcelona, La Borda residents reported enhanced safety, empowerment, and shared learning—outcomes that go beyond traditional housing metrics (Cabr   & Andr  s, 2018). Direct participation in decision-making and management fostered capability building, leadership development, and a sense of belonging (Girb  s-Peco et al., 2020).

This research work demonstrates that engagement is not a single act—it is a continuous and evolving practice, both in the lived experience of residents and

in the work of researchers. Investigating ULLs, urban commons, and cooperative housing revealed how collaborative processes shape not only physical spaces but also social relations, collective agency, and everyday practices of dwelling. For researchers, contributing meaningfully to these processes required developing active listening, communication, and critical reflection skills, capacities that mirror those cultivated through community participation.

3. COMMUNITY-ENGAGED PEDAGOGY: TOWARDS PARTICIPATORY AND SITUATED LEARNING

In the preceding sections we have shown that creating inclusive living environments depends not only on spatial and policy innovation, but on sustained community engagement and the ability to work across disciplinary and institutional boundaries. If housing and public space are to be understood as interrelated dimensions of dwelling—as a political, relational, and collectively shaped process—then education must support that vision. In this section we address a key question: how can we prepare future professionals and researchers to engage meaningfully in the co-production of just, resilient, and participatory urban life?

Traditionally, education in housing and urban planning has been shaped by technical rationality, disciplinary specialisation, and expert-led approaches of spatial development. While such knowledge remains important, it is insufficient to address the multi-scalar and value-laden challenges of contemporary living. Professionals must be able to collaborate with communities, interpret socio-spatial dynamics, and act with ethical and political awareness. They must understand dwelling not merely as a technical object, but as a lived and negotiated condition (Swyngedouw, 2004; Awan et al., 2011).

This calls for pedagogical models that are both participatory and situated. Rather than separating theory from practice, these models foster integrated learning processes that are grounded in place-based realities and co-produced with diverse actors. In the spirit of Paulo Freire's (1970) problem-posing education, learners are not passive recipients of knowledge but co-investigators in real-world contexts. Knowledge emerges through dialogue, reflexivity, and experimentation, making education a political and transformative act.

Participatory learning emphasises the co-creation of knowledge between learners and communities, enabling students and researchers to engage directly with the socio-spatial realities of housing and dwelling (Sanoff, 2000; Gonçalves, 2017). Situated learning, as conceptualised by Lave and Wenger (1991), frames learning as a socially embedded process, shaped by specific contexts, relationships, and practices. Recent scholarship highlights its relevance to spatial disciplines, fostering reflective, experiential, and collaborative learning (Steen & van Bueren, 2017; Mulvihill & Swaminathan, 2022; Tomasini Giannini & Mulder, 2022). Together, these approaches provide a framework for developing the capacities required to engage in the co-creation of living environments.

The RE-DWELL project addressed this need not merely through pedagogical activities, but by using them as vehicles to explore and advance the operationalisation of co-creation of living environments. Workshops, summer schools, exhibitions, and collaborative tools were designed as more than training exercises: they became testing grounds where early-stage researchers could develop the skills, shared language, and reflexive capacities required to engage with diverse academic and non-academic actors. In this way, education and research become intertwined, and pedagogical encounters functioned as spaces for generating insights into how community engagement and situated learning can inform broader practices of co-producing dwelling.

3.1 Situated and participatory learning in practice

The pedagogical approach grounded learning in real-world contexts through a combination of fieldwork, stakeholder engagement, and reflective exercises. Early-stage researchers engaged directly with community-led housing and public space initiatives through site visits, interviews, and walking workshops to connect theoretical inquiry with the material and social realities of specific neighbourhoods. These encounters were paired with structured reflection activities—including visual mapping, research storytelling, and group dialogue—which enabled participants to interpret lived experience through critical, disciplinary, and cross-disciplinary lenses.

This hands-on engagement supported the development of situated awareness and deepened the understanding of the socio-spatial dynamics at play in community-led dwelling. Participants began to reframe their research questions in response to the complexities encountered on the ground, fostering an iterative and responsive research ethos.

Co-creation was central to the pedagogical approach, not only as an external goal but also as a method of learning. Participatory tools—such as role-playing exercises, stakeholder simulations, collaborative mapping, and interactive digital platforms—enabled researchers to rehearse modes of democratic engagement, shared governance, and real-time negotiation.

These exercises strengthened interpersonal and political capacities essential for community-engaged practice, including active listening, consensus-building, and decision-making in pluralistic environments. They also offered opportunities to critically examine power dynamics and institutional constraints within collaborative processes, further aligning pedagogy with the realities of co-producing dwelling.

4. FINAL CONSIDERATIONS

Community engagement is not a peripheral gesture in the production of built and lived environments, but a transformative practice—situated, relational, and pedagogical—that must be central to how housing is conceived, designed, governed,

and learned. Housing and public space are co-constituted with social relations, infrastructures, and governance across scales, with engagement serving as the relational fabric through which these environments are produced, contested, and transformed.

Learning as dwelling, dwelling as learning. Community-engaged approaches are powerful not only for the physical environments they shape but for the relationships, knowledge systems, and solidarities they generate. Dwelling—understood as the dynamic interplay of housing, public space, and social relations—is inseparable from learning. Collaborative practices do not merely supplement dominant models; they challenge and reconfigure them, opening new possibilities for how people relate to each other, to the places they inhabit, and to knowledge produced through collective, situated practices.

Transdisciplinary methodology. Operationalising this methodology requires a multi-scalar and multi-sectoral perspective which links household routines, spatial configurations, infrastructures, and governance through joint problem-framing and iterative co-design. It involves convening residents, community organisations, practitioners, policymakers, and researchers; developing shared languages and collaborative tools that serve as boundary objects to coordinate understanding across diverse perspectives; establishing ethical protocols for data stewardship; and embedding continuous reflexivity. As both method and ethos, transdisciplinarity challenges conventional specialisation by integrating people, knowledge systems, terminologies, and institutional norms into collaborative practices of research and action.

Reconfiguring professional education. Complex housing and urban challenges cannot be addressed by technical expertise alone. Traditional, discipline-based education prepares professionals to analyse and design dwellings, but often in isolation from the social, political, and relational dimensions of housing and public space. Addressing dwelling in a comprehensive, participatory manner requires the same skills needed to materialise it: boundary-spanning collaboration, ethical responsiveness, conflict mediation, and co-production of knowledge with communities. This demands more than adding participatory techniques to existing curricula; it calls for cultivating an ethos of collaboration, humility, and ethical responsibility. Pedagogical environments must be open to uncertainty, structured around dialogue, and attentive to the situated knowledge of communities. Expertise needs to be reframed as a relational capacity, built through shared investigation, real-world engagement, and collaborative learning tools.

Ultimately, transformative approaches to housing and urban development begin long before a brick is laid and continue long after. They start with how questions are posed, power is shared, and space is held for difference, and they endure in the collective frameworks, relationships, and capacities built along the way. Building homes and knowledge must proceed together—grounded in community, oriented toward justice, and sustained through shared engagement.

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5.3

Co-creating housing solutions: A participatory toolbox for transdisciplinary research

Alexandra Paio, Androniki Pappa and Marja Elsinga

This chapter outlines and contextualises the development and application of a co-creation toolbox to support transdisciplinary research in affordable and sustainable housing within the RE-DWELL project. Early-stage researchers (ESRs) engaged in an iterative process of designing, testing, and refining tools—including cards, boards, and narrative frameworks—across collaborative events in Helsinki, Reading, Delft, and Barcelona. These tools operationalise systems, target, and transformation knowledge, facilitating engagement among academic and non-academic stakeholders, including community members, policymakers, practitioners, and industry representatives. Local implementations in Lisbon, London, and Nicosia illustrate how context-sensitive adaptations of the toolbox supported co-creation, dialogue, and strategic problem-solving in real-world housing initiatives. Through this process, ESRs strengthened transdisciplinary competences, including systems thinking, anticipatory and normative reasoning, strategic planning, and interpersonal skills. The findings indicate that participatory tools function as adaptable scaffolds for collaborative knowledge production, supporting inclusive decision-making, mutual learning, and the generation of actionable outcomes that contribute to sustainable, socially responsive, and contextually grounded housing solutions.

INTRODUCTION

A key aspect of transdisciplinary research in affordable and sustainable housing is the meaningful involvement of non-academic stakeholders—community members, policymakers, practitioners, industry representatives, and civil society organisations—in both defining the problem and co-creating viable solutions. These actors bring contextual knowledge, lived experience, and practical insights that are essential for addressing complex housing challenges in socially inclusive and context-sensitive ways. The success of such research therefore depends on how

effectively it integrates these diverse perspectives and knowledge systems to produce actionable, sustainable, and locally relevant outcomes.

Engaging a broad range of stakeholders, however, requires more than extending an invitation to participate. It demands the use of well-designed tools and methodologies that foster open dialogue, mutual learning, and shared decision-making. These instruments must help bridge disciplinary boundaries, overcome communication barriers, and cultivate trust among participants.

As part of their training in transdisciplinary research, ESRs played a central role in developing and refining participatory tools that evolved throughout the project. The process began at the RE-DWELL workshop held during the International Social Housing Festival in Helsinki (2022) and continued through a series of collaborative events, including the Summer School in Reading (2023), a plenary meeting in Delft (2023), and the Barcelona conference (2024). Each of these stages contributed to shaping and testing the tools, gradually strengthening their effectiveness and adaptability while helping ESRs develop competencies essential for transdisciplinary work, such as systems thinking, reflexivity, and the ability to navigate complex social and institutional contexts.

The final phase focused on applying the acquired knowledge, methods, and tools in real-world housing contexts. Pilot implementations in Lisbon, London, and Nicosia demonstrated the value of developing participatory tools tailored to specific local challenges, highlighting both their versatility and their ability to support context-sensitive solutions.

This chapter serves a dual purpose: it retraces the step-by-step development of the participatory toolbox across the network's activities and reflects on its application in diverse local contexts.

1. LEARNING THROUGH CO-CREATION

The participatory toolbox was developed as a collaborative effort involving ESRs, supervisors, and partner organisations. Its purpose was to operationalise the principles of transdisciplinarity, addressing pressing challenges in affordable and sustainable housing in Europe (Paio et al., 2024). The toolbox provided a structured set of participatory tools to support collaborative research, knowledge exchange, and dialogue among diverse stakeholders, enabling the network to move beyond disciplinary silos toward collective problem-solving.

Its development followed an iterative process of design, application, and refinement, grounded in experimentation and feedback across multiple network activities. At the 2022 International Social Housing Festival in Helsinki, ESRs began prototyping scenario-building activities using thematic boards that introduced concepts from across the three intertwined RE-DWELL research domains (Figures 5.3.1-5.3.3). These initial trials translated abstract theoretical insights into accessible, interactive methods of engagement (Figure 5.3.4).

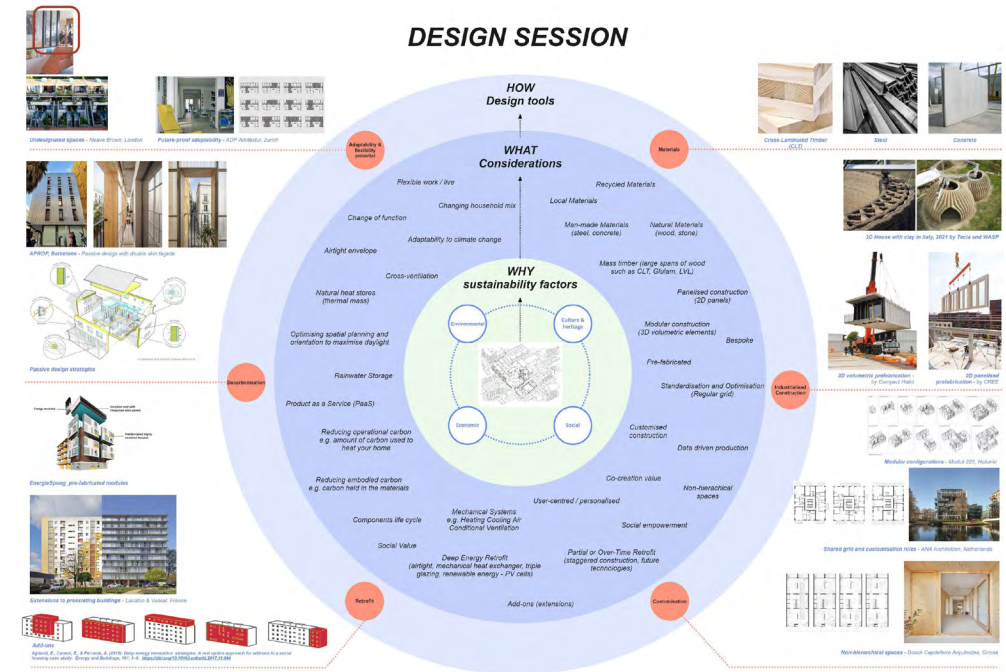


FIGURE 5.3.1: Scenario planning board for Design, Planning and Building, ISHF 2020.

COMMUNITY PARTICIPATION SESSION

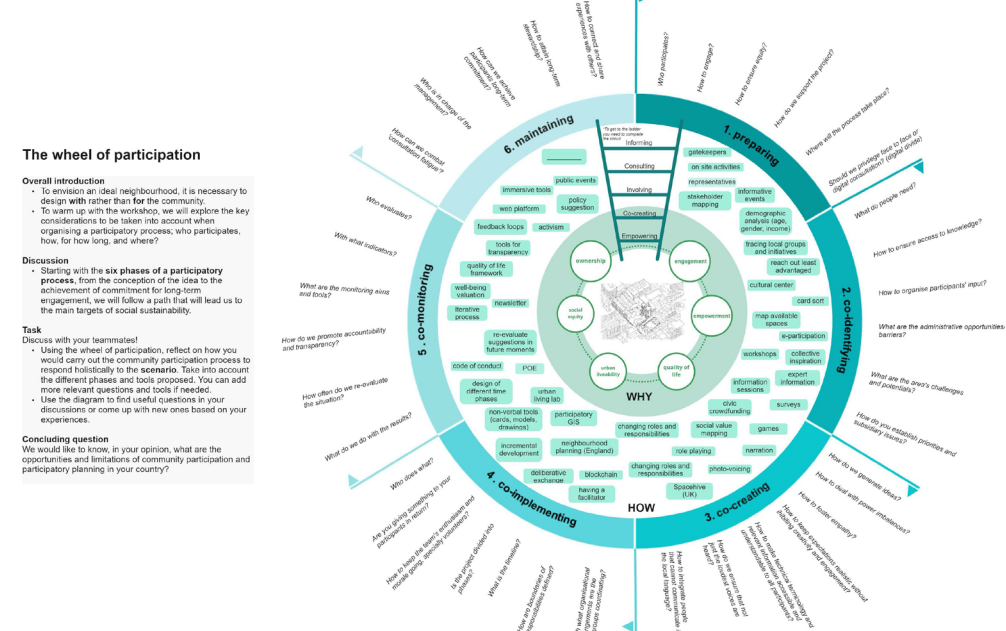


FIGURE 5.3.2: Scenario planning board for Community Participation, ISHF 2020.

POLICY SESSION

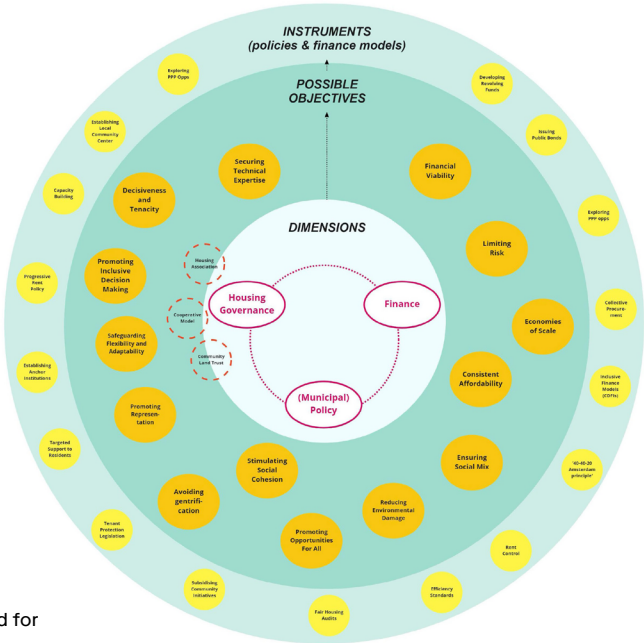
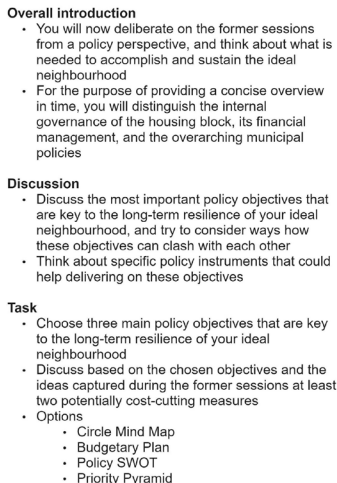


FIGURE 5.3.3: Scenario planning board for Policy and Financing, ISHF 2020.

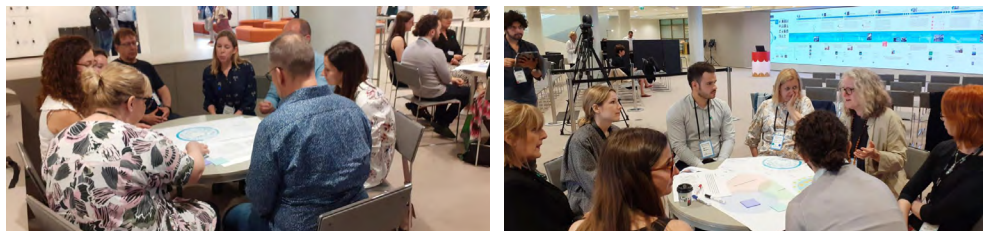


FIGURE 5.3.4: RE-DWELL workshop at the ISHF Helsinki.

The 2023 Summer School at the University of Reading marked a pivotal stage in the toolbox's evolution. Researchers and non-academic partners collaboratively tested a set of cards reflecting challenges studied by the ESRs and encompassing three types of knowledge: systems, target and transformation knowledge (Pohl & Hadorn, 2007). This exercise fostered shared understanding across disciplinary and experiential perspectives while enabling participants to engage with practical problem-solving.

During the network meeting at TU Delft in October 2023, the toolbox was further refined. Researchers and non-academic partners explored variations in facilitation techniques and adapted participatory formats for diverse institutional and cultural settings (Bammer, 2017; Klein, 2020). By the final conference in Barcelona in May

2024, a set of modular participatory formats—including card sets, actor maps, and impact pathways—had crystallised. These tools supported dialogue on policy trade-offs, stakeholder dynamics, and housing strategies, prompting collaborative reflection, surfacing tensions, and building competencies in facilitation, negotiation, and critical engagement (Sanoff, 1990; Schöpke et al., 2018; Buser & Schneider, 2021). Importantly, the tools were not prescriptive but served as scaffolding for co-creation and mutual learning.

The development of the toolbox exemplified a learning-by-doing approach, enabling ESRs to create dialogical spaces where knowledge could be integrated across disciplinary, institutional, and experiential domains. Its design emphasised adaptability and responsiveness, reflecting the broader goal of training researchers to navigate complexity, build trust, and co-produce transformative knowledge in the field of affordable and sustainable housing. Across all stages, RE-DWELL members could explore how participatory tools bridge disciplinary boundaries, overcome communication barriers, and support open dialogue, mutual learning, and shared decision-making.

2. TOOLKITS FOR TRANSDISCIPLINARITY IN URBAN AND HOUSING PLANNING

In recent years, several toolkits have emerged to advance inter- and transdisciplinary collaboration in urban and housing planning. Among them, *Toolkits for Transdisciplinarity* (Bammer, 2017), *Transdisciplinary Knowledge Co-Production: A Guide for Sustainable Cities* (Hemström et al., 2021), the UN-Habitat *My Neighbourhood* initiative (UN-Habitat, 2023), and the *New European Bauhaus Toolbox* (European Commission, 2024) offer structured approaches to integrating diverse forms of knowledge and stakeholder perspectives.

These resources share a focus on co-creation, inclusive participation, and iterative learning as key strategies for addressing complex urban challenges. Bammer's work provides conceptual and methodological principles for framing problems, mapping stakeholders, and managing collaboration across disciplines. Hemström et al. translate these principles into the urban context, presenting participatory tools for co-producing knowledge among researchers, city officials, and citizens. The UN-Habitat initiative puts these ideas into practice by offering community-focused tools and frameworks that support participatory planning and engagement in neighbourhood development. Finally, the NEB Toolbox serves as a comprehensive resource for municipalities and other organisations aiming to integrate NEB values into their projects, facilitating the co-design and implementation of sustainable, inclusive, and beautiful urban transformations.

In addition, participatory tools such as *Urbanology* (BMW Guggenheim Lab, n.d.), the *Affordable Housing Game* (Play the City, 2018), *Participatory Chinatown* (Gordon & Schirra, 2010), and the *BIP/ZIP Manual for Local Development* (Folgado et al., 2017) demonstrate how serious games and interactive approaches can translate these transdisciplinary principles into practice. These tools actively engage stake-

holders in decision-making, make complex trade-offs visible, and foster collective creativity in problem-solving, complementing the structured guidance offered by the broader toolkits.

Collectively, these resources informed the RE-DWELL toolkit, underpinning its structure, methods, and participatory approach.

3. COMPONENTS OF THE PARTICIPATORY TOOLS

The participatory toolbox was conceived to support collaboration and knowledge co-creation in processes addressing affordable and sustainable housing. Comprising a series of modular components—such as cards, boards, and narrative frameworks—it seeks to make complex urban challenges understandable, facilitate dialogue among diverse stakeholders, and enable the co-design of context-sensitive strategies. Drawing on the principles of participatory design and transdisciplinary research (Sanders & Stappers, 2008; Bammer, 2017; Dalsgaard, 2017), the toolbox is adaptable to different social, cultural, and institutional settings, functioning as a bridge between disciplinary, professional, and cultural perspectives. This adaptability fosters trust-building, iterative learning, and the integration of diverse forms of knowledge into actionable outcomes that can inform real-world decision-making.

Its development was structured around three core components:

- The roles of participants in co-creation.
- The cards and boards as facilitation tools.
- Narrative-driven engagement methods (Taylor, 1971; Quick, 2018).

Each of these components was tested and refined through a sequence of participatory events. The resulting insights—together with ongoing reflection and feedback—contributed to a cumulative learning process that shaped the evolution of the toolbox and its practical application in collaborative housing initiatives.

3.1 Collaborative roles in co-creation

Within the co-creation sessions during the network events, researchers and stakeholders assumed four complementary roles to support structured yet flexible collaboration:

- **Facilitators** guided inclusive participation, ensuring that all voices were heard and discussions progressed constructively, even in settings marked by power asymmetries (Sanoff, 1990).
- **Experts** provided disciplinary or professional knowledge, grounding deliberations in technical, regulatory, economic, or spatial frameworks (Bammer, 2017; Masser & Mory, 2018).

- **Stakeholder** representatives articulated lived experiences and local priorities, surfacing contextual knowledge and challenging abstract or technocratic assumptions (Kindon et al., 2007; Quick, 2018; Klein, 2020).
- **Evaluators** supported real-time learning, helping participants reflect on both the process and the quality of engagement, while identifying emerging insights and potential adaptations (Schäpke et al., 2018).

These roles are deliberately flexible, allowing reconfiguration depending on session objectives and context. They enabled researchers to develop facilitation strategies tailored to specific actor constellations, fostering collaborative leadership and shared responsibility in the co-creation process.

3.2 Cards and boards

Cards and boards in participatory processes function as facilitation tools that structure dialogue, make complex issues tangible, and guide collective thinking (Figure 5.3.5). By visualising relationships, processes, or systems, they help participants navigate abstract concepts, explore multiple perspectives, and collaboratively generate ideas. They support co-design and decision-making by providing a framework within which participants can organise, discuss, and translate knowledge into actionable strategies. In this way, these tools provide a scaffold for reflection, iterative learning, and shared understanding, fostering structured, inclusive, and collaborative engagement.

By the midpoint of the process, during the Reading Summer School, it became essential to organise the knowledge accumulated in the project—including individual ESR research, the collectively developed vocabulary, the case library, the identified challenges, and the experiences of researchers and partner organisations during secondments—into a structured language to facilitate its effective exchange and co-creation with stakeholders beyond the RE-DWELL network (Paio et al., 2024).

To achieve this, the project adopted the tripartite framework of knowledge, distinguishing systems, target, and transformation knowledge (Buser & Schneider, 2021). Systems knowledge addresses the structures, actors, and processes that shape the housing issues under investigation, helping researchers map the social, institutional, and physical dimensions of each context. Target knowledge defines objectives, priorities, and desired outcomes, guiding participants to clarify what successful solutions would look like in practice. Transformation knowledge focuses on actionable strategies, policies, or interventions, enabling researchers and stakeholders to co-design concrete steps for implementing context-sensitive housing solutions (→ see 2.1). By integrating these three types of knowledge into the participatory toolbox, the project provided a structured yet flexible framework for collaborative learning, dialogue, and problem-solving across disciplinary and institutional boundaries (Zonta et al., 2023).

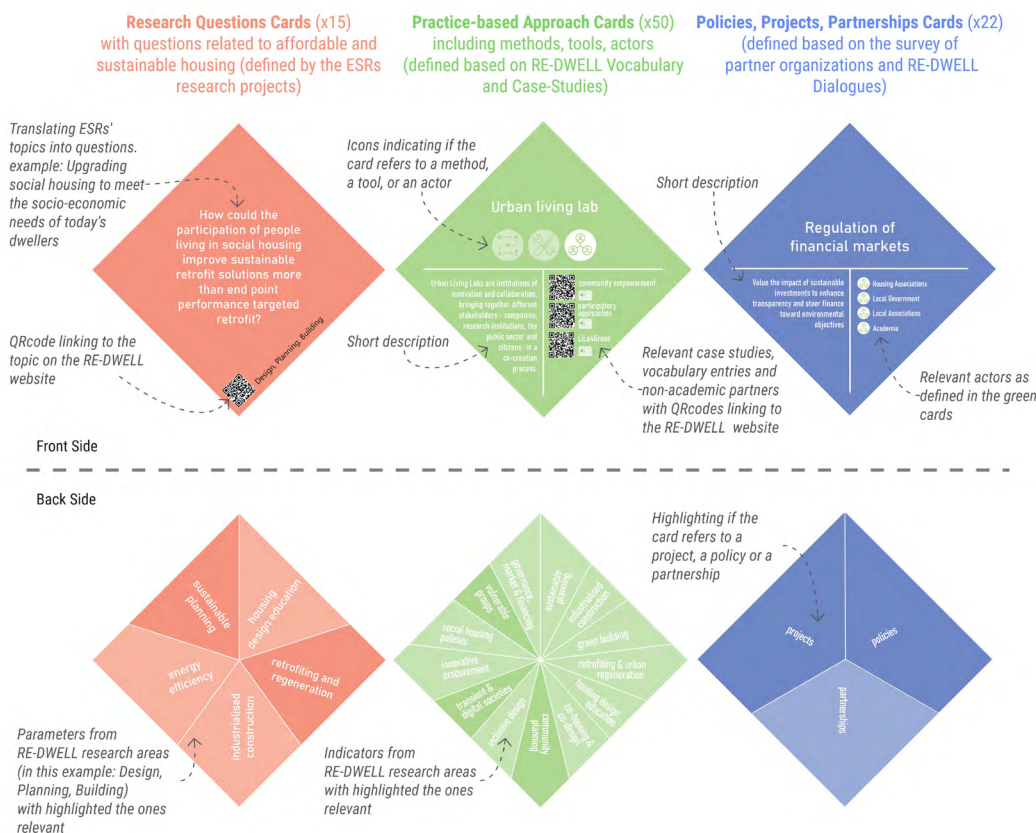


FIGURE 5.3.5: Examples of cards used in the Reading Summer School activity, 2023.
Source: Androniki Pappa.

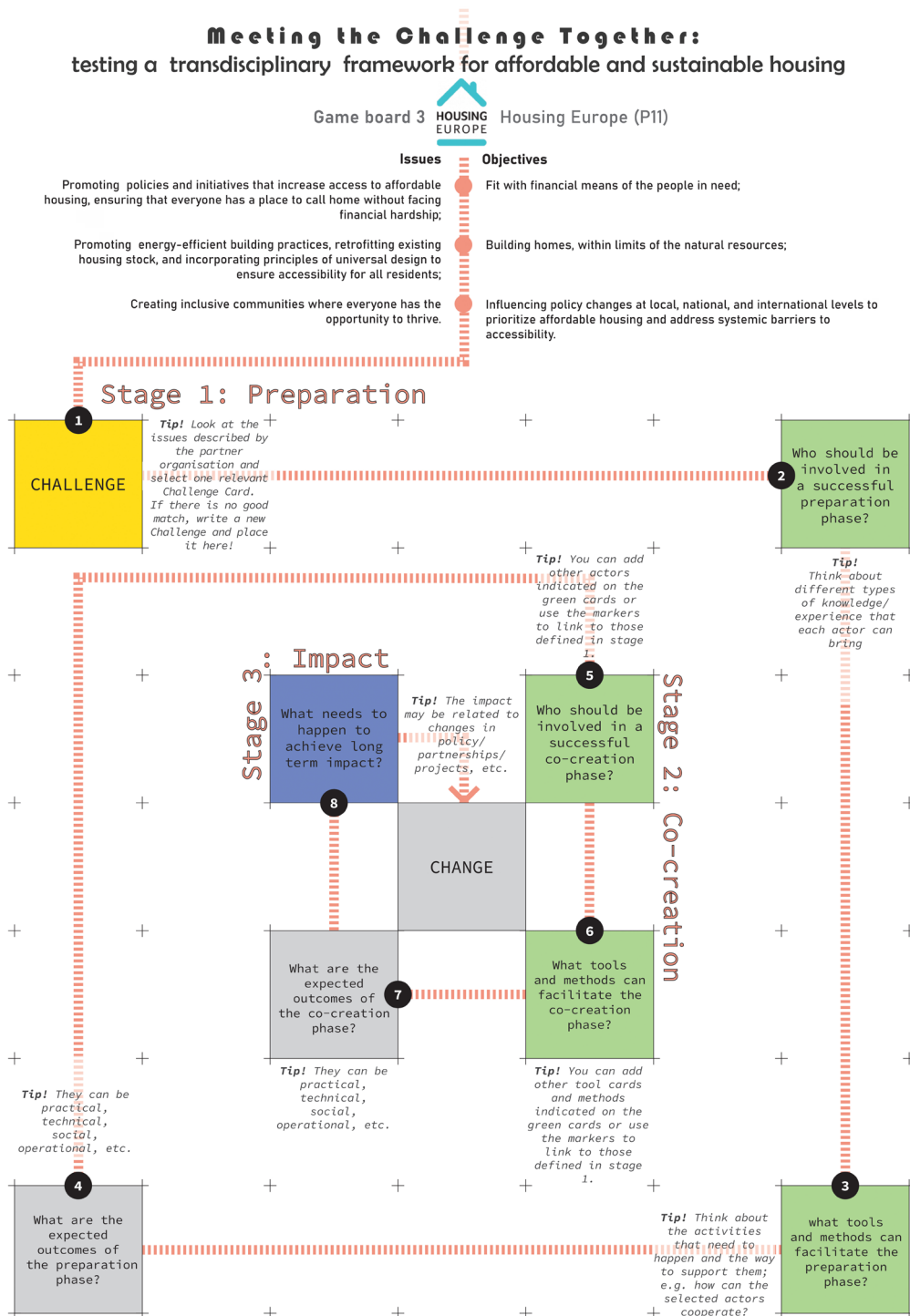
3.3 Narrative-driven engagement methods

During the hands-on process of developing and testing the toolbox, participants actively engaged with the tools through practical experimentation, iteration, and reflection. Narrative structuring was used as a central strategy to guide these experiences, providing a coherent storyline that framed activities, encouraged dialogue, and helped participants make sense of complex issues. Rather than relying solely on theoretical or prescriptive formats, sessions were designed as iterative, story-driven experiences, enabling participants to explore challenges, share perspectives, and co-create solutions in ways that aligned with co-design principles and transdisciplinary practices (Doucet & Janssens, 2011; Scholz & Steiner, 2015; Schöpke et al., 2018).

This narrative arc evolved into a flexible three-stage structure, adaptable to different socio-institutional contexts:

- **Framing the challenge.** In the participatory sessions, different actors were invited to articulate shared challenges, personal experiences, and key questions. Visual prompts, experiential storytelling, and abstract framing techniques were used to surface diverse perspectives and foster a collective understanding of the housing issues at stake (Kendon et al., 2007). This initial stage was essential to identify the systemic nature of challenges and align expectations across participants.
- **Exploring strategies.** The core of the participatory sessions focused on collaborative exploration. Through structured activities such as scenario-building, actor mapping, and card-based dialogues, participants engaged with multiple dimensions of the issue, surfacing trade-offs and synergies between possible actions (Sanoff, 1990; Sanders & Stappers, 2008; Bammer, 2017). These activities supported deliberation on potential pathways while ensuring context-sensitivity and openness to diverse forms of knowledge (Dalsgaard, 2017).
- **Imagining impact.** Participants reflected on the ideas generated during the sessions and developed strategic proposals and actionable visions. They used action planning boards, value maps, and roadmaps to visualise how proposed ideas could unfold in practice and affect various stakeholders (Zonta et al., 2023). This reflective synthesis helped align long-term aspirations with short-term interventions and revealed opportunities for coalition-building or institutional change.

This three-stage structure was not applied prescriptively but adapted and implemented across different network events. Its most refined articulation occurred during the final RE-DWELL conference in Barcelona (2024), where ESRs facilitated participatory sessions using the complete toolbox—modular cards, actor role-play, action planning boards, and impact mapping tools (Figure 5.3.6). These sessions, grounded in real policy challenges presented by institutional partners, demonstrated how narrative logic enabled the alignment of experiential insights with strategic foresight (Paio et al., 2024).



4. TRANSDISCIPLINARY COMPETENCES

Through their involvement in the design and testing of the toolbox, RE-DWELL participants—ESRs, supervisors and partner organisations representatives—learnt that the participatory toolbox is a valuable resource for fostering dialogue, clarifying complex housing issues, and supporting strategic collaboration across disciplines and stakeholders. Its key strength lies in integrating theory with practice, enabling abstract knowledge to be translated into participatory exercises. However, its effectiveness depends on adaptability to cultural and local contexts, simplification of content, and ensuring that all stakeholders—researchers, practitioners, policymakers, and community members—are working toward shared goals and understand each other's roles and perspectives. For the toolbox to be effective, it is necessary to balance complexity with practicality, tailoring it to the diverse needs of stakeholders in order to generate innovative, cooperative solutions for affordable and sustainable housing.

Through the development and application of the toolbox, ESRs also strengthened essential transdisciplinary competences (Wiek et al., 2011). They advanced their Systems Thinking by understanding the interconnectedness of social, economic, cultural, and environmental dimensions of housing. Their Anticipatory Competence was developed through scenario-building and impact-mapping, which encouraged them to assess trade-offs and explore future uncertainties. Working with stakeholders required Normative Competence, as ESRs reflected on competing values and priorities to negotiate desirable sustainability outcomes. They also built Strategic Competence by facilitating participatory sessions, co-designing actionable strategies, and adapting tools to different institutional and cultural contexts (→ see 2.2). Finally, they enhanced their Interpersonal Competence by acting as facilitators, negotiators, and collaborators—skills that enabled them to build trust, navigate power asymmetries, and support inclusive dialogue.

5. LOCAL IMPLEMENTATIONS

As the final step in the learning process, several ESRs—working in collaboration with partner organisations—designed and carried out local adaptations of the participatory toolbox, building on the guidelines developed during the network activities. These three implementations, conducted in Lisbon, London, and Nicosia, were not uniform replications but context-sensitive applications that both tested the toolbox as a set of methods and enriched it with the situated knowledge of local actors.

In each case, ESRs drew on the participatory methods and collaborative competences developed throughout the training programme. The implementations were designed as opportunities to both apply and critically reflect on the transdisciplinary learning process. Sessions combined the toolbox methods and tools (systems knowledge), a focus on a key challenge identified by the researcher (target knowledge), and engagement with practitioners and stakeholders who contributed contextual expertise (transformation knowledge), enabling a holistic and iterative

FIGURE 5.3.6: Example of boards used in the Barcelona Conference session, 2024.
Source: Androniki Pappa.

approach to knowledge co-production. Embedded in specific socio-institutional settings, this process created a bridge between theoretical insights and practical engagement, demonstrating the adaptability and relevance of the participatory toolbox across diverse contexts.

5.1 Lisbon: Retrofitting through community dialogue—Vila Romão, Lisbon Municipality (27 February 2024)

Led by ESR Lucia Chaloin, with support from peer Androniki Pappa and supervisor Alexandra Paio, the focus group “APROXIMAR” took place at Vila Romão, a historic affordable housing complex undergoing retrofitting in Lisbon (Figure 5.3.7). The session aimed to explore how the community could be meaningfully integrated into renovation projects, fostering collaboration among tenants, municipal staff, architects, social workers, construction personnel, and academics. A total of 22 participants engaged in a structured, three-stage process—preparation, co-creation, and impact—using a specially designed board and participatory cards developed through the RE-DWELL project.



FIGURE 5.3.7: Lisbon Municipality participatory session. Source: Alexandra Paio.

The session facilitated multi-perspective dialogue, bringing together stakeholders who do not normally interact to share knowledge, discuss trade-offs, and co-reflect on challenges related to energy efficiency, social inclusion, and daily life disruption during renovations. Residents’ perspectives were captured through post-it activities, highlighting bottom-up inputs alongside technical and municipal priorities. The discussions revealed tensions between these

local needs and top-down decision-making but fostered a collaborative environment that encouraged mutual understanding.

Evaluation of the session highlighted the need for simpler, more accessible materials, clearer explanations, and improved group dynamics to support community participation. Despite these challenges, participants valued the opportunity to interact across sectors, gain an overview of the entire renovation process, and contribute to socially grounded, adaptive retrofitting strategies.

5.2 London: Organisational reflection and social value—Clarion Housing Group (22 May 2024)

ESR Leonardo Ricaurte, supported by Clarion Housing Group representative Elanor Warwick, facilitated a focus group exploring opportunities and barriers to integrating post-occupancy evaluation (POE) with social value assessment across Clarion’s activities (Figure 5.3.8). Held at Clarion’s London offices with hybrid participation,

the session brought together staff ranging from directors to frontline personnel across multiple departments responsible for social value creation, regeneration, and resident engagement (→ see 6.1).

The participatory session applied the RE-DWELL transdisciplinary knowledge framework—systems, target, and transformation knowledge—using a specially designed board. Discussions enabled participants to translate abstract problem statements into actionable insights, consider multiple perspectives, and explore ways to embed social value systematically across roles. Key outcomes included



FIGURE 5.3.8: Clarion Housing Group participatory session, London. Source: Leonardo Ricaurte.

the need for a culture shift to recognise day-to-day social contributions, integrate social value into staff objectives, embrace qualitative outcomes alongside KPIs, and link POE processes to resident-focused social value generation.

The session demonstrated the value of multi-perspective dialogue in a large organisation, uncovering overlooked impacts, fostering shared understanding, and supporting strategic reflection. The hybrid format enhanced participation, and participants highlighted the importance of iterative sessions to sustain culture change and reinforce long-term commitments to social value.

5.3 Nicosia: Cross-actor planning and policy innovation—Cyprus Land Development Corporation (30 May 2024)

ESR Andreas Panagidis, with support from supervisor Nadia Charalambous, facilitated the focus group session “Collaborative Neighbourhood Planning” in partnership with the Cyprus Land Development Corporation (CLDC) in Nicosia, Cyprus (Figure 5.3.9). The session, held in the Dafni neighbourhood of Strovolos Municipality, explored the barriers and opportunities for improving neighbourhood planning through enhanced collaboration among stakeholders, including the Department of Town Planning and Housing, local authorities, the CLDC, and community members.

A board was employed in the activity, structured into three stages—preparation, co-creation, and impact—and used prompts, actor cards, and post-its to guide discussion. Key themes included enhancing communication and coordination among stakeholders, fostering engagement in collaborative problem-solving, and addressing neighbourhood-specific challenges such as vandalism and limited stewardship of public spaces.

Participants highlighted the value of multi-perspective dialogue, noting that including residents alongside government and housing actors helped ground discussions in local realities. Visual tools like maps and photos facilitated a neighbourhood-



FIGURE 5.3.9: Cyprus Land Development Corporation session, Nicosia. Source: Andreas Panagidis.

focused approach, bridging abstract planning discussions with tangible, context-specific challenges. Feedback emphasised the need for broader stakeholder participation, more time for in-depth discussion, and simpler materials to support understanding.

Overall, the session provided a structured, yet open forum for exploring neighbourhood planning issues, fostering knowledge exchange, and generating contextually appropriate, collaborative solutions for affordable housing and public space management.

6. FINAL REFLECTIONS

The development of the participatory toolbox within the RE-DWELL network illustrates how transdisciplinary research can be operationalised. Rather than producing a fixed set of methods, the evolving RE-DWELL participatory toolbox—shaped by iterative design, collaborative experimentation, and contextual adaptation—enabled ESRs to co-create knowledge across disciplinary and institutional boundaries and to develop competencies essential for transdisciplinary work, including systems thinking, reflexivity, and context sensitivity.

A key aspect of the toolbox's development was the integration of collaborative knowledge—including shared vocabulary, case studies, and identified challenges—into interactive formats, particularly card-based activities. While this integration could not be fully realised during the early prototyping stage at the International Social Housing Festival, subsequent iterations progressively incorporated these elements, enhancing the toolbox as a vehicle for mutual learning and dialogue. Incorporating systems, target, and transformation knowledge proved valuable in structuring discussions, though also introduced additional complexity that was sometimes challenging to manage in practice.

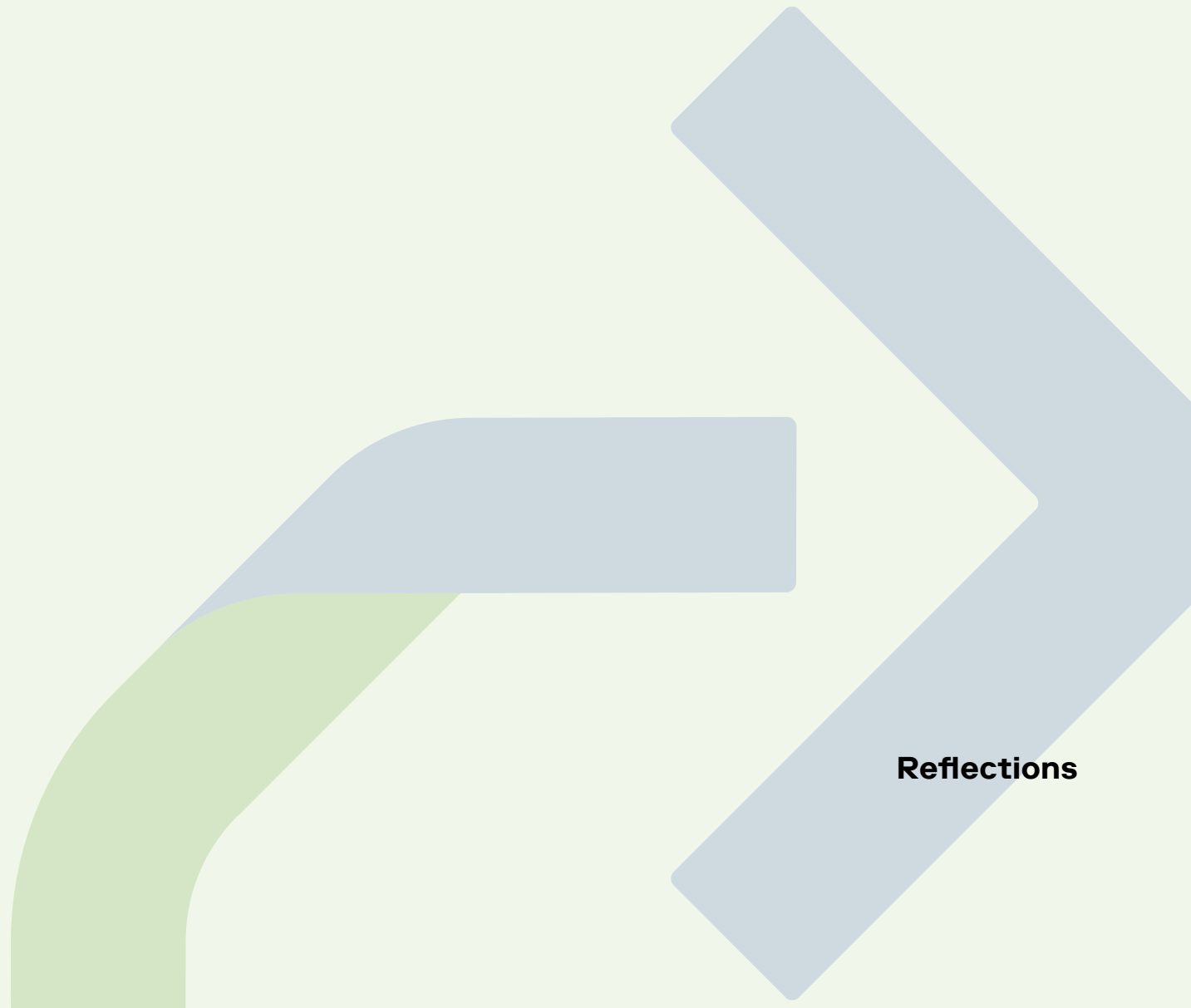
The three local implementations in Lisbon, London, and Nicosia demonstrated both the adaptability and the limitations of the toolbox. ESRs applied the tools according to their understanding of the structured language developed in the training sessions and in response to the constraints and opportunities of their local contexts. Variations in interpretation and clarity occurred, but these differences also highlighted the toolbox's flexibility and its capacity to be reshaped through situated engagement.

Collectively, the RE-DWELL experience shows that participatory tools for co-creation function best not as prescriptive solutions, but as scaffolds for knowledge exchange. They facilitated spaces for academic and non-academic actors to confront tensions, negotiate trade-offs, and generate actionable knowledge. For ESRs, this process was both a training exercise and a lived experience of transdisciplinarity, preparing them to address the complex and dynamic challenges of housing provision in Europe, in collaboration with the stakeholders involved.

Looking forward, the findings suggest that future research and training programmes should more actively support the integration of collaborative knowledge into participatory formats, while also providing clearer guidance and documentation to enhance coherence across contexts. At the same time, openness to adaptation must remain central, ensuring that tools stay responsive to local conditions. By embedding these practices in education and research, housing studies can more effectively foster just, sustainable, and participatory urban futures, directly contributing to the United Nations' Sustainable Development Goals.

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Reflections

The chapters explore the intersections between research domains, community engagement, and co-creation in the context of the work conducted within the RE-DWELL project.

Bežovan, Charalambous, and Csizmady offer a concise synthesis of the work across the three intertwined research areas—Design, Planning and Building; Community Participation; and Policy and Financing—tracing the evolution from individual, discipline-specific investigations to multidisciplinary and collaborative knowledge creation. The outcomes of the projects are connected through a set of shared challenges, encompassing technical and environmental concerns, such as reducing ecological footprints and enabling adaptable housing, as well as social, participatory, governance, and financial dimensions.

Collectively, the challenges identified by researchers reveal cross-cutting themes that extend beyond individual projects or disciplines, pointing to integrated priorities for future inquiry. These include circular and flexible design grounded in life-cycle thinking; resident participation and mass customisation supported by digital tools; and governance frameworks that align policies across scales while promoting equity, community empowerment, and financial and regulatory innovation.

The supervisors' integrative assessment of the collaborative knowledge construction process emphasises how new insights emerge when distinct disciplinary paths are intentionally connected. This convergence fosters shared understanding, uncovers interdependencies, and generates knowledge that could not arise within isolated domains. The reflective process can be applied iteratively, with collective insights feeding back into individual research trajectories, and extended to other contexts—for example, co-creation workshops where researchers, practitioners, and community actors participate, with external observers taking on the role of assessment, engaging in guided, collaborative reflection.

Through their involvement in the RE-DWELL project, Sentieri, Charalambous, and Paio explore how community engagement forms the connective thread linking three interrelated dimensions of sustainable and inclusive dwelling: community-led housing and public space, transdisciplinary engagement that bridges research and practice, and pedagogy grounded in participatory and situated learning. Housing and public space are co-constitutive, shaped through the active participation of residents and, in turn, shaping social relations, governance, and collective agency. Transdisciplinary engagement integrates diverse disciplines, stakeholders, and knowledge systems, enabling collaborative problem-framing and iterative co-creation grounded in community priorities and local knowledge. Participatory pedagogical activities, fieldwork, and hands-on exercises function as living laboratories, where researchers and students develop reflexive, ethical, and collaborative capacities while learning from communities and contributing to real-world processes.

Within this context, dwelling can be understood as a communal and participatory practice of inhabiting and co-producing space, through which relationships, knowledge, and the social, material, and cultural dimensions of lived environments are collectively shaped. By integrating building, research, and education, community-grounded practices foster sustainable living environments, with dwelling, transdisciplinary engagement, and participatory learning jointly shaping inclusive and resilient urban life.

Paio, Pappa, and Eslinga describe the development and application of a participatory co-creation toolbox designed to support transdisciplinary collaboration in sustainable and affordable housing. Developed collaboratively throughout the project, the toolbox—including cards, boards, and narrative frameworks—enabled researchers, residents, policymakers, and practitioners to share knowledge, explore challenges, and co-design solutions. Network events in Helsinki, Reading, Delft, and Barcelona informed its design, with the final version structured around systems, target, and transformation knowledge to structure dialogue and decision-making. Real-world applications in Lisbon, London, and Nicosia demonstrated its adaptability and context sensitivity.

Beyond its practical use, the toolbox served as a flexible scaffold for knowledge exchange, strengthening researchers' skills in facilitation, systems thinking, and collaborative problem-solving. These experiences illustrate both the potential and the challenges of operationalising participatory tools, suggesting that future research should further integrate collaborative knowledge into participatory formats and embed such practices in education and training to advance just, sustainable, and inclusive housing aligned with the UN Sustainable Development Goals.

6

Integration of academia and practice in transdisciplinary research

Integration of academic research and professional practices, illustrating how collaboration with practitioners supports the co-production of actionable knowledge.

6.1

Exploring the value of secondments in housing research: A reflective review
by Mahmoud Alsaeed and Leonardo Ricaurte

6.2

Bridging academia and practice in transdisciplinary housing research

Exploring the value of secondments in housing research: A reflective review

Mahmoud Alsaeed and Leonardo Ricaurte

This chapter draws on the first-hand experiences of the co-authors during their secondments hosted by South Yorkshire Housing Association (SYHA) in Sheffield and Clarion Housing Association in London. Using systematic reflective writing, it presents two complementary narratives: one examining how early engagement in practice can shape research direction and theoretical development, and another reflecting on how such engagements support empirical validation and research progression. Together, the narratives illustrate how secondments can enhance research relevance through stakeholder engagement and knowledge co-production, while also surfacing challenges related to organisational alignment, ethics, and academic–industry expectations. On this basis, the authors reflect on the conditions under which secondments can meaningfully support transdisciplinary research over time.

INTRODUCTION

Secondment is commonly defined as a management practice in which an employee is temporarily transferred to another department within the same organisation or to an external entity for a specified period, with the expectation of returning to their original role upon completion (Parry & Urwin, 2009; Silva et al., 2015). In research, secondments involve temporary placements beyond the home institution, offering researchers the opportunity to gain practical experience, expand networks, and develop expertise in new contexts. Such arrangements foster knowledge exchange, support skill development, and promote collaboration across institutional boundaries (Chikuku et al., 2017).

This practice is increasingly recognised across sectors as a valuable mechanism for cross- and inter-organisational knowledge transfer (Lampraki, 2022). Initially conceived primarily as a staff development tool, secondments have evolved to benefit all actors involved, namely, the secondee, the home organisation, and the host institution (O'Donoghue Jenkins & Anstey, 2017). Their form, duration, and

purpose vary considerably, depending on the objectives of the participating entities (Wang et al., 2010).

In the UK, secondments are a well-established practice, particularly in the health-care sector. The National Health Service (NHS), for example, has long facilitated secondment programmes for nurses and managers to enhance experience and build capacity across institutions (Lampraki, 2022). Similarly, academia has adopted secondments through partnerships with industry, enabling researchers to apply their expertise in real-world settings while gaining practical insights. Despite this growing uptake, the literature still lacks a comprehensive articulation of secondments' benefits, particularly in fields requiring transdisciplinary approaches (Lampraki, 2022).

To assess the value of secondments within housing research, it is essential first to situate them within the broader framework of transdisciplinary research. As Weiss (2021) explains, the aim of research is to generate knowledge, deepen understanding, and inform theory, practice, and decision-making across fields (Weiss, 2021). These multi-scalar objectives give rise to inherently complex modes of knowledge production, which vary significantly across disciplines. In housing research, this complexity is particularly evident, as the process of knowledge production is often shaped by discipline-specific methodologies. Du Toit et al. (2022) argue that this complexity is further exacerbated by the compartmentalised nature of housing research methods, which remain largely unsynthesised.

In response to the complex challenges facing the housing field, transdisciplinary research has gained increasing prominence because of its capacity to integrate diverse disciplinary perspectives (Alsaeed et al., 2022). This is particularly important for addressing multifaceted issues such as housing affordability and sustainability (Salama & Alshuwaikhat, 2006). Transdisciplinary research not only bridges academic debate and practical application but also creates conditions for knowledge exchange between researchers and industry. Within this context, secondments can be understood both as a mechanism for such exchange and as a transdisciplinary form of knowledge production. In this capacity, they offer a way of linking theoretical inquiry with real-world practice in relation to pressing housing challenges.

The methodological approach adopted in this chapter is systematic reflective writing. As Zuckermann and Rajuan (2008) explain, this method involves a structured and intentional process of documenting and analysing professional or educational experiences. Rooted in pedagogical and professional learning contexts, it emphasises critical engagement with practice through evidence-based reflection, typically guided by specific frameworks or prompting questions.

Unlike informal reflection, systematic reflective writing follows a deliberate and organised format that promotes deeper analysis and academic rigour. It enables practitioners to move beyond surface-level descriptions by fostering objectivity by explicitly distinguishing between actual events and personal interpretations.

Moreover, it facilitates the integration of theory and practice by encouraging the connection of lived experience to broader conceptual frameworks, thereby deepening understanding and informing future decision-making (Zuckermann & Rajuan, 2008).

The discussion draws on the first-hand experiences of the co-authors during their secondments as part of the RE-DWELL project, hosted by South Yorkshire Housing Association (SYHA) in Sheffield and Clarion Housing Association in London—both RE-DWELL core partners. It presents two reflective narratives: one exploring secondment as a gateway for research through M. Alsaeed's placement at SYHA, and another examining secondment as a method of validation, by L. Ricaurte, illustrating how such engagements support research validation and progression. Together, these narratives examine both the benefits and challenges associated with secondments and their role in addressing housing-related issues. Maintaining a reflective, personal tone, the final section synthesises key insights and offers recommendations for enhancing secondments as a methodological tool in transdisciplinary housing research.

1. SECONDMENT AS A GATEWAY FOR RESEARCH (BY M. ALSAEED)

Founded in 1972, South Yorkshire Housing Association (SYHA) is a not-for-profit housing association based in Sheffield, known for its commitment to delivering tailored housing and social support programmes across the region. At the start of my doctoral research in late 2021—hence the term gateway—I undertook a three-month secondment at SYHA. The aims were threefold: to bridge academic research with real-world housing challenges; to understand the policy landscape surrounding housing and sustainability; and to disseminate knowledge beyond academia through reflective writing, reports, and conference contributions.

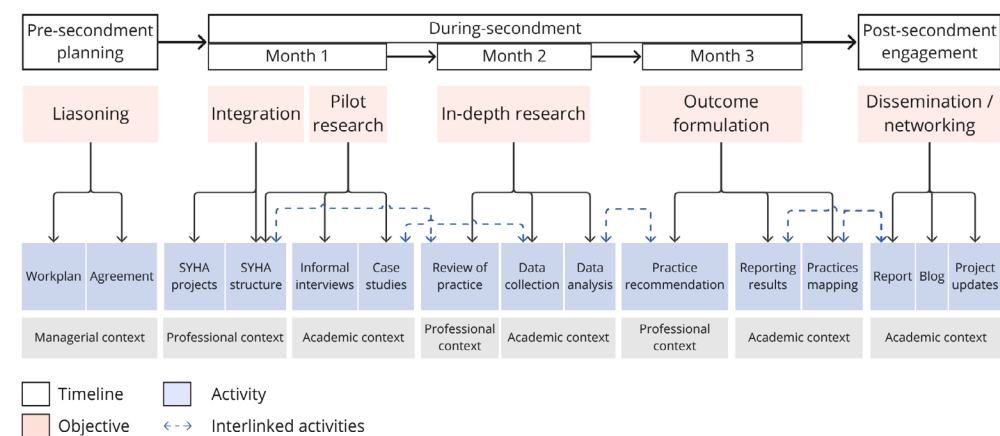


FIGURE 6.1.1: Secondment work plan. Source: Authors.

During the secondment, I followed a predefined work plan (Figure 6.1.1) that involved qualitative and quantitative research, case study analysis, informal interviews, and collaboration with housing and sustainability experts. I critically assessed SYHA's sustainability strategies, housing standards, and UK regulations, working across academic and professional modes of inquiry—from testing hypotheses and simulations to analysing procedures and stakeholder engagement.

This engagement generated a range of insights, revealed several challenges, and contributed to the development of a distinctive perspective on how secondments can shape housing research. These dimensions are discussed in the following sections.

1.1 The value of the secondment

One of the most immediate benefits of the secondment was improved access to timely and reliable data. Analysing SYHA's case studies played a crucial role in ensuring that my doctoral research questions remained grounded in real-world challenges. Exposure to organisational workflows, particularly the need to coordinate data rapidly across teams, highlighted the importance of data-informed decision-making. This exposure significantly enhanced my analytical capabilities, improved decision-making accuracy, and strengthened the practical orientation of my research.

The secondment also provided valuable space to test, validate, and further develop the theoretical framework underpinning my PhD. The conceptual lens—focused on sustainability integration in social housing—was enriched by SYHA's applied knowledge, internal policies, and practical constraints. For instance, examining net-zero strategies and internal governance mechanisms related to sustainability revealed limitations in my initial assumptions about how sustainability is perceived in the UK. These insights prompted theoretical refinement, resulting in a more nuanced and contextually grounded analysis.

As a platform for knowledge exchange, the secondment enabled me to apply academic skills within SYHA's professional environment, supporting both critical reflection and operational development. Through a theoretical evaluation of SYHA's practices, I identified areas for improvement and created a conceptual flow-chart to clarify decision-making (Figure 6.1.2, left), which in turn highlighted perception-related challenges. In response, I developed an online platform featuring SYHA-specific training details and a glossary of terminology intended to improve communication and clarity (Figure 6.1.2, right). These outputs became integral to the doctoral research, deepening my understanding of sector policies and supporting a more transdisciplinary, practice-oriented approach to housing challenges.

While these outputs directly impacted my doctoral research, their precise influence on SYHA practices remains difficult to measure. Nevertheless, their contribution can be considered from two complementary perspectives. Formally, the outcomes

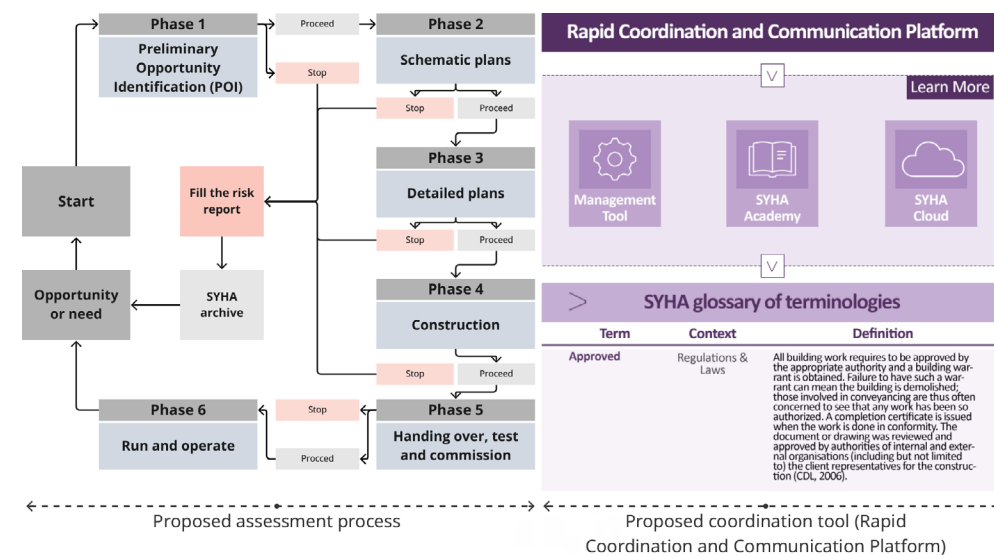


FIGURE 6.1.2: Secondment contributions to SYHA.
Source: Authors.

were documented in a detailed report submitted to SYHA and the RE-DWELL network, with the potential to inform wider discussion. Informally, feedback gathered through interviews, dialogue, and engagement with the platform prototype indicated that the knowledge exchange was perceived as timely and relevant. In this respect, the placement operated as a space of mutual learning in which theory and practice were brought into relation.

1.2 Obstacles and mitigation strategies

As with most research activities, the secondment presented several challenges, both anticipated (e.g., integration) and unforeseen (e.g., data structure). While the predefined work plan (Figure 6.1.1) helped mitigate expected difficulties, unforeseen challenges required flexibility in situ.

A key anticipated challenge concerned the management of dual identity. This sense of liminality in research mobility—described by Lampraki (2022) as occupying a transitional or “in-between” state—meant that I was neither fully embedded in my home institution nor fully integrated into the host organisation. This dual affiliation was mitigated through pre-secondment coordination and by dedicating time early on to understanding SYHA's organisational structure, projects, and working practices, as well as through sustained dialogue with staff to establish mutual expectations and a shared working framework.

Another challenge was related to reporting obligations. Although the work plan allowed flexibility in format and frequency (e.g., briefs, presentations), aligning

these outputs with the aims of my doctoral research required a clear strategy. To address this, I adopted a structured approach, with each report focusing on a specific research question, secondment objectives, and detailing the corresponding methods and findings.

A further significant challenge involved reconciling institutional research practices with data from the professional sector. Academic institutions enforce rigorous ethical protocols for data collection and handling, which do not always align with the data management practices of housing associations. For instance, integrating SYHA case studies into my doctoral research required careful attention to personal identifiers and data protection, ensuring compliance with institutional ethical guidelines. Meeting these requirements introduced additional layers of complexity into the research process.

Time constraints further intensified these challenges. Despite having clear objectives—such as conducting qualitative research on the state of housing stock—the limited duration of the placement required rapid familiarisation with new organisational structures and processes. In addition, much of the data provided by the host organisation was in raw or meta formats, necessitating skills in data processing, classification, and analysis. To address this, the home institution offered tailored training sessions, including guidance on using qualitative analysis software such as NVivo, which proved essential for effectively managing and interpreting the data.

1.3 Housing challenges, secondments, and transdisciplinarity research

Among the various challenges facing housing stakeholders, several recurring issues emerged that aligned closely with my doctoral research. These include the misalignment between theoretical housing concepts and terminology and their practical applications (Granath Hansson & Lundgren, 2018), fragmented collaboration among housing actors, and the need for innovative housing practices (Alsaeed, 2025). While these challenges are well documented, less attention has been paid to approaches that move beyond interdisciplinarity toward more explicitly transdisciplinary mechanisms, such as secondments.

From a conceptual standpoint, the secondment played a pivotal role in identifying and interpreting the terminologies actively used in practice. While academic discourse often relies on standardised concepts, organisational usage is shaped by operational priorities and professional roles. For instance, within SYHA, sustainability was interpreted differently by asset management and sustainability teams. Occupying an external yet embedded position, I was able to identify these discrepancies and facilitate dialogue aimed at establishing common ground. This process supported clearer internal communication and strengthened collaboration with external stakeholders, contributing to the development of a shared language.

From a practice and policy perspective, the placement served as a mechanism for integrating external research expertise into organisational processes. This engage-

ment created conditions for policy, research, and practice to be brought into closer relation around sustainable housing solutions. Moreover, such arrangements offer housing associations a structured and relatively low-risk way to explore innovative approaches, including modern methods of construction and standards such as Passivhaus. By facilitating collaboration between housing associations and researchers, secondments create a platform for mutual learning: housing associations gain access to cutting-edge research perspectives, while researchers acquire first-hand insight into operational constraints and sector-specific challenges. As a result, secondments contribute to a more grounded understanding of emerging construction systems, their applications, and their broader implications for housing sustainability.

To this extent, it can be argued that undertaking a secondment at an early stage of research holds significant potential to inform the overall direction of the study and shape how the researcher engages with the identified challenges.

2. SECONDMENT AS A METHOD OF VALIDATION (BY L. RICAURTE)

I conducted my secondment at [Clarion](#), the largest housing association in the UK, with more than 125,000 homes across the country. Initially, the placement was scheduled to last four months, from November 2022 to February 2023, however, this period was subsequently extended to enable additional data collection and analysis. This included multiple rounds of interviews with staff and residents from a housing estate, as well as a validation focus group aimed at discussing findings and recommendations.

This engagement marked the beginning of the empirical phase of the doctoral research, shifting my focus to the social value of housing and design, and the management practices that help generate it at the housing estate scale. More than a year into my PhD—which began in September 2021—the secondment proved crucial in facilitating access to a real-world context embedded within the phenomenon under investigation. It enabled direct engagement with key informants, opportunities for first-hand practical observations, and access to secondary data sources, all of which contributed to the development of a pivotal case study.

2.1 The value of the secondment

In my case, the secondment became a significant stepping-stone within a long-term, evolving research endeavour such as a PhD. It did not occur in isolation but formed part of a carefully planned research strategy, structured several months in advance through a detailed work plan. Its purpose, grounded in an emerging research approach and sustained collaboration with the organisation under the RE-DWELL framework, helped ensure reciprocal value for both parties (Figure 6.1.3).

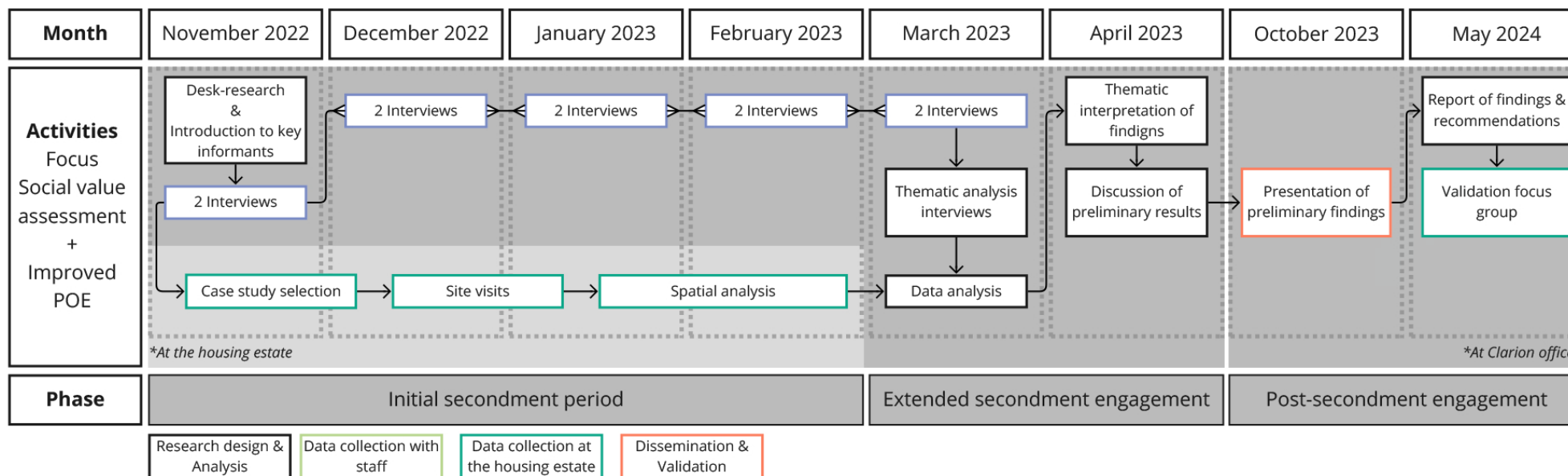


FIGURE 6.1.3: Secondment work plan, including extended and post secondment engagements.
Source: Authors.

Supported by a nurturing supervisory environment, where my secondment supervisor was involved from the outset, the placement was not constrained by its short-term nature; rather, it enabled the establishment of a flexible and collaborative framework for knowledge exchange.

A key enabling condition was the presence of a research-intensive department within the organisation, where practitioners actively engage in both in-house research and collaborative projects at the interface of academia and practice. This context reflects a critical requirement for effective collaboration: an industry partner with an understanding of the inquiry process itself. For example, my secondment supervisor holds a PhD and has extensive experience conducting research and disseminating outputs in both academic and industry settings, positioning her as a research-savvy collaborator well-versed in the organisation's action-oriented and fast-paced working environment. I consider her a key facilitator, crucial in shaping the research strategy by providing insight into the organisation's internal dynamics, enabling access to research participants, expediting the integration process for the secondee, and mediating potential tensions between the organisational and scholarly priorities.

This experience underscored the importance of delivering tangible value in industry-academic collaborations. While academic research often progresses at a slower pace, practitioners typically require timely and actionable insights. Navigating this tension required adaptability, openness, and a willingness to move beyond

conventional academic comfort zones. During the placement, I participated in a range of professional activities, including industry conferences, inter-organisational working groups, and project-specific initiatives aimed at developing organisational strategies. These engagements varied in their immediate relevance to my research and in their benefits for the organisation, but collectively they fostered a sense of reciprocity and long-term collaboration. They also expanded my pool of research participants and supported the organisation of a confirmatory focus group, contributing to both scholarly and professional development.

2.2 Obstacles and mitigation strategies

Understanding a secondment as a collaborative research activity—where both parties agree to examine organisational practices through a research-based lens—also implies that compromises must be negotiated. Organisations provide resources, and institutional support, while researchers contribute expertise and an external analytical perspective. In turn, organisations may expect benefits or have specific demands concerning the nature of the study, research outputs, or data access. For this reason, transparency and open communication channels are essential to fully harness this form of collaboration. Likewise, organisations must be receptive to constructive criticism and be willing to disclose any potential conflicts of interest related to sensitive data exposure.

During my placement, I signed a non-disclosure agreement (NDA). Combined with the rigorous ethical review undertaken at the University of Reading, this ensured confidentiality and responsible data handling throughout the research process. While potential tensions could have arisen between emerging findings and organisational perspectives, these did not compromise analytical independence or the transparent presentation of results. Ongoing formal and informal discussions with staff—including a feedback workshop at the end of the placement—helped sustain trust and mutual understanding.

A key stakeholder group in the research was the residents of the housing association. While direct engagement with residents was a significant advantage of the secondment, it also introduced several challenges. One concern related to potential impact of perceived power imbalances or misunderstandings regarding the research objectives and the implications of participation. As access to residents was mediated by the housing association, there was a risk that the study might be seen as led or commissioned by the housing provider. This perception could influence residents' responses—either through fear of potential repercussions from their landlord or through heightened expectations of tangible outcomes from the research.

To mitigate these concerns, strict ethical and communication protocols were followed, such as visibly wearing University of Reading identification during interviews and clearly explaining—both verbally and through consent forms and information sheets—my affiliations and the nature of my collaboration with Clarion.

2.3 Housing challenges, secondments, and transdisciplinary research

My doctoral research explored the potential of activities such as post-occupancy evaluations (POEs) to capture the often elusive social value created at the housing estate level, particularly as expressed through the relationship between the built environment and residents' lived experiences. Clarion proved to be a particularly

appropriate host organisation, given its leading role and influence in developing and implementing social value assessment methodologies within the housing sector. Semi-structured interviews with staff provided valuable insights into a wide range of issues, including sectoral practices, organisational approaches to social value, and intervention-driven initiatives aimed at fostering it. These conversations helped situate theoretical concerns within concrete organisational contexts, strengthening the empirical grounding of the research.



FIGURE 6.1.4: Participation in international industry events during the secondment (Clarion offices, London, 2023). Source: Authors.

One of the most generative moments occurred several months after the initial interviews, through a validation-focused focus group. This session enabled participants to engage in an open and comprehensive dialogue about the themes raised during earlier interviews, now enriched by group reflection and the presentation of preliminary findings. The focus group served three interrelated purposes: first, to enable cross-validation of findings and the collection of additional critical data; second, to enact a practical iteration of the RE-DWELL methodology through a hands-on workshop (→ see 5.3); and third, to act as a feedback mechanism, by collecting input from a diverse group of Clarion professionals, fostering meaningful dialogue about organisational challenges.

Additional examples of how secondments offer a valuable platform for networking and knowledge exchange—even across broader industry networks—included participation in a joint meeting of the European Federation for Living (EFL) Social Topic Group and Eurhonet—a network of public and social housing providers—hosted by Clarion (Figure 6.1.4), as well as involvement in a collaborative workshop with the Quality of Life Foundation at the Housing Diversity Network Conference 2023 in Birmingham, which showcased ongoing initiatives between the two organisations. These settings provided a productive environment for practical learning where I could present and contextualise my research, its objectives and theoretical underpinnings within real-world housing scenarios.

A defining feature of this collaborative framework was the opportunity to engage directly with residents of the estates managed by the organisation. In transdisciplinary research, lay participants are not merely informants but active contributors whose knowledge and lived experience are essential to addressing complex societal challenges. This engagement reinforced the importance of inclusive, resident-informed research practice.

Overall, the placement contributed significantly to the development of both interpersonal and technical skills required for research in a practice-oriented field such as housing studies. Engagements of this kind can contribute to strengthening evidence-based decision-making and learning cycles within housing organisations. Throughout numerous formal and informal interactions, I observed that my contributions were generally well received, with staff often acknowledging the distinctive position researchers hold in framing problems—particularly research questions—from an inquiry-driven standpoint.

3. CONCLUSIONS

The two secondments described in this chapter offer valuable insights into the practical and theoretical dimensions of housing research. Each placement provided distinct opportunities to engage with different stakeholders, develop critical skills, and apply research methodologies in real-world settings. The following reflections synthesise key learnings across both experiences, highlighting their contribution to advancing evidence-based practice and supporting more collaborative approaches within the housing sector.

3.1 Benefits and challenges

Secondments provide substantial benefits to all parties involved, while also presenting inevitable challenges. Drawing on the authors' reflective experiences, Figure 6.1.5 summarises the key benefits and challenges encountered.

These experiences offered more than a simple exchange of knowledge; they yielded significant benefits for the secondees, including skill development, enhanced career prospects, and broadened interdisciplinary understanding across diverse

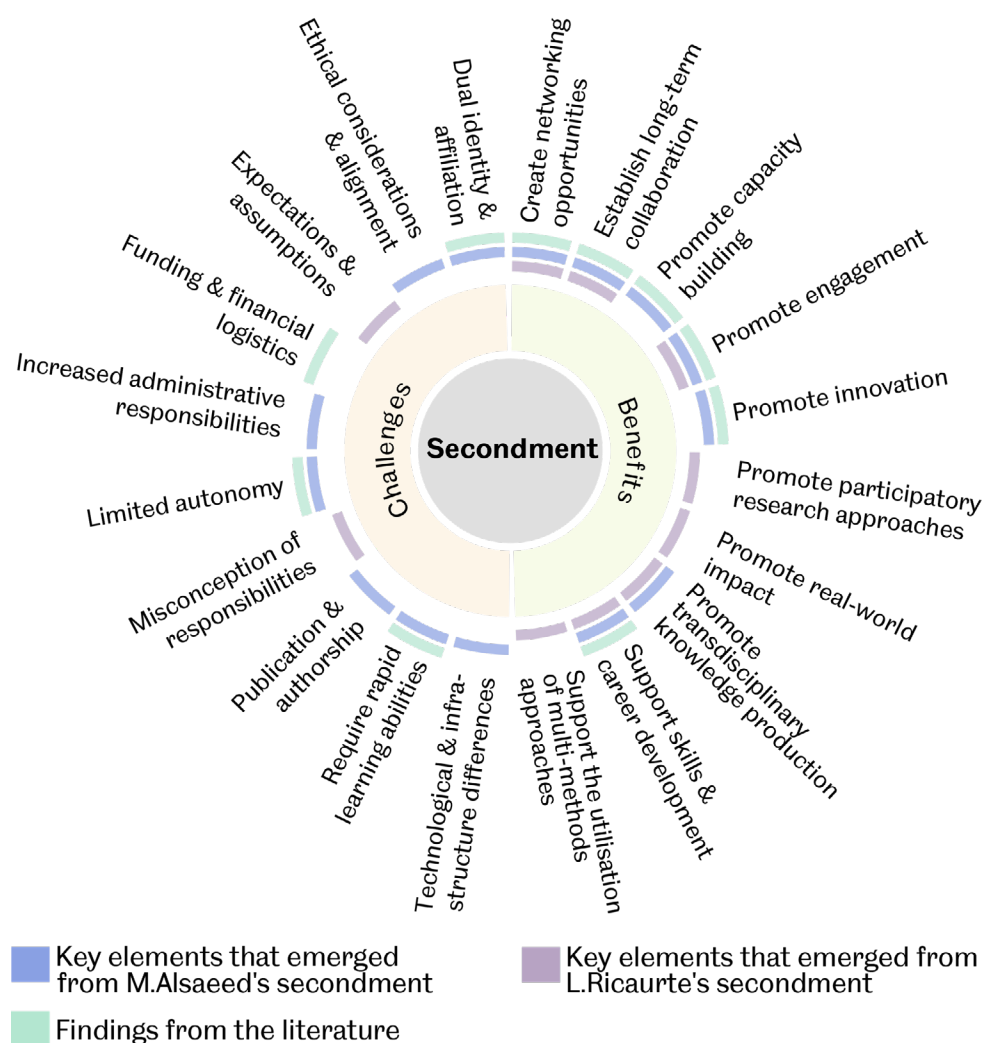


FIGURE 6.1.5: Secondment benefits and challenges.
Source: Authors.

working environments. Participation in professional networks and engagement with unfamiliar problems often supported motivation and professional confidence. For host organisations, secondments brought diverse expertise and fresh perspectives, stimulating innovation while strengthening links between research and practice. Host organisations similarly benefited from expanded research networks and improved collaboration. The return of secondees fostered knowledge transfer, facilitated research-practice integration, and contributed to organisational learning and policy implementation. Additionally, secondments enabled the application of multi-method approaches in housing research, such as qualitative and participatory methods, case studies, and in-depth interviews.

At the same time, several challenges emerged. Organisational transitions can lead to dual affiliation, thereby increasing administrative burdens, particularly where technological infrastructures differ significantly between organisations. Moreover, unclear agreements around authorship and publication expectations at the outset can give rise to tensions, potentially hindering research progress. Although host organisations often benefit from the expertise secondees bring, financial constraints and misaligned or overly ambitious expectations may result in frustration for all parties involved.

3.2 Role in addressing housing challenges

Secondments enable researchers to work directly with housing stakeholders, offering situated insight into sectoral challenges, operational dynamics, and policy implementation. Drawing on the two experiences reported here, we suggest that such arrangements hold significant potential for addressing housing challenges—particularly in the UK, where the secondments took place—while also offering relevance for housing research contexts beyond this setting through their emphasis on sustained knowledge exchange between academia and practice.

First, secondments help bridge the gap between theory and practice. Housing concepts and terminology are often abstract or inconsistently applied across sectors. Through immersive collaboration, researchers can critically assess and align theoretical frameworks with the practical language and needs of housing associations. For example, in the SYHA case, varying interpretations of “sustainability” across departments were reconciled through the researcher’s external analytical perspective, improving internal communication and coherence. Similarly, in the Clarion case, the researcher’s theoretical focus on residents’ capabilities to assess social value aligned with—and helped illuminate—existing and evolving resident engagement practices.

Second, secondments facilitate transdisciplinary collaboration by embedding researchers within organisational processes. This contributes to learning and innovation within housing organisations while shaping academic research trajectories. At SYHA, academic engagement led to practical tools—such as decision-making flowcharts and an online coordination platform—that enhanced data management

and communication. These outcomes illustrate how such arrangements can support knowledge co-production and expand the sector's capacity to tackle complex challenges, including modern methods of construction and sustainability standards such as Passivhaus.

Third, secondments enhance research quality by providing access to timely, practice-based data and enabling validation of findings through stakeholder engagement. The Clarion case demonstrates this clearly: close collaboration with staff and residents generated deeper insight into social value assessment, while focus groups provided structured opportunities to test and refine emerging findings, enhancing the research's robustness and real-world relevance.

Beyond these research-related benefits, secondments also support professional development, skill-building, and networking. They expose researchers to diverse stakeholders—including housing professionals, residents, and policymakers—while granting housing organisations access to current academic thinking. Participation in sector-wide events, such as Clarion's involvement with the European Federation for Living and the Quality of Life Foundation, further highlights the broader value of these collaborations in promoting dialogue and innovation across the housing field.

Finally, secondments promote more inclusive, resident-informed research. As long-term stewards of the built environment and resident wellbeing, housing associations are well-positioned to support transdisciplinary approaches. Engaging residents as active contributors to knowledge creation helps ensure that research addresses real societal needs, reinforcing the role of secondments as an essential mechanism for advancing housing research.

3.3 Recommendations

Building on the insights and reflections outlined above, the following recommendations aim to guide future secondments and amplify their impact within the housing sector. They focus on maximising benefits, addressing challenges, and fostering stronger collaboration among researchers, housing organisations, and residents. Figure 6.1.6 summarises three key phases—pre-secondment, during-secondment, and post-secondment—each accompanied by targeted recommendations informed by the transdisciplinary nature of housing research.

- **Pre-secondment recommendations.** To ensure meaningful integration into the host organisation, researchers should begin by familiarising themselves with fundamental housing concepts, terminology, and the broader landscape of housing research, including policy, design, sustainability, governance, and social equity. Understanding the host organisation's internal structure and service model is essential for identifying synergies with the research agenda.

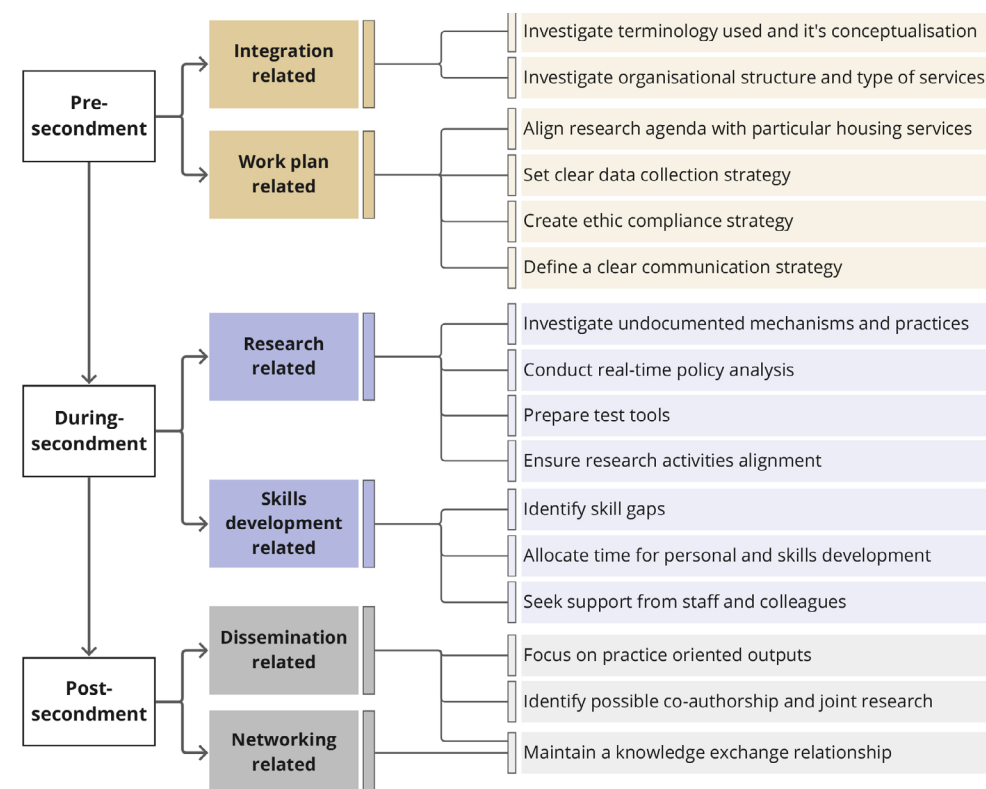


FIGURE 6.1.6: Secondment timeline and recommended activities.
Source: Authors.

A clear, structured work plan should be developed at an early stage to ensure coherence between secondment activities, research objectives, and the host organisation's operational context. Data collection strategies should be directly tied to research questions while fitting seamlessly with organisational practices. Equally important is the early definition of ethical protocols and communication procedures, especially when handling sensitive data related to tenants or service delivery.

- **During-secondment recommendations.** Where possible, researchers should move beyond passive observation and actively engage in day-to-day operations, such as tenant assessments, maintenance planning, or regeneration activities. These hands-on activities provide deeper insight into the realities of housing delivery and highlight gaps between policy intentions and actual outcomes.

Monitoring real-time policy developments—such as emerging housing rights legislation or decarbonisation requirements—and assessing their implica-

tions for the host organisation is also essential. Secondments additionally offer a valuable opportunity to test and refine research tools (e.g., housing quality indicators or retrofit assessment frameworks) in collaboration with practitioners.

During this period, researchers should take advantage of the opportunity to strengthen practical skills—such as qualitative data analysis, performance evaluation techniques, or collaborative planning methods—in order to enhance both their research and professional development. Close collaboration with experienced staff deepens understanding of housing delivery realities and supports the relevance and applicability of the research.

- **Post-secondment recommendations.** Following the completion of the secondment, research findings should be translated into practical outputs—such as toolkits, policy briefs, or evaluative frameworks—tailored to professional audiences. Researchers are encouraged to maintain collaboration by co-authoring publications or developing joint research proposals with practitioners.

Maintaining relationships with key contacts within the host organisation can help sustain the long-term impact of the secondment while supporting ongoing mutual learning. Such continuity can strengthen the connection between academic research and housing practice.

Drawing on the authors' experiences, this chapter has examined the role of secondments as a meaningful and practice-engaged method in housing research. At the same time, we acknowledge the limitations of our reflections and the need for further investigation. In particular, future studies could explore secondees' experiences in greater depth and incorporate the perspectives of host organisations to better understand how secondments influence practice and contribute to organisational learning.

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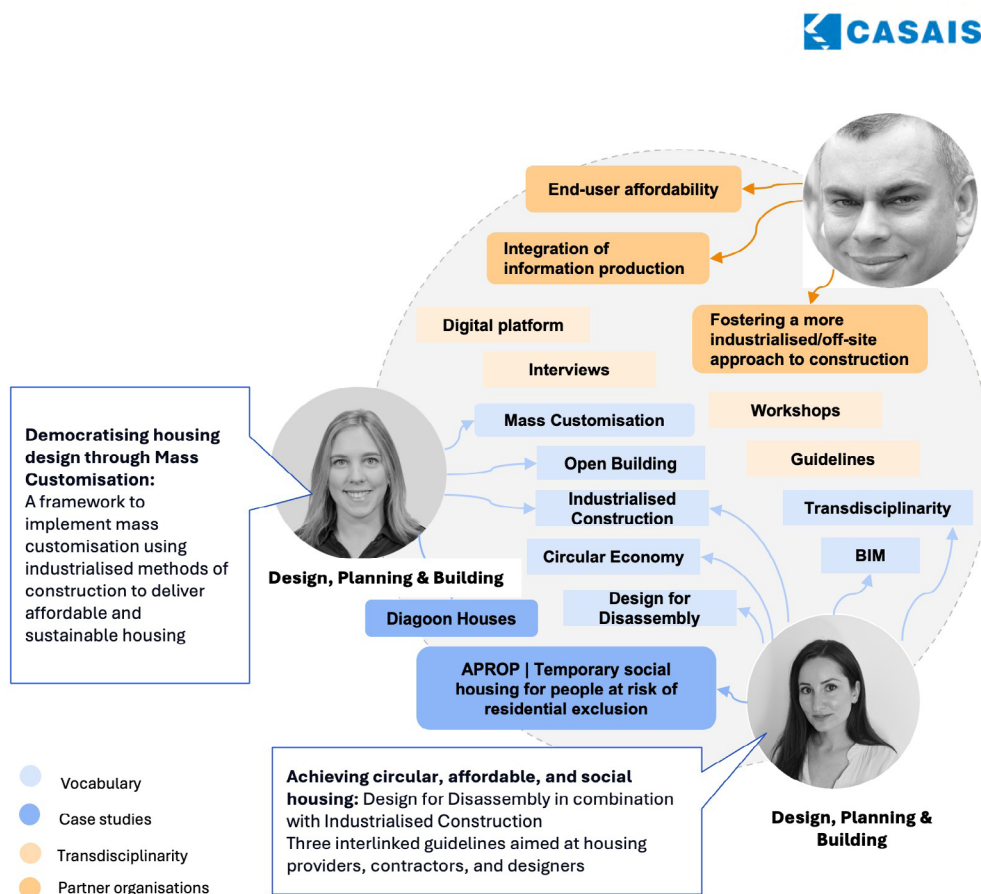
6.2

Bridging academia and practice in transdisciplinary housing research

Twelve non-academic organisations have participated in the RE-DWELL network, including a local administration (City of Lisbon), governmental organisations (CLDC, Incasòl), a construction company (CASAIS), housing associations (Clarion, SYHA), a housing cooperative (Sostre Cívica), a civil society organisation (CERANEO), European networks for social and affordable housing (EFL, Housing Europe), a research centre (MRI), and a social service organisation (BMSZKI). These organisations have hosted secondments for early-stage researchers, enabling them to conduct research in a professional setting (→ see 6.1). In addition, they have actively participated in network meetings, contributed to the organisation of workshops and seminars, and collaborated in the development and local application of the participatory toolkit (→ see 5.3).

A DIALOGUE BETWEEN EARLY-STAGE RESEARCHERS AND PROFESSIONAL ORGANISATIONS

In April 2023, almost two years after the start of the network activities, partner organisations were invited to complete an online questionnaire to provide their feedback on the work conducted during the first two years of interaction with early-stage researchers. The questionnaire focused on their experiences with the secondments, expected project outcomes, and the anticipated impact on both their practice and wider society. Insights from the collaborative research conducted within the network, including terms of the vocabulary and illustrative case studies, were used as references in the dialogue. The responses were then collated and shared with the ESRs, who prepared two follow-up questions for the partners that had hosted their secondments. This dialogue took place during an online plenary meeting of the network in May 2023. An excerpt from this dialogue is presented next.



CASAIS

Secondees: Annette Davis, Carolina Martín

Q: What are the key factors the housing construction sector should consider to enhance industrialisation in a sustainable way, balancing on one hand the optimisation of productivity, resources, and workforce, and on the other hand the affordability, flexibility, and adaptability of the resulting housing?

A: Casais addresses challenges such as limited on-site workforce, low productivity, and inefficient resource use by strengthening industrialised and off-site construction. Although modular methods are often perceived as fragile or restrictive, the company has successfully challenged these prejudices through a growing portfolio of completed projects.

At the same time, the sector should integrate information across design, construction, and operation, covering all stages from surveys to facility management through smart digital twins. Minimising information loss and ensuring team interoperability improves productivity, optimises resource use, and enhances workforce efficiency. Fully deployed BIM supports housing affordability through fewer errors, better predictability, and cost control, while also promoting sustainability by reducing material waste.

Achieving this level of industrialisation and sustainability requires a shift from long-standing construction practices and overcoming resistance to industrialised components. To support this transition, Casais is implementing company-wide digital workflows and extensive team training to ensure smooth adoption, manage financial risks, and foster a culture of innovation. Despite these obstacles, the company remains committed to a cleaner, more efficient construction sector with less physically demanding site work, recognising that maintaining the status quo would create greater long-term problems.

Q: How can Casais persuade clients to incorporate circular housing—designed to be disassembled and reused—when circular solutions are currently more expensive than conventional construction?

A: While client contracts often prioritise profitability over sustainability and affordability, Casais seeks to demonstrate the value of circular housing through practical experience and successful project examples. By combining modular, industrialised construction with material passports and the buildings as material banks (BAMB) philosophy, the company can show how circular approaches enhance productivity, reduce waste, and deliver flexible, adaptable housing. Increasing public awareness and demand for sustainable housing is also crucial to create market conditions that make circular solutions both attractive and viable.

CERANEO

Secondees: Alex Fernández, Marko Horvat, Anna Martin

Q: What is the main problem in Croatia regarding housing provision for vulnerable groups, especially the homeless?

A: The main issues include the need for a systematic evaluation of housing needs, services, and policies, the development of housing innovations, and the strengthening of fragmented governance structures, alongside more effective advocacy and a greater media sensitivity to homelessness, all of which impact policy implementation.

Q: What are the main directions to improve service provision for the homeless in Croatia?

A: Improving service provision for the homeless requires promoting innovative approaches such as Housing First and advocating for an effective housing allowance programme to support excluded populations, particularly tenants in the unregulated private rental sector. It is also crucial to strengthen public debate around affordable and sustainable housing and to support evidence-based policies that address emerging social risks. CERANEO actively involves students and other vulnerable groups in producing and testing innovative solutions while building a network of stakeholders engaged in regular discussions and research efforts.

Clarion Housing Group

Secondees: Tijn Croon, Leonardo Ricaurte

Q: When generating actionable outputs from secondments, how can we reconcile the common expectation of tangible results within time-constrained practical settings with the slower pace of academic research? How can we balance contributing to knowledge with creating real-world impact in transdisciplinary housing research?

A: Clarion is already adopting a transdisciplinary approach, collaborating with building physicists, social scientists, sustainability experts, community groups, architects, designers, and other professionals. However, reconciling practice and research requires a clear understanding of the differences in pace, priorities, and expectations between academic projects and day-to-day housing operations. While academic research may focus on thorough analyses and methodological rigour, practice often demands timely, actionable solutions. Recognising and bridging these differences is key to effective collaboration in transdisciplinary housing studies.

Q: What are your thoughts on the trade-off between developing a pan-European assessment for affordable and sustainable housing and creating a framework that accounts for local contexts?

A: Clarion recognises the complexity of housing systems and the multiple dimensions involved, from governance and finance to community participation and sustainable planning. While a pan-European assessment offers the advantage of comparability and shared standards across countries, it must be balanced with sensitivity to local contexts in order to account for specific regulations, social conditions, and housing practices. Striking this balance enables the development of tools that are both robust at a European level and practical and actionable in local settings.

European Federation for Living - EFL

Secondee: Tijn Croon

Q: How can platforms like EFL facilitate cross-learning and strengthen the connection between theory and practice? What is the added value of sharing best practices and providing policy and practice recommendations that are directly applicable in the context of affordable and sustainable housing?

A: We strongly believe in best practices because they inspire our members to apply recommendations and guidelines in practice. Furthermore, policy and practice recommendations should be genuinely applicable for housing associations, which requires a strong connection between theory and practice. At EFL, we serve as a platform for cross-learning, leveraging our insight into the diverse needs of our members across Europe.

Q: What are the main obstacles faced by European social housing providers, and what strategies could be used to overcome them?

A: European social housing providers face financial, organisational, and policy-related obstacles, including urgent issues such as energy poverty. These can be mitigated through cross-disciplinary collaboration, knowledge exchange, and practical, evidence-based guidance that links sustainability and affordability goals with tenants' real needs. RE-DWELL could support this by providing a framework to align different policy levels—national, international, and organisational—and by facilitating collaboration among technical, financial, and social disciplines, as well as sharing best practices across European housing associations.

Housing Europe

Secondees: Mahmoud Alsaeed, Tijn Croon, Alex Fernández, Saskia Furman

Q: How can the diversity across European countries, including variations in quality of housing stock, ownership types, involved actors, and policy/regulatory frameworks, be effectively addressed to avoid a “one size fits all” approach in the Renovation Wave?

A: To address the wide diversity across Europe, it is essential that Renovation Wave strategies remain flexible and context-sensitive rather than relying on prescriptive, one-size-fits-all checklists. This means acknowledging the significant differences in housing stock quality, ownership structures, policy and regulatory frameworks, and the roles of various actors across Europe. Transdisciplinary collaboration, involving housing providers, residents, policymakers, and other stakeholders, ensures that renovation projects are both feasible and responsive to local conditions while meeting broader sustainability and affordability objectives.

Q: Which social aspects of the energy transition do you think should be prioritised and why are these so important?

A: The social aspects of the energy transition that should be prioritised include affordability, reducing energy poverty, and providing support for vulnerable residents. Addressing these issues alongside environmental objectives is critical to ensure that low-income households are not disproportionately burdened. Supporting residents with additional services, instead of focusing solely on physical improvements, helps communities adapt to change, encourages inclusive participation, and strengthens the long-term effectiveness of sustainability policies. Equity and inclusion are also essential to prevent social segregation and to meet the needs of vulnerable populations. Prioritising these social dimensions ensures that the energy transition is socially sustainable, broadly accepted, and inclusive across different social groups.

Incasòl

Secondees: Alex Fernández, Saskia Furman

Q: Which are the difficulties that prevent the effective cooperation of a public agency, such as Incasòl, with the private sector to provide affordable and sustainable housing (e.g., sharing objectives, regulatory and financing constraints, land availability)?

A: Effective cooperation between Incasòl and the private sector is challenged by several structural and procedural factors. Regulatory and public procurement

frameworks are often slow and inefficient, delaying project timelines—housing provision from initial planning to occupancy can take up to five years. Resource constraints within Incasòl limit the capacity to actively manage partnerships, while private developers frequently have limited local expertise in affordable housing projects. Additionally, aligning objectives between public agencies and private actors requires clear contractual frameworks, yet the absence of established mechanisms can hinder collaboration.

Q: In which ways could the private sector be involved in refurbishing the social housing building stock (e.g., providing monitoring and maintenance, construction and engineering services, energy-efficient solutions) and which guidelines would be necessary to regulate such cooperation?

A: The private sector could contribute to social housing refurbishment through construction and engineering services, monitoring and maintenance, and implementing energy-efficient solutions. To ensure effective cooperation, guidelines must be clearly defined and locally adapted, taking into account legal, economic, and social contexts. Structured frameworks—such as right-to-build contracts—can help clarify roles, responsibilities, and objectives, enabling private actors to complement public efforts while ensuring affordability, sustainability, and compliance with local regulations.

Lisbon City Council

Secondee: Androniki Pappa

Q: Moving beyond housing to dwelling, what types of municipal instruments can foster the creation of sustainable neighbourhoods, giving great value to the social dimension? Who is invited to participate in multi-sectoral collaborations, and what is the role of each urban actor in the production and governance of the city?

A: Municipal instruments to foster sustainable neighbourhoods include participatory programs such as the BIP/ZIP initiative, co-governance structures at the parish level like GAIP-Freguesia (“Support Office for Priority Interventions in the Parish”), and a taxonomy of governance models that facilitate communication and shared decision-making between the municipality and local organisations. Multi-sectoral collaborations involve the municipality, community groups, and residents, with each actor sharing accountability in planning and implementing strategies that enhance quality of life, social cohesion, and territorial integration. These structures ensure that local knowledge and citizen participation inform decision-making and contribute to sustainable urban development.

Q: What are the necessary tools and institutions to facilitate intersectoral dialogue and secure a shared language of understanding between experts and non-experts?

A: The Lisbon Municipal Housing Charter (soon to be submitted for approval) establishes three main priorities to guide the city's housing policy: (1) increasing and improving housing supply—public, in partnership, and private; (2) reducing asymmetries in access to housing; and (3) regenerating neglected areas, guided by mapping of priority zones.

To achieve these objectives, essential tools and institutions include data-driven systems that identify the needs of populations, communities, and neighbourhoods, alongside mechanisms that foster participatory citizenship and citizen engagement in urban development. Optimised processes and methods are also necessary to enhance coordination within the municipality and with external stakeholders. Collectively, these tools facilitate effective intersectoral dialogue, bridge the gap between technical experts and community actors, and support agile, transdisciplinary approaches to sustainable urban governance.

Thematic insights from follow-up interviews

The questionnaire that follows was completed by partner organisations as a reflective response to their involvement in the RE-DWELL project and developed specifically for the purposes of this book. It brings together practitioner perspectives on collaboration with academia, transdisciplinary working, and the translation of research into practice. Organised around key thematic prompts, the responses capture how partners experienced knowledge exchange, navigated differences between academic and operational logics, and reflected on the role of research in addressing real-world housing challenges.

The questions were answered by Pere Picorelli (P.P.) from Incasòl, Jose Téllez (J.T.) from Sostre Cívic, Elanor Warwick (E.W.) from Clarion, and Ana Zadelj Kovač (A.Z.K.) from CERANEO.

BRIDGING THEORY AND PRACTICE: INTEGRATING ACADEMIC AND PRACTICAL INSIGHTS

Connecting academic research with practical experience allows for a meaningful dialogue between theory and the realities of practice. This interaction produces knowledge that is not only methodologically rigorous but also relevant and actionable in real-world contexts.

How do practitioners navigate the interface between academic research and operational needs? How can academic insights guide decision-making, and how can the flexible, provisional nature of practice help shape enduring research priorities and methods?

P.P.: We tend to have more projects about implementing solutions so we get involved in networks that deal with either project management issues, like industrial sites, where there is a need to improve how things work. Usually, there is some academic involvement in these networks, but not just academia.

J.T.: We find that academic collaboration is most valuable when it translates research into actionable decisions—on land access, financing, governance, affordability, or community development. Academic work helps to clarify options, test scenarios, and provide comparative evidence that strengthens strategic choices. At the same time, practice serves as a real-world stress test. Implementation reveals constraints and unintended consequences that theory alone cannot anticipate. This feedback loop helps refine research priorities and methods, producing outcomes that are both methodologically sound and operationally viable.

E.W.: I think there is a difference between an academic approach and a practical approach in that, in practice, there is very rarely an opportunity to fully articulate those differences. Often, it's: "We have this problem to solve—who do we need to call on, and what are their views?" By that point, we have usually already leapt to:

“This is the solution, and it is going to require these different inputs or perspectives.” In academia, by contrast, there is more opportunity to consider what these perspectives might be, or where they might lead. Quite often, we arrive at a solution without asking where people are coming from or what emerges from these different views. A lot of project activity is provisional in the way research is undertaken in practice.

NAVIGATING DIFFERENCES IN TRANSDISCIPLINARY COLLABORATION: PERSPECTIVES, LANGUAGE, AND INTEGRATION

Collaboration across disciplines brings together diverse perspectives, professional languages, and approaches to problem-solving. While such differences can foster innovation and enrich knowledge, fully integrating them is often challenging.

How do different disciplines interpret concepts and methodologies, and how can communication be managed to ensure that expertise is understood and applied effectively? What strategies can support genuine integration across projects while acknowledging differences in language, perspective, and approach?

P.P.: Academics are so used to their own language that they sometimes get lost in arguments. For practitioners, it can be difficult to follow because we are not familiar with that language. In that sense, the specific research field is not the most important aspect. What matters more is the scope: what exactly we are researching in academia and how that connects with our interests as practitioners working in that area.

J. T.: The most persistent gaps are language and timelines. Academia often works through analytical frameworks, theoretical positioning, and iterative critique. Practice, however, operates within regulatory, financial, and political constraints that require implementable solutions within defined timeframes. We address this gap by agreeing early on shared operational definitions, clarifying expectations regarding outputs, and building in regular validation moments where research insights are translated into concrete decisions.

E.W.: Geographers think about space differently from architects. For geographers, space is where activities and people exist. For architects, it is something you make, form and create.

CO-DEFINING RESEARCH PRIORITIES: STRUCTURING AGENDAS WITH PRACTITIONER INPUT

Developing research that responds effectively to real-world housing challenges requires early and active involvement of practitioners in framing research agendas. Collaborative definition of priorities ensures that academic inquiry reflects both operational realities and strategic aspirations. This involves recognising where practitioner experience can guide problem identification, while also acknowledging the iterative and uncertain nature of research.

How can researchers formulate questions that remain open to unexpected findings while still addressing practitioners' concerns? What mechanisms enable practitioners to share experiential knowledge—successful and unsuccessful alike—to inform emerging research priorities?

P.P.: I believe it makes much more sense for us to take part in defining the research project. That way, it can be better adapted to our needs and areas of interest. Being involved in shaping the topic from the start would really make a difference.

J.T.: Co-defining priorities works best when starting from real dilemmas—land access, development timelines, financing, inclusion, and community quality. It is essential to agree upfront on what “useful results” will look like—whether guidelines, indicators, or decision-support tools—and to treat bottlenecks and failures as integral parts of the learning process.

E.W.: We can all work together on what makes a good research question. Quite often, those questions can be a bit different. As a group of housing associations, we're interested in a range of issues, some that are very immediate and others that are more long-term. As practitioners, sometimes we are asked: “I need an answer to this problem, but the parameters for the solution are limited.” That's fine, but we have directors coming to us: “Can you tell me what will happen when our residents say this...?” and you go: “Whoa, they might say exactly the opposite ... if we knew the answer, it wouldn't be research.” The lovely thing about one of the ESR's research projects was that it made us go back to some work we had done as an organisation in 2013, which we had stopped and given up on. Actually, it gave real value to a past piece of practitioner insight. I think it is all about extracting the potential benefits out of research. And when things do not work out as you want, being able to go back, dig, and evaluate. Not giving up on an idea too quickly, and realising that there is always some lesson to be learned, from failure and from things that go wrong.

A.Z.K.: Researchers could formulate the research questions and hypotheses, but practitioners can put on the agenda the problems that are relevant right now, the ones actually happening. They can also contribute their experience, not only with past solutions that did not work, but also with innovative approaches they found in their local communities. So why not share these and see if they might apply to future problems as well?

TRANSLATING HOUSING POLICY INTO PRACTICAL, INCLUSIVE SOLUTIONS

Implementing policy in practice requires adapting high-level strategies to specific local conditions, taking into account social, economic, and environmental contexts. Achieving sustainable and inclusive outcomes involves navigating multi-level governance, identifying actionable steps, and balancing priorities such as affordability, equity, and long-term impact.

How can broad policy goals be translated into concrete actions? What are the key levers and obstacles that determine whether policies achieve their intended social and environmental outcomes?

P.P.: “Policy should be like that!” Well, that sort of change is very difficult to implement, because our scope as an organisation is quite narrow—we are public developers. I understand that it would be interesting, for instance, if we could provide social housing at a third of the actual price, because that would improve social balance and, in general, benefit society. But we cannot do that, it depends on regional development. This is just an example of such a multi-governance approach. Sometimes, in a quite rigid structure like ours, it is not easily achievable.

J.T.: The strongest levers tend to be public–community collaboration combined with non-speculative land arrangements, such as long-term surface rights or use agreements, and stable long-term financing. The main barriers are high land costs, administrative complexity, and the absence of durable instruments that secure affordability and inclusion over time.

E.W.: All the challenges proposed by ESRs, I think, are great. All of them are worth exploring, but even so, they are looking at the big questions. It’s only when you get down to the granularity of practice that you can ask: “Okay, how does this go from being an aspiration to a concrete action? What are the variable levers that make this challenging?” I completely agree that we need to support and incentivise a holistic, socially inclusive approach, but we also have to ask: “What is that social inclusive approach? How do we tackle all of the pieces? How do we get there? And is that the real challenge that really hampers us?”

A.Z.K.: In my experience, it is certainly possible to achieve change in advocacy with decision-makers and to increase public awareness, but implementation may take longer because it often depends on political will, which is tied to election cycles in each country.

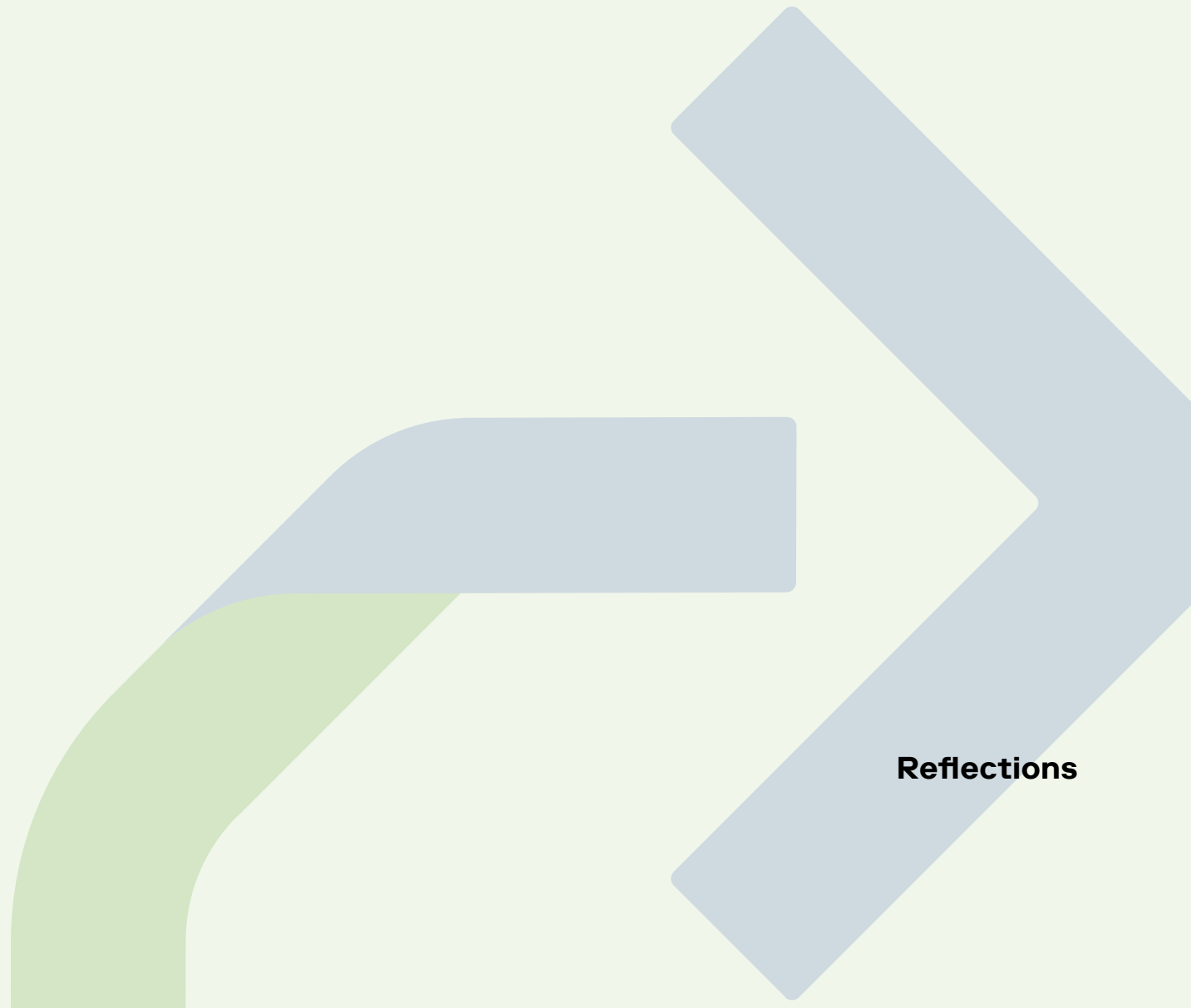
FOSTERING RESIDENT AND COMMUNITY INVOLVEMENT IN HOUSING DECISIONS

Engaging residents and communities in decision-making ensures that housing solutions reflect lived experiences, local knowledge, and actual needs. Inclusive participation strengthens accountability, enhances social cohesion, and supports outcomes that are responsive, equitable, and sustainable.

How can residents’ voices be effectively included in housing processes? What strategies encourage meaningful engagement, and how can feedback be incorporated to improve both design and management decisions?

J.T.: In cooperative housing models, participation is embedded structurally. There are clearly defined governance bodies, accessible information channels, and transparent decision-making processes. Feedback is incorporated through regular evaluations and adjustments to established protocols. Early and continuous involvement not only improves design decisions—particularly for shared spaces—but also strengthens long-term community outcomes.

A.Z.K.: One important aspect is communication—informing residents about what’s happening and getting their feedback. Another is involving them so that they recognise a problem as something that affects them and that they can contribute to finding solutions. I’m talking specifically about the housing issue.



Reflections

Transdisciplinary housing research relies on creating spaces where academic knowledge and practical expertise interact in meaningful ways. Secondments, workshops, and co-creation activities facilitate a two-way flow of knowledge: researchers contribute insights that inform practice, while practitioners shape research questions, methods, and priorities based on real-world challenges.

Reflecting on their secondments with SYHA and Clarion, Alsaeed and Ricaurte show how these placements function as effective mechanisms for transdisciplinary collaboration. Benefits include access to relevant data, validation of research frameworks against real-world conditions, improved communication between researchers and practitioners, and deeper understanding of complex policy and operational landscapes. At the same time, challenges arise, such as navigating dual institutional affiliations, translating abstract academic concepts into actionable language, reconciling divergent interpretations of terms like sustainability, managing ethical considerations in resident engagement, and balancing academic rigour with organisational priorities.

Based on their experience, the authors recommend a structured approach: thorough preparation and alignment before the secondment; active engagement, skill development, and tool testing during the placement; and focused dissemination, sustained collaboration, and ongoing knowledge exchange afterward.

Beyond individual secondments, dialogues between researchers and practitioners—across diverse project settings—revealed additional constraints, including institutional barriers, disciplinary differences, misaligned incentives, and challenges in engaging communities. A fundamental tension arises between the slower, rigorous pace of academic research and practitioners' need for timely, actionable solutions, further complicated by communication barriers and the difficulty of moving beyond mere information exchange toward genuine integration of perspectives.

For collaboration to be effective, research must be grounded in real-world problems. Practitioners should be involved from the outset to co-define research questions and translate high-level goals into actionable steps. Disconnects between policy frameworks—such as EU strategies—and local implementation, along with market resistance, higher costs for sustainable or circular housing, and the challenges of meaningful community engagement, further complicate the process. Successful transdisciplinary work therefore requires strategic, sustained efforts to bridge gaps, align priorities, and reconcile differing languages, timelines, and expectations between academia and practice.

Afterword

Roderick J. Lawrence

Transdisciplinary housing futures

Housing and infrastructure are created by human societies and framed by a multitude of individual and group decisions, social conventions, and communal rules that are transmitted across generations. Housing, dwelling and domesticity reflect cultural predispositions that implicitly and explicitly express personal, household and communal beliefs, intentions, know-how, motives, preferences, values and worldviews. However, there has been a growing tendency for architects, housing construction firms, public policymakers, politicians and public administrators to overlook the fundamental metaphysical character of housing, dwelling and human habitation in a multicultural and rapidly urbanising world (Lawrence, 1987). While many actors and institutions have based their work on rationalised and normative frameworks for housing design and construction, they have done little to prevent dominant power structures in the real estate sector from shaping housing outcomes. They have also largely accepted the political agendas and intentions of public authorities that have prioritised national economic growth at the expense of housing quality (Lawrence, 2021). In contrast, this engaging RE-DWELL publication shows with numerous examples that architectures of housing can be creative, inclusive and just settings that accommodate the diversity of housing cultures, the plurality of dwelling

practices, and multiple attributes of housing quality that nurture planetary health and wellbeing of residents.

The RE-DWELL contributors acknowledge that housing is a complex societal challenge that has evolved with demographic, economic, technical and urban development in a globalising world with increasing mobility of goods, services and people. The contributors note that data and information from housing surveys in numerous countries confirm a mismatch between what the providers of new housing propose and what inhabitants state are their housing needs and preferences (Furtado & Flynn, 2025). These findings highlight divergence between the intentions, knowledge, motives and values of policymakers, practitioners, real estate professionals and the domestic culture and lifestyles of increasingly heterogeneous households in European countries. Notably, more than 50 years of research on the meanings, uses and values of residential environments, and on housing needs and preferences, has had little influence on the supply of housing by either the public or private enterprises. This is a prime example of a persistent knowledge–practice divide (Lawrence, 2015, 2021).

The overall aim of the RE-DWELL project was to advance new ways of thinking about housing by bridging architecture, building construction,

finance, land-use planning, and public policy using innovative collaborative approaches in a variety of localities with different housing markets and diverse cultural and political contexts. Reading the contributions in the six main sections of this book confirms that this aim has been addressed conceptually and methodologically by relational thinking. The editor and authors have advanced understanding about the European housing crisis, which is clearly part of a global housing crisis that impacts housing markets and households elsewhere, including Australia and the United States of America.

Before reading this book, and based on my professional path in three countries over four decades, my key questions were:

- How can the persistent housing crisis in European countries be understood critically? What interventions are needed to correct inadequate housing supply, and extant unhealthy housing conditions for all kinds of households in a heterogeneous society?
- How can the innovative cases produced by this programme be upscaled to become mainstream in the housing sector?

I read the contributions in each part of this book with these questions in mind.

The Introduction by Leandro Madrazo presents a tripartite operational framework that structures systematically all contributions. This pragmatic framework represents multiple interrelations between the constituents of three core domains: physical and technical constituents

of housing design and construction; social and communal dimensions for collaborative design and planning with inhabitants; and the governance, financial and regulatory framework for the supply of new housing and the upgrading of the existing stock to meet sustainable development goals.

Part 1 includes three chapters that examine housing challenges through the tripartite framework presented in the Introduction, highlighting tensions between affordability, liveability, sustainable housing construction, and energy and resource consumption. It is worth recalling that the triple bottom line—People, Planet, Profit—presented as foundations of sustainable development has been enlarged to the 5P Model—People, Planet, Prosperity, Peace, Partnerships—aligned with the 17 Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda for Sustainable Development (Lawrence, 2020). This part confirms why collaborative partnerships in architecture and urban planning are crucial to facilitating a better understanding of affordable and sustainable housing and consequently promote access to it. Notably, creative thinking about ‘Reduce, Space, Share’ is much needed to address the housing crisis; however, the proposed shift from participation to co-production cannot guarantee this radical change given dominant housing trends that favours increases in habitable space per person in many European countries. These trends contradict sustainable housing and will only be reversed with a radical reset of human motives, preferences and values that have nurtured these long-term trends in Europe and beyond.

Part 2 explores the development of transdisciplinary research since the 1970s and the pertinence of recent contributions to housing studies. Readers interested in a pluri-cultural interpretation of transdisciplinarity framed by living in a heterogeneous world can consult chapters in the *Handbook of Transdisciplinarity: Global Perspectives* (Lawrence, 2023; see chapters 6, 7, 33). Collectively, these chapters complement and question the dominant Anglo-Germanic interpretation of transdisciplinary research to deal with the root causes of the housing crisis. Some contributions in the Handbook (see chapters 3, 8, 15, 16 and 18) converge with the pedagogical model used in RE-DWELL that exemplifies ‘learning-by-doing’ and ‘inquiry by design’ in contrast to the common practice of solving predefined problems (Zeisel, 1981).

Part 3 summarises the doctoral research projects that contributed to the shared knowledge domain they collectively produced. This domain was founded on a communal vocabulary used for relational thinking by members of the consortium. Collaborative exercises co-produced conceptual diagrams representing clusters of key concepts and their connections. These concepts were used to analyse a repertoire of cases in various localities with quite different societal contexts for housing. Case-based projects and case-based research have been common in housing since the Second World War; however, there are fundamental issues concerning the dissemination of generalisations from specific cases that are influenced by contextual contingencies. The strengths and limitations of the case study method could have been

discussed, emphasising the need for place-based inquiry to identify the multi-dimensional character of the contextual variables of each case (Yin, 1984).

In the context of the persistent housing crisis, it is crucial to understand which drivers are pertinent to facilitate change by outreach and upscaling from specific cases. Contributions in this book remind readers that many seminal architectural contributions combining research and practice for public and social housing projects—innovative contributions by Ralph Erskine or John Habraken, for example—were not catalysts for significant broader change in the housing sector both in and beyond Europe (Bosma et al., 2000).

Part 4 explores three sets of challenges classed as conceptual, regulatory and operational linkages between providing affordable and sustainable housing and the advantages of constructing cooperative housing. These cooperatives enable concerted action involving collaboration between practitioners, public administrators, non-profit organisations, community associations and laypeople for effective responses to contemporary housing challenges. In some European countries, including Austria, the Netherlands, Norway, Sweden and Switzerland, for example, cooperative housing provided a different pathway for access to attractive, adaptable, and affordable housing in many cities throughout the last century. Housing cooperatives have been established elsewhere, including South Africa, India and Uruguay, to challenge the status quo and enable low-income households to become self-help managers and collective owners of affordable,

sanitary and secure housing. After the persistent failure of private and public sector contributions, this fundamental reorientation of housing should be scaled up to overcome the housing crisis in Europe (Bredenoord et al., 2014). Moreover, cooperatives create a third housing sector that accommodates the residential needs of specific households, particularly during periods of crisis, when domestic spaces must adopt new functions such as domiciliary healthcare, schooling, and home-based paid work.

Consequently, the sociodemographic drivers of societal change that have influenced and continue influencing housing affordability and availability could have been considered in more detail. One example is the diversity of household types that influence the occupancy of the housing stock, including known mismatches between supply and demand. Studies show that societal changes refute normative and rational approaches that have not accommodated sociodemographic changes such as household size, composition and lifestyles; or rapid population growth and decline in cities, especially 'shrinking cities' in Eastern Europe. These core components of habitation in this century remain largely unaddressed in housing policy and in the design and construction of the housing stock; yet these characteristics of domesticity and daily life must be critically addressed if housing is to become a catalyst for more radical societal change towards achieving the sustainable development goals.

Part 5 discusses the crucial role of communal engagement and joint problem-solving to promote affordable and sustainable housing. The authors

argue that community engagement is a key driver of affordable and sustainable housing. While this cannot be contested, the desired transition in the housing sector will not be achieved without partnerships including actors and institutions in real estate, particularly those individuals and institutions that finance the construction of new housing and upgrading of the housing stock. Chapter 2.2, Section 2.6.5, noted that toolboxes have been used for decades in architectural and urban design processes, and more recently during transdisciplinary research projects. Part 5 presents a methodological approach to enhance interpersonal communication during collaborative design and planning.

Part 6 discusses enhanced collaboration between academics and professional practitioners to bridge the divide between knowledge and practice. It explains why secondments were used during the RE-DWELL programme to enhance intersectoral collaboration, improve access to data and information, and facilitate knowledge exchange between researchers and practitioners. These secondments, although rare in the housing sector, proved worthwhile as they illustrate how convergence and collaboration between individuals and institutions concerned with housing can create intersectoral dialogues about emergent and persistent housing challenges. Secondments also facilitate sharing and synthesising empirical knowledge and learning between sectors. This enlarged interpretation of knowledge transfer about housing enabled a debate during RE-DWELL about the benefits of co-producing knowledge.

In sum, this attractive book includes many examples of how several types of knowledge, know-how and other ways of knowing can be used creatively in large programmes and projects for the planning and construction of new residential environments, and the renovation of the housing stock using criteria for sustainability. These recent examples complement pioneering contributions in participatory design and planning, now called 'co-design' and 'co-creation'. A key issue, especially for architects and planners, is whose knowledge counts, and whose authority and power will decide housing futures or define what they should be (Lawrence, 2025).

Notably, individuals and institutions in the real estate sector make decisions that clearly restrict rather than increase housing choices by residents. For example, since the 1960s, privatisation and gentrification have been increasingly proposed at the 'upstream' level by policymakers and real estate developers; then architects, builders and planners interpret how these decisions are translated 'midstream' into specific housing projects; finally, owners or tenants living 'downstream' in completed residential buildings are confronted with the outcome. This common approach confirms the power of decision makers; it also highlights the narrowing of options and reduced choices of architects and laypeople (Black et al., 2019). In addition, given that architects design such a small share of the housing stock in Europe, those key actors and institutions in the real estate sector cannot be ignored while they continue to define housing futures.

Finally, the thought-provoking content of this book helped me answer my initial questions: my reading confirms that numerous obstacles to the provision of affordable and sustainable housing need to be removed and replaced, and this book proposes a way forward. The optimistic outlook of the editor and authors should be endorsed by communities and those who represent them in local and national authorities; only then will a societal commitment to a new housing agenda replace the status quo. On this common foundation, creative architecture should provide affordable and sustainable housing; political support for inclusive housing should be long-term for the public good; reforms of neoliberal legal and administrative norms are crucial; and different kinds of financial incentives for societal change need guarantees. The stakes are high.

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Epilogue

RE-DWELL had a dual nature from its inception. On the one hand, it functioned as an innovative doctoral training programme in affordable and sustainable housing, where PhD candidates pursued their individual research while developing transdisciplinary skills and contributing to the collective construction of knowledge. On the other hand, as an EU-funded research project, it was bound by contractual obligations to carry out a work programme—including courses, workshops, summer schools, conferences, and communication activities—as well as to deliver specified outputs such as reports, publications, and this book. This dual nature sometimes made it difficult to reconcile collaborative project work with individual research trajectories and interests.

As a joint doctoral programme, the project had to align the individual agendas of PhD candidates—including the requirements of their home doctoral programmes—with the collective task of developing a novel transdisciplinary learning and research environment. At the same time, RE-DWELL navigated a landscape of uncertainty as a research endeavour, guided by a roadmap that outlined possible directions rather than prescribing a fixed route. Some actions proceeded according to plan, such as the courses, workshops, summer schools and conferences, and the development of the vocabulary and case library. Other activities emerged as the project progressed, including

the formulation of challenges for interconnecting research projects and the launch of a blog to share experiences from secondments. However, some planned work did have to be reformulated. An illustrative example was the decision to abandon the initial intention of developing an assessment framework for affordable and sustainable housing derived from the individual research paths—a task that proved unfeasible within a doctoral training context and more appropriate for a dedicated research project—and instead focus on the transdisciplinary learning and research environment as the project's main framework.

In retrospect, the project's four-year journey reveals both the potential and the complexities of transdisciplinary collaboration. Behind the work compiled in this publication, and the more comprehensive materials available on the website, were individuals with diverse backgrounds, commitments, and interpretations of the project's aims: early-stage researchers working toward PhDs, supervisors from multiple institutions and disciplinary traditions, and representatives of partner organisations hosting secondments. Although all were involved in the shared project, each participant brought personal expectations and contributed to it to varying degrees, depending on their motivations, levels of engagement, and capacity to participate at different stages.

It is widely recognised that transdisciplinary work can be a source of conflict, and RE-DWELL was no exception. Differences in priorities, disciplinary orientations, and working cultures occasionally led to misunderstandings and the formation of distinct groupings—ESRs versus supervisors, architects versus social scientists, academics versus practitioners. Personal affinities and incompatibilities added further layers of complexity. When left unresolved, such tensions risk fragmenting the team, undermining the principles of transdisciplinary collaboration, and jeopardising the continuity of the project itself. Conflicts over interpretations of the project's goals redirected effort from authentic intellectual engagement toward the mere fulfilment of contractual obligations, reducing opportunities for genuine research, shared learning, and cross-disciplinary integration. In this context, steady and transparent leadership is essential to maintain alignment with shared objectives, mediate differences constructively, and ensure that the collective endeavour remained cohesive despite its diversity.

This reflective account does not seek to cast doubt on the solid work that speaks for itself, but to make the difficulties visible, so that may serve as lessons for future initiatives and illuminate the realities of transdisciplinary collaboration. The network's achievements—what was accomplished, and what might have been possible—are inseparable from the parallel effort to manage complexity, uncertainty, and the human dynamics inherent in transdisciplinary work. It underscores that producing socially robust and

context-sensitive knowledge depends as much on managing relationships and expectations as it does on methods, analytical frameworks, or disciplinary expertise.

RE-DWELL has been a dwelling experience, and while the dwellers may have already gone their separate ways, the knowledge, insights, and lessons may guide their future projects and collaborations.

Leandro Madrazo
RE-DWELL Project coordinator

Barcelona, February 2026

Appendix

Round table: Transdisciplinary research for affordable and sustainable housing

This online [round table](#) brought together scholars with extensive experience in housing studies, architecture, urban planning, and energy research to reflect on transdisciplinary approaches to affordable and sustainable housing. Convened as part of the RE-DWELL Lisbon workshop on 23 September 2021, the discussion created a space for dialogue across disciplinary boundaries, drawing on diverse research trajectories and practice-based insights. The exchange foregrounded housing as a complex and socially embedded process and explored the implications of transdisciplinarity for housing research, education, and action.

The speakers were:

David Clapham, Professor at the University of Glasgow, who has dedicated 45 years to housing studies, bringing an interdisciplinary perspective shaped by his background in business, economics, and social policy. His research ranges from collaborations with psychologists on homelessness to political scientists on health policy, highlighting his broad approach to social issues. As editor of *Housing Theory and Society* for 15 years, he has played a key role in integrating diverse perspectives into housing research.

Gilles Debizet, a researcher at the PACTE Laboratoire de sciences sociales, Université Grenoble Alpes, who specialises in urban planning and energy transitions in the context of climate change. His work explores local energy communities, urban energy coordination, and the circulation of sustainable planning models. Over the past ten years, he has collaborated with social and engineering researchers in interdisciplinary projects, contributing to a deeper understanding of energy issues from both technical and societal perspectives.

Doina Petrescu, Chair of Architecture and Design Activism at the School of Architecture, University of Sheffield. Founder of the *Atelier d'architecture autogérée*, a platform for collaborative research and action on the city. Her research addresses key issues in architecture and urban planning, particularly in areas such as co-design, civic participation, gendered practices, political ecology, co-production, and urban resilience.

Ashraf Salama, Professor of Architecture at the University of Strathclyde, has made significant contributions to architectural pedagogy, housing studies, and transdisciplinary research. His work focuses on social and cultural

sustainability, particularly with environment-behaviour interactions. Professor Salama has long been at the forefront of discussions on transdisciplinarity in sustainable and affordable housing, with his 2006 paper being a key reference in this domain.

The session was moderated by Professor **Flora Samuel** from the University of Reading, an expert in inclusion, planning policy, and community engagement with a focus on social justice and climate change. She leads the AHRC-funded Community Consultation for Quality of Life Project and was the first RIBA Vice President for Research. Flora is also the author of the RIBA Social Value Toolkit and has contributed significantly to architectural practice and social value research.

ASHRAF SALAMA

My work primarily revolves around social and cultural sustainability, particularly in relation to person-environment studies—essentially, human behaviour within the built environment. In the American context, this field is often referred to as environment-behaviour studies or environment-behaviour interactions. My research touches on various themes, including architecture education, design studio teaching practices, and the dynamics of emerging cities in the Middle East. I would start by saying something about housing studies in general, and then touch on transdisciplinarity. When we look at the body of knowledge in housing, especially from the perspectives of architecture, urban planning, and urban studies, we find two basic approaches. One is very technical, focusing on cost reduction, sustainability issues, finance,

tenure, and related topics. The other involves more stylistic discussions about authenticity, cultural issues related to housing production, and social narratives like household structure and defense theory.

These approaches rarely meet. People who discuss the technicalities of sustainability have their own paradigms of thinking, tools, and techniques, while scholars discussing cultural authenticity are operating in a completely different paradigm. This is fine in terms of depth and comprehensiveness, but the problem is that issues related to affordable housing and sustainability are often addressed in isolation. If you look at many housing projects, you'll find that the factors impacting sustainable affordable housing are either oversimplified, focused on one area, or just superficially addressed, ignoring or simplifying other crucial issues.

My approach to housing studies is to be as transdisciplinary as possible. Transdisciplinarity is not an easy subject; we are living in an academic tribal culture, with each discipline adopting its own way of thinking. If you talk to engineers, they think in one way; architects have their own perspective; and social scientists have theirs. When we sit together as planners or architects with people from other disciplines, the first thing we often say is, "This is not how we do things." By saying that, we establish the boundaries between us and other experts. We try to avoid this by using the idea of triangulation, considering affordability, sustainability, and lifestyles together.

But I would like to revisit the concepts of monodisciplinarity, multidisciplinarity, and transdisciplinarity. We need to

distinguish between transdisciplinary research and transdisciplinary action, which are two different things. Transdisciplinary research is about generating transdisciplinary knowledge related to housing, while transdisciplinary action involves considering design and planning as a process of action research, where knowledge is generated during the design process. But the real question is, who are we designing with and how?

Housing production from the 1920s to the 1970s focused on monodisciplinarity. If it was about social housing, one discipline dominated: building economy or cost reduction, and all other fields took a back seat. From the mid-1970s until today, multidisciplinarity and interdisciplinarity started to occupy the academic and professional psyche, but to me, they don't mean much. Multidisciplinarity often means different disciplines working in parallel, addressing a problem while recognising the boundaries of each discipline. Similarly, interdisciplinarity doesn't really break down those boundaries. Then came transdisciplinary research.

In 1998, I attended a session in Switzerland where transdisciplinarity was discussed as a way to address the plurality of social, environmental, and economic issues related to affordable housing. From this event, I realised that transdisciplinarity represents a completely different paradigm because monodisciplinarity and interdisciplinarity focus on what housing is, while transdisciplinarity focuses on what housing does and how it impacts people's lives.

Again, transdisciplinary action is distinct from transdisciplinary research. It recognises that knowledge is produced in the context of its application, not just through research. Transdisciplinary action involves different types of knowledge coming together from various groups to solve a problem. But who these groups are is extremely important. We have different kinds of knowledge: scientific and expert, folk or indigenous, practical or vocational, and tacit or experiential. All of these types of knowledge must be integrated, which is why we emphasise co-production and participatory practices. I'm not talking about consultation where people attend a meeting, have some tea, and watch the planners make a presentation. Real participation means giving people the opportunity to shape their future.

Returning to the idea of triangulation—looking at affordability and sustainability in housing—when we talk about affordability, we often focus solely on cost reduction, ignoring other social aspects. When we talk about sustainability, we often consider only technical issues, leaving out social and cultural concerns. I adopt lifestyle theories, arguing that housing perception and production should be incorporated into discussions of housing at both the research level and during transdisciplinary action or design. While there is a lot of literature on affordability and sustainability, I try to bring together sociology, anthropology, and ethnography to form frameworks that recognise that lifestyle is shaped by culture and past experiences, contemporary social structures, and individual life modes.

DAVID CLAPHAM

I've always returned to the idea that housing is not just a field of study, but an issue in itself. I completely agree with Ashraf, and I'll elaborate on this further—it's not about *what* housing is, but about *what* housing does. We should express it in terms of its function, rather than its form. Housing is not just a dwelling; it's an ongoing process. I've been exploring ways to develop a more holistic framework to examine the various issues surrounding housing.

I started with sociology and then took up ideas about social constructionism but always wanted to link it into ideas about structuration—the work of Giddens and Bourdieu—and ideas about social practices. This enabled me to bring together the individual and structural issues.

But what has stayed with me on my journey is the idea of social practices, and it's one that I want to come back to, because it offers us a framework for disciplinarity. Practices are very much about *what* housing does, rather than *what* it is about. I use the idea of home-making practices or house production practices, and combine them with ideas about Nature, the fact that housing and cities are part of Nature. Then, you can begin to do away with the distinctions between the mind and the body, and between humans and the rest of Nature, between humans and animals and materials.

Once you can actually go beyond those kinds of distinctions, which some social scientists do through assemblage theory or actor-network theory, it enables you to take a

more comprehensive view of those different elements and draw them into ideas of transdisciplinarity. Because traditionally, the way those different elements have been looked at has been the subject of different disciplines, and they've been looked at using very different philosophies and techniques.

But before I get into it a little bit more, just to focus on this idea of transdisciplinarity not being easy: the reason it's not easy is that disciplines do actually involve fundamental ideas about the nature of society, the nature of Nature, the nature of materials, and so on. Therefore, when you draw concepts and theories from different areas, you very often had to redefine them. You had to look at what the concepts were, what the basic fundamentals of them were, and how they fit into the worldview. And we had to redefine them to be able to bring them together with other disciplines, and that makes things quite difficult to do, quite intensive to do.

I'm currently working on developing a holistic view of housing. I've tried to redefine the field, so rather than call it houses, housing, I call it inhabitation. What we're doing is inhabiting a space in terms of time, in terms of Nature. Inhabiting undertakes various kinds of practices, and part of those practices are animals and materials.

To give an example—maybe one that's been researched quite well: heating and energy use in housing. This involves all kinds of practices, like washing, showering, and bathing. What you've got involved in the practice of bathing are social elements and social norms. The first house I lived in didn't have a bathroom; it had an outside toilet.

Bathing was something you did once a week in a tub in front of the fire. But we've now got to the situation that we shower every day, or more than once a day. So, that's a kind of social norm, but then you've got all the materials that are used, like the different kinds of soap. And there's heating technology for hot air, and the fact that houses now have as many bathrooms as bedrooms.

And there are also other things involved, like animals. We wash our dogs in—or some people do—wash their dogs in the showers. Dogs and cats require a certain amount of heating. There are some interesting studies about how pets are the silent partners in the household, in the sense that trying to keep them happy, not being cold, and being dry and so on, and feeding them, is actually part of an important part of home-making practices.

You can only understand each of those individually, like why do we have so many bathrooms? What will the impact be of new technology to heat hot water and houses by looking at all of those things together? I think the idea of practices brings this together.

When you're looking at things like technology, you use different kinds of techniques to do that, based on different disciplines. I haven't worked this out completely, but I got an insight to Ken Wilber's idea of holon from the work, which isn't often quoted in our field. What he suggests is that all matter is made up of a holon, and a holon is part individual and part collective. Holons only actually exist as part of other kinds of holons. Then he says every holon has four elements or quadrants—interior/exterior/collective/individual—and

that to understand that holon, you actually need to look at all four of these quadrants.

So, in terms of the individual/exterior axis, you're relating studies of behaviour, which have been fairly common in sociology, with external measurements of behaviour. The collective is about how individuals work together. Systems theory fits into this. For example, assemblage theory is looking at how networks operate. Then, when you get to the interior/individual, this could have to do with psychology or hermeneutics. It's looking at the way that individuals operate and the mix of kinds of materials and brain power. And then, the collective element is about culture discourse.

Wilber says that if you want to understand the holon, you need to understand each of those quadrants. And this insight to me is that these things aren't wrong. I've always considered systems theory to be wrong because it ignores certain kinds of elements. But Wilber says it is not wrong, it is just partial. It gives you one part of the picture, so all you need to do is just integrate it with these other parts of the picture. Now what Wilber doesn't do is give you any guide about how to do this integration. He says, for example, you can find links between individual behaviour and collective behaviour, and patterns across in that kind of way. But it doesn't give us any real understanding of how we can assess all of those together.

So that's the point that I'm at about this idea of practices. It is a field which goes back to Giddens and Bourdieu in the 1960s, but it's got recently updated with the work of Elizabeth Shove and

Schatzki. Their research is closely tied to environmentalism and the need for a holistic view of nature in order to understand issues like sustainability and climate change. And the inclusion of animals and materials into practices has become a key focus in this contemporary discourse.

DOINA PETRESCU

My interests are in participatory architecture, urban resilience, gender, and urban commons. I trained as an architect, but I also hold a PhD in Women's Studies, which has given me a transdisciplinary perspective that I have found extremely valuable. My current research, situated at the intersection of academia and practice, focuses on urban resilience in suburban neighbourhoods. Specifically, I am exploring a new model of co-produced regeneration through the creation of civic hub networks that support collective resilience practices. This reflects my broader understanding of architecture and urban design—not just in terms of what they are, but in terms of what they do.

This research has led to the establishment of five civic hubs in two metropolitan areas—Paris and London—under a framework called *Urban*, a bottom-up strategy for resilience. Through this initiative, we have developed tools that drive change in social relations, policy, and ecological and economic practices at the local level. This is a complex transdisciplinary project where transdisciplinarity is understood as the fusion of theories, methods, expertise, and practices across different disciplines. Rather than existing as separate elements,

these components merge into a unified whole—one that is much more than the sum of its parts.

The civic hubs, central to this strategy, are intricate settings managed by the inhabitants themselves. They are located within social housing estates, yet they are not dwellings in the conventional sense. Instead, they operate as multifunctional facilities—supporting urban agriculture, recycling, and fabrication—that empower residents with collective agency as dwellers. Positioned between housing units, these hubs expand the definition of the field—something David previously referred to as renaming *inhabitation* rather than housing. In this context, *housing* extends beyond private units to include outdoor spaces and new ways of inhabiting the city.

We have also examined architecture as a process rather than merely a physical outcome. Our focus has been on how architecture facilitates, enhances, and even invents everyday life practices. We see architecture as both a resource and infrastructure that enables people to learn resilience and actively engage in resilience-building. This has required us to consider aspects of environmental governance, social governance, and economic sustainability—helping people develop economic activities, create their own jobs, and not just alter their lifestyles but also their ways of working. Spatial and sociological dimensions have also been critical.

Through this research, we have observed unique relationships between space, spatial organisation, and the effects it generates. For instance, we integrated greenhouses into architectural design—not only for their

aesthetic appeal, creating inviting green spaces—but also for their practical functions. These greenhouses served as passive heating systems, gathering spaces for collective meals, and even as catalysts for economic benefits.

Our exploration of value creation in such spaces extends beyond economic aspects to include ecological and wellbeing benefits. This required collaboration with experts from other disciplines, as value itself is inherently a transdisciplinary concept. To quantify this, we worked with economists, environmental scientists, and the users themselves. The inclusion of non-academic stakeholders in knowledge production is yet another dimension of transdisciplinarity.

One of our key research projects focused on value measurement, culminating in a published article co-authored with renowned geographer and economist Katherine Gibson. This transdisciplinary collaboration was particularly fruitful—Gibson provided a matrix for calculating community return on investment, which we adapted and applied to the urban context. This resulted in a tool that can now be used by others managing urban commons, serving as an argument in day-to-day negotiations over urban space.

The urgency of this research became evident in 2014 when one of our hubs faced eviction. The newly elected mayor, with shifting priorities, sought to transfer the site to real estate investors. We needed to demonstrate that the value generated by such a project—often invisible and uncalculated—far exceeded the site's financial worth on the real estate market. This required

us to measure the value of ecological repair, social activities, enhanced skills, wellbeing, and more. These dimensions are typically ignored in conventional assessments that focus solely on economic value.

Unfortunately, our efforts came too late to serve as legal proof in the eviction case. However, the tool remains an invaluable resource for others, with the potential to shift perspectives on how we define and measure the value of community-invested spaces in cities.

GILLES DEBIZET

I have been engaged in interdisciplinary research for a decade, and it remains a continuous challenge. I could detail numerous difficulties, obstacles, and strategies to navigate them, but instead, I prefer to illustrate how interdisciplinary collaboration is possible by presenting an example of a transdisciplinary research project. I will focus on certain aspects of the cross-disciplinary programme *Eco-SESA* Smart energy in districts.

This programme involved 16 laboratories, including three dedicated to social sciences. We worked with 23 junior researchers—PhD candidates and postdoctoral fellows. The research was structured into five key areas, each aligned with contemporary international scientific literature and requiring interdisciplinary collaboration:

1. Interactive systems to involve occupants of connected buildings
2. Emerging behaviours from individual to communities
3. Interactions modelling between buildings and grids
4. Architectures for integration of on-the-spot renewable energy and

5. Integration of components into systems. Together, these research areas contribute to addressing the climate challenge of integrating renewable energy generation into urban environments.

The research areas two and three are mainly analytical and the others are projective, aiming to renew conventional tools used in energy engineering. I will concentrate on research areas three and four, which focus on the district scale.

There are connections between the work in these two areas and Doina's previous insights, particularly in how our engineering colleagues sought to incorporate social value into energy system modelling.

The programme is founded on a new paradigm, summarised as follows: Renewable energy sources enable direct exchanges between buildings and communities, challenging the traditional structure of energy networks and reshaping social relations at the local level. To analyse this, we employ the concept of the socio-energy assemblage. We consider energy infrastructure as a network of socio-energy nodes—clusters of material and organisational elements that gather, convert, and distribute energy flows. These nodes are overseen by a key decision-maker who interacts with human and non-human actors.

This concept emerged from observations of energy issues in various French and European eco-districts. We noted the rise of new intermediary actors and energy systems that exist between traditional utilities and individual buildings. The conventional analytical approach used by economists

and lawyers—focusing solely on the relationships between networks and producers or consumers—is insufficient to understand the ongoing social transformations. Instead, we must explore direct interactions between producers and consumers, as well as the local extraction, usage, and environmental discharge of energy, as David previously explained.

Our approach recognises that researchers primarily aim to advance their own disciplinary objectives—spanning sociology, urban planning and design, and energy system modelling—rather than pursuing interdisciplinarity for its own sake. Our cross-disciplinary methodology consists of the following steps: identifying and selecting socio-energy nodes; observing and surveying decision-makers and users; analysing design, operation, and usage patterns, and modelling social and physical interactions. The goal is to understand the social implications of capturing renewable energy for local use in buildings and to integrate these insights into decision-support tools for urban planning and energy system design.

Let me share some examples of our findings. We have demonstrated, for example, that implementing accounting and payment per household for each use of washing machines in a shared laundry led to a disempowerment of users in choosing the most economical and sustainable times for the community, namely during periods of generation of photovoltaic energy. In this way, payment per household reduces consideration for the common good and contradicts the goal of minimising the use of exogenous, non-renewable electricity.

Another key observation concerns French regulations. While community power generation is officially encouraged, national policies—particularly those related to taxation and power grid financing—tend to favour long-distance generation. In practice, the national power grid is still considered as the primary pillar of solidarity and territorial equity.

Regarding the relationship between energy and architectural design, we observed that ambitious renewable energy projects must often be developed independently of public energy distributors. Our findings suggest that the most effective strategies for sustainable urban development require alternative organisational models.

From a projective perspective, our research contributes to modelling and representing energy systems. Most of our findings have been applied to decision-support tools that model the constraints and objectives of stakeholders in renewable energy projects. These tools help stakeholders reassess their initial goals to find viable compromises regarding financing and operations.

Interestingly, our research revealed that optimal energy assemblages—in the technical and economic sense—are rarely implemented. In practice, the social values and priorities of various stakeholders play a crucial role in shaping the final design of district energy systems. In other words, instead of just refining optimisation models, it would be more useful to develop methods that help stakeholders reach an agreement.

Another innovative project tool is the urban transect, which visualises energy flows and infrastructure, revealing the interdependencies between buildings, industries, and the natural environment.

DISCUSSION

Flora Samuel: I'd like to invite the speakers to think about ways we can make housing research more transdisciplinary. What measures can we take to improve this field?

David Clapham: The first thing to acknowledge, as we all seem to agree, is that this isn't easy—it's actually quite difficult. I believe the starting point is how we define what we're looking at. Traditionally, we have approached housing through our own disciplinary lenses, shaping our understanding within the confines of our respective fields. Instead, we need to take a step back and define our focus in broader, more holistic terms.

For example, the last case we discussed was a great example of this approach. If we define our subject matter with a wider scope and invest time in carefully framing our inquiry, we open the door for participatory methods—not just academic perspectives, but also constructive ways of engaging with practitioners and communities to co-produce knowledge.

When we take this approach, it becomes easier to bring together the necessary tools and perspectives to tackle complex issues. Of course, this remains a challenge, but it is a necessary shift in our thinking.

Ashraf Salama: I'd like to add a couple of points from an architectural practice perspective. If we truly want transdisciplinary thinking to become part of professional culture, we must recognise that it is not about replacing disciplinary research but about complementing it.

First, we should emphasise research-based practice, moving beyond practice-based research. This means integrating evidence-based design, building performance evaluation, and participatory design as fundamental, ethical approaches in housing production.

Second, the role of professional organisations, academics, and universities needs to be re-evaluated. The traditional image of an architect sitting in an office waiting for a client no longer reflects reality. Today's architect must be a facilitator and an advocate, actively promoting transdisciplinary collaboration.

Audience question: How can a transdisciplinary approach inform architectural education?

Ashraf Salama: This is a difficult challenge, but transdisciplinarity is already embedded in architectural education—particularly in the studio model, where environmental issues, construction technologies, and design practice intersect in a single learning environment. However, university structures themselves often hinder transdisciplinary work. By organising knowledge into departments

and faculties, universities create silos that fragment disciplines instead of integrating them.

We need to rethink the very structure of the university. The model we work with today was largely established during the Enlightenment, and yet we continue to use it unchanged. Should we still rely on a system designed 200 or 300 years ago? I don't think so. This issue extends beyond architecture—it affects all disciplines.

Doina Petrescu: I'd like to add to this point because, at Sheffield, we are actively working to create transdisciplinary programmes. For instance, our Live Projects initiative brings students together across disciplines to collaborate with local organisations, professional practices, and external experts. These are pioneering models of transdisciplinary learning, producing outcomes that go beyond the work of individual architects to involve complex teams of stakeholders. I completely agree that universities, as they are currently structured, are outdated. However, it is also up to us to push for change. By pioneering new programs and approaches, we can transform universities into assets for their cities, communities, and society as a whole. This is a responsibility we should take seriously.

Flora Samuel: Absolutely. Interestingly, a new university is being established in London with transdisciplinarity as its central focus. While we may not need to go to that extreme, there is a balance to be struck between disciplinary and transdisciplinary knowledge. We need to be more intentional about where that balance lies. Who or what do you think suffers most from the lack of transdisciplinarity? Who are we failing?

David Clapham: Honestly, we're failing everyone. In a field like housing, or however we define architecture, we are failing the very people who live in these spaces. We are also failing policymakers, and by extension, policy itself. Many policy interventions focus too narrowly on a single aspect of a complex system, failing to consider broader impacts.

For instance, policies around heating technologies often focus solely on energy efficiency, without considering how people actually use these technologies and the cultural practices that shape their energy consumption. By not addressing these interconnected elements, we are ultimately failing the planet.

Flora Samuel: That's a great point. Energy is a perfect example—studies show that perceived warmth can be influenced by something as simple as a room's decor, which has little to do with actual temperature. This highlights how subjective these issues can be.

I recently read a quote from Christine Whitehead, who argues that Britain's poor housing conditions are a direct failure of academic theory—a damning indictment of our field.

Gilles Debizet: It's widely acknowledged that interdisciplinary approaches are essential for integrating environmental concerns into urban projects and architectural education. However, the biggest obstacle is how research is assessed within universities.

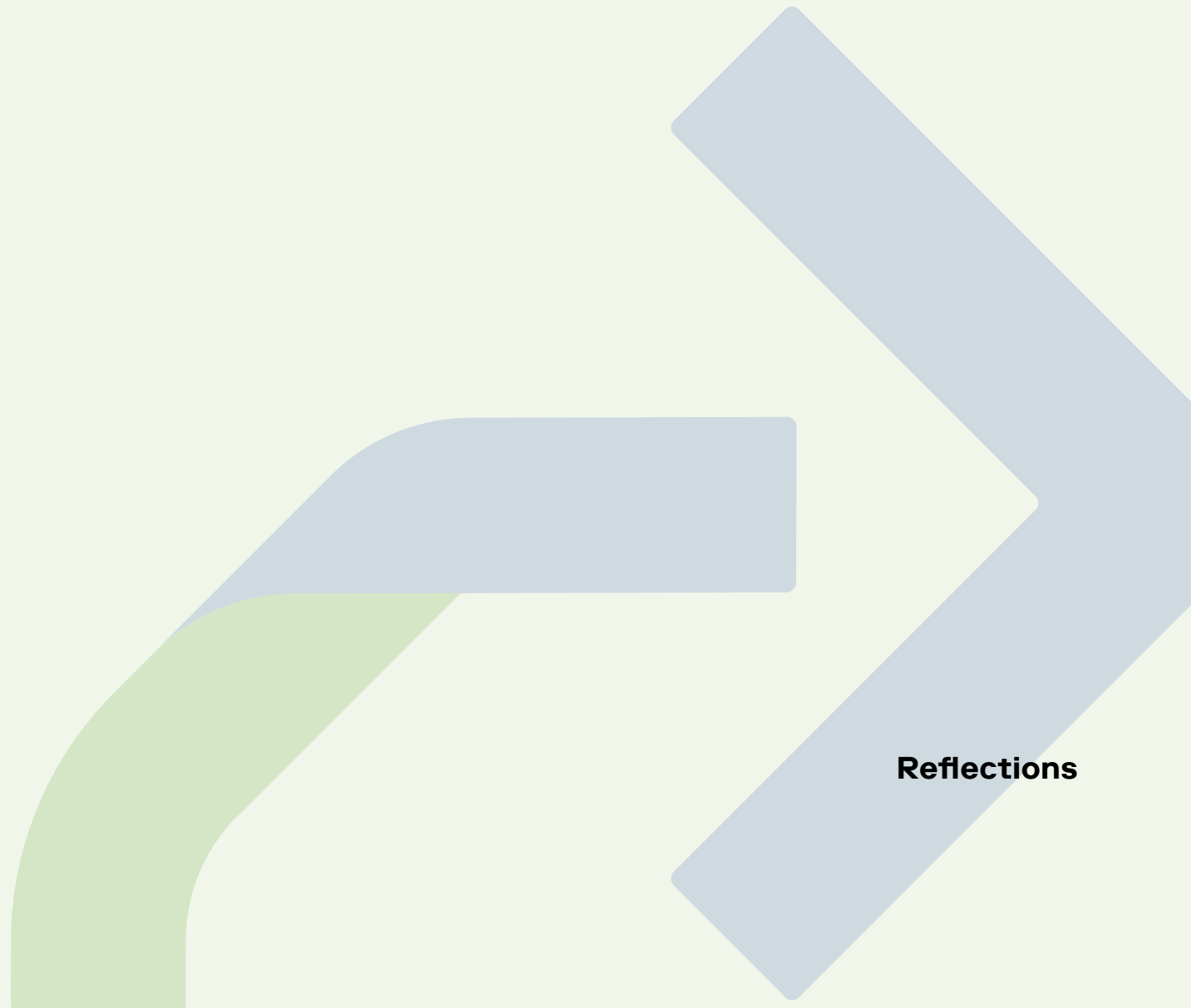
While funding for interdisciplinary projects is often available, the challenge lies in genuinely integrating different disciplines. Successful collaboration requires a shared operational goal—not just an interdisciplinary aim for its own sake, but a tangible, practical outcome.

For example, in the project I presented, we developed two tools: one for architectural design and another for energy system design. Both needed to integrate environmental concerns, engage community participation, and address the constraints and goals of different stakeholders. This kind of transdisciplinary work is challenging because each discipline must be willing to abandon some of its own assumptions.

Economists must recognise that financial flows are not the only driver of decision-making. Sociologists must accept that social norms are not the sole force shaping behaviour. We need a “flat ontology”—an approach that acknowledges multiple influences on urban systems, resisting the dominance of any single explanatory framework.

Flora Samuel: That's an excellent point to conclude on. The structural realities of academic life—whether for young researchers or established scholars—often make transdisciplinary work difficult. When interdisciplinary projects are reviewed, evaluators tend to assess them through their own disciplinary lens, reinforcing barriers rather than breaking them down.

To truly advance transdisciplinary research, we must embrace generosity and mutual respect across disciplines, recognising that each has valuable insights to contribute. Only then can we create meaningful, holistic solutions for the challenges we face in housing and beyond.



Reflections

The discussion among round table participants helps to identify a set of interconnected themes addressing the need for transdisciplinary approaches to housing, the integration of technical and cultural perspectives, and the evolving roles of research, education, and professional practice.

The need for a transdisciplinary approach

A transdisciplinary approach is crucial to tackling the complexities of housing, as it moves beyond the constraints of individual disciplines and combines insights from diverse fields to create holistic solutions. For example, policies that focus exclusively on energy efficiency without considering how people use technologies or the cultural context of their environments may fail to provide comprehensive solutions. As a result, housing solutions may not meet the true needs of people or the planet.

In housing, it is essential to integrate three main areas: affordability (encompassing economics, policy, and finance), sustainability (including environmental science and energy efficiency), and lifestyle considerations (involving sociology, architecture, and cultural studies). Instead of treating these issues separately, transdisciplinary research examines how they interact, recognising that solutions that focus solely on affordability might overlook how sustainable measures, like passive design, can reduce long-term costs while ensuring housing remains culturally and socially suitable for diverse communities.

Integration of disciplines

To foster meaningful and tangible outcomes, it is essential to strike a balance between disciplinary and transdisciplinary knowledge. While transdisciplinary research is fundamental, it should complement, not replace, the deep insights that come from specialised disciplines. The real challenge lies in truly integrating disciplines, where successful collaboration hinges on shared operational goals. This requires a willingness from each discipline to challenge its assumptions and embrace a “flat ontology”—an approach that recognises multiple influences—be they economic, social, or environmental—affecting urban systems and housing design.

Transdisciplinary research should not prioritise one perspective over another, but rather integrate diverse knowledge to create holistic solutions. In this context, fostering generosity, mutual respect, and collaboration across disciplines is paramount. Only then can we create innovative, sustainable, and inclusive housing solutions that address the diverse needs of society.

The divide between technical and cultural housing perspectives

Housing research is often divided into technical and cultural domains. The technical domain focuses on quantifiable factors such as cost, sustainability, energy efficiency, and finance, while the cultural domain deals with social structures, household compositions, community identity, and the meaning of home. Unfortunately, these two perspectives rarely intersect, which can lead to housing solutions that, although technically efficient, do not align with the lived experiences of residents. For instance, a technically optimised building might not meet cultural expectations regarding space, privacy, or social interactions, leading to designs that are efficient yet impractical for daily life. A more integrated approach, which bridges the gap between these technical and cultural considerations, is urgently needed to ensure that housing is both functional and reflective of the diverse needs of its inhabitants.

Transdisciplinary research vs. transdisciplinary action

It is crucial to differentiate between transdisciplinary research and transdisciplinary action. Transdisciplinary research involves generating knowledge across disciplines, studying housing from multiple angles—such as economics, sociology, architecture, and urban planning—thereby creating a comprehensive understanding of housing issues. Transdisciplinary action, however, goes a step further by applying the insights gained from research in real-world contexts. This means actively engaging stakeholders, such as residents, policymakers, architects, and engineers, to design housing solutions that reflect both research findings and lived experiences. For example, research might suggest that mixed-use developments improve community wellbeing, but transdisciplinary action would involve working with urban planners, local governments, and communities to implement policies and create projects that transform neighbourhoods into vibrant, multifunctional spaces.

Defining housing research

A key starting point for improving housing research is redefining the subject matter more broadly, beyond traditional disciplinary boundaries. By focusing on broader, holistic terms, researchers can open the door to participatory methods and engage a wide range of stakeholders, including communities and practitioners, in the research process. This collaborative approach makes it easier to integrate diverse tools, knowledge, and perspectives, ultimately ensuring that housing solutions are inclusive, adaptable, and grounded in real-world needs.

Housing is a process, not a static entity

Traditionally, housing is often viewed as a fixed product—a physical structure that exists independently of its inhabitants. However, a transdisciplinary perspective sees housing as a dynamic process that not only shapes people’s lives but is also

shaped by them. This process-oriented view of housing encompasses adaptability, acknowledging that housing needs change over time due to shifting family structures, economic conditions, and technological advancements. It also emphasises the social interactions within housing, recognising that the way people experience and use spaces influences their wellbeing, community engagement, and daily practices like cooking, working, and socialising. Moreover, a process-oriented approach considers the long-term environmental and economic impacts of housing, addressing issues such as energy consumption, resource use, and financial stability over time. By treating housing as a dynamic, evolving process, we can develop solutions that are more flexible, sustainable, and reflective of the real needs of individuals and communities.

Architectural education and the role of universities

Architectural education has already incorporated elements of transdisciplinarity, particularly in the design studio model, where issues like environmental concerns, construction technologies, and design practices intersect. However, traditional university structures, which are often siloed into departments, can hinder transdisciplinary collaboration. To overcome this, universities need to rethink their structures, fostering more flexible, integrated programmes that encourage collaboration across disciplines. This shift would enable students to engage more effectively with complex, real-world challenges in housing. Programmes such as Live Projects, which bring together students from different disciplines to collaborate with external stakeholders, allow them to create outcomes that go beyond the work of individual architects and involve complex teams of experts and community members.

The role of architects

Architects must evolve from being passive designers to active facilitators and advocates, promoting transdisciplinary collaboration across professions and sectors. This means taking on a leadership role in coordinating and guiding interdisciplinary teams to produce more inclusive, sustainable, and contextually relevant housing solutions. Rather than simply responding to clients' needs, architects should engage with a wide range of stakeholders to ensure that their designs are informed by diverse perspectives and are adaptable to the complexities of real-world contexts.

In conclusion, addressing the challenges in housing requires an integrated, transdisciplinary approach that considers technical, cultural, economic, and social perspectives. Only by embracing collaboration, mutual respect, and a willingness to challenge traditional boundaries can we create housing solutions that are truly reflective of the diverse and evolving needs of society.

Contributors

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She holds a Master's degree in Sociology and Social Sciences from the University of Bologna. Experienced in social innovation and community welfare theories, including theory of change methods. Participated in the Horizon 2020 project ENLIGHTENme, in collaboration with the London School of Economics, the Urban Innovation Foundation, and the Municipality of Bologna, applying action research and co-design methods to explore youth and territorial dynamics. Her research focuses on participatory urban development, social inclusion, and the role of culture in shaping urban interventions.

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Architect with international professional experience in the UK and Australia, alongside teaching experience in Spain. She holds degrees from the University of Bath and the Manchester School of Architecture, and completed her RIBA Part 3 at the University of Westminster in 2019. With over four years of experience in architecture and urban design, her work encompasses residential, educational, commercial, and public realm projects. She is an active member of the Architects Climate Action Network (ACAN) in the UK and previously in Spain. Her doctoral research explores circular economy principles, industrialised construction, design for disassembly, life-cycle assessment, and integrated strategies to enhance housing affordability and sustainability.

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She has coordinated several international Master's programmes in urban planning and urban studies at UGA. Research and publications examine the transformations of social and affordable housing, as well as emerging collaborative practices and experimental approaches in housing production, management, and use.

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Architect focused on social and environmental sustainability, with experience across residential, listed, community, and low-carbon retrofit projects, including the EU-funded Homes As Energy Systems (HAES). She holds architecture degrees from the Manchester School of Architecture and the University of Liverpool, where her investigation into the pragmatic and societal results of automation led to a new housing typology and the award-winning thesis Automonument.

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Zoe Tzika

Early-stage researcher

Architect holding a Diploma in Architecture from the Aristotle University of Thessaloniki and a Master's degree from the Institute for Advanced Architecture of Catalonia. She has gained professional experience in Denmark, France, and Greece, working on housing, participatory design, and urban planning projects. Her doctoral research examines community participation and cooperative housing in Catalonia, analysing how collective dwelling practices transform social and spatial relations and foster the co-production of housing, space, and community. Her research addresses alternative housing models, collective agency, and transdisciplinary approaches.

Elanor Warwick

Partner organisation

Head of Strategic Policy Evidence and Research at Clarion Housing Group. Oversees research on affordable housing and occupant experiences, previously Head of Research at CABE. Her PhD was in estate regeneration, and research since covers housing quality, new towns, Lifetime Neighbourhoods, and measuring intangibles such as wellbeing and social value. Supervises postgraduate research at Bartlett UCL and Cambridge University. Trustee of The Good Homes Alliance and Commonweal Housing Trust, an action-learning charity addressing housing injustice.

Ana Zadelj Kovač

Partner organisation

She holds a Master's degree in Social Policy and works at CERANEO—a civil society organisation. Her work involves project preparation, monitoring, implementation, and dissemination in homelessness, housing, and the social inclusion of NEET youth. Key aspects of her work include promoting sustainability, applying evidence-based social policy, and fostering collaboration between academia, NGOs, and local communities. Currently manages the European Social Fund (ESF) project “And Where Are You? Reactivation and Integration of Inactive Youth in NEET Status.”

Consortium

The RE-DWELL consortium is composed of 10 higher education institutions—in whose doctoral programmes the ESRs are enrolled—and 12 partner organisations, where they carry out their secondments, representing a total of nine European countries.

HIGHER EDUCATION INSTITUTIONS

Institute for Social Policy (ISP),
University of Zagreb (UNIZG)
CROATIA

School of Technology and Architecture,
University Institute of Lisbon (ISCTE-UL)
PORTUGAL

Department of Architecture, University
of Cyprus (UCY)
CYPRUS

School of Architecture La Salle, Ramon
Llull University (Project Coordinator)
SPAIN

PACTE – Laboratoire de sciences
sociales, Université Grenoble Alpes
(UGA)
FRANCE

School of Architecture, Polytechnic
University of Valencia (UPV)
SPAIN

Centre for Social Sciences, Hungarian
Academy of Sciences (CSS)
HUNGARY

School of Built Environment, University
of Reading (UREAD)
UNITED KINGDOM

Faculty of Architecture and the Built
Environment (ABE), TU Delft (TUD)
NETHERLANDS

Sheffield School of Architecture,
University of Sheffield (USFD)
UNITED KINGDOM

PARTNER ORGANISATIONS

Housing Europe (HE) BELGIUM	European Federation for Living (EFL) NETHERLANDS
CERANEO CROATIA	CASAI Lisbon City Council (LCC) PORTUGAL
Cyprus Land Development Corporation (CLDC) CYPRUS	Institut Català del Sol (INCASÒL) Sostre Cívica SPAIN
Budapesti Módszertani Szociális Központ (BMSZKI) Városkutatás Kft (MRI) HUNGARY	Clarion Housing Group (CLARION) South Yorkshire Housing Association Ltd. (SYHA) UNITED KINGDOM

Fifteen early-stage researchers were selected through an open call to carry out their PhD research at the host universities, under the supervision of academic supervisors and co-supervisors from the participating universities and with guidance from representatives of the partner organisations where they complete their secondments.

EARLY-STAGE RESEARCHERS

Mahmoud Alsaeed University of Sheffield	Tijn Croon TU Delft
Supervisor: Karim Hadjri (USFD) Co-supervisors: Ignacio Guillén (UPV), Krzysztof Nawratek (USFD) Secondments: HE, SYHA	Supervisor: Marja Elsinga (TUD) Co-supervisor: Joris Hoekstra (TUD) Secondments: CLARION, EFL, HE
Lucia Chaloin Université Grenoble Alpes	Annette Davis School of Architecture La Salle, Ramon Llull University
Supervisor: Adriana Diaconu (UGA) Co-supervisors: Paulette Duarte (UGA), Joris Hoekstra (TUD) Secondments: LCC	Supervisor: Núria Martí (La Salle-URL) Co-supervisors: Ignacio Guillén (UPV), Alexandra Paio (ISCTE-UL) Secondments: TUD, UPV

Aya Elghandour
University of Sheffield

Supervisor: Karim Hadjri (USFD)
Co-supervisors: Vasco Moreira Rato (ISCTE-UL), Krzysztof Nawratek (USFD)
Secondments: ISCTE-UL, SYHA

Alex Fernández
TU Delft

Supervisor: Marja Elsinga (TUD)
Co-supervisors: Gojko Bezovan (UNIZG), Marietta Haffner (TUD)
Secondments: CERANEO, HE, INCASÒL

Saskia Furman
School of Architecture La Salle, Ramon Llull University

Supervisor: Anna Martínez (La Salle-URL)
Co-supervisors: Karim Hadjri (USFD)
Secondments: HE, INCASÒL

Marko Horvat
University of Zagreb

Supervisor: Gojko Bezovan (UNIZG)
Co-supervisors: Gerard van Bortel (TUD), Ivan Rimac (UNIZG)
Secondments: CERANEO, TUD

Anna Martin
Hungarian Academy of Sciences

Supervisor: József Hegedüs (MRI)
Co-supervisors: Adriana Diaconu (UGA), Gerard van Bortel (TUD)
Secondments: BMSZKI, CERANEO, MRI

Carolina Martín
University Institute of Lisbon

Supervisor: Alexandra Paio (ISCTE-UL)
Co-supervisors: Núria Martí (La Salle-URL), Carla Sentieri (UPV)
Secondments: CASAI, La Salle-URL, UPV

Andreas Panagidis
University of Cyprus

Supervisor: Nadia Charalambous (UCY)
Co-supervisors: Gábor Csanádi (CSS), Andreas Savvides (UCY)
Secondments: ISCTE-UL, UREAD

Androniki Pappa
University Institute of Lisbon

Supervisor: Alexandra Paio (ISCTE-UL)
Co-supervisors: Paulette Duarte (UGA), Carla Sentieri (UPV)
Secondments: La Salle-URL, LCC

Effrosyni Roussou
University of Cyprus

Supervisor: Nadia Charalambous (UCY)
Co-supervisors: Andreas Savvides (UCY), Carla Sentieri (UPV)
Secondments: UPV, USFD

Leonardo Ricaurte
University of Reading

Supervisors: Stephen Gage, Lorraine Farrelly, Flora Samuel (UREAD)
Co-supervisor: Jean-Cristophe Dissart (UGA)
Secondments: CLARION, TUD, UGA

Zoe Tzika
Polytechnic University of Valencia

Supervisor: Carla Sentieri (UPV)
Co-supervisors: Anna Martínez (La Salle-URL), Adrienne Csizmady (CSS)
Secondments: La Salle-URL, Sostre Cívica

