Proceedings

RE-DWELL Conference

Sustainable Living, Affordable Homes: Meeting the Challenge Together

School of Architecture La Salle

Barcelona, 16-17 May 2024

RE-DWELL
MSCA-ITN

RE-DWELL “Delivering affordable and sustainable housing in Europe” has received funding from the European Union’s Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 956082

RE-DWELL

Deliverable 3.8 RE-DWELL Barcelona Conference

Version 1

September 2024

DOI 10.5281/zenodo.13786641

Editor:

Leandro Madrazo
School of Architecture La Salle
Ramon Llull University
Barcelona, Spain

Table of contents

About the conference 8

Introduction

Leandro Madrazo 11

Keynote address

Michelle Norris, *Resilient and fragile social housing systems: The micro political economy of social renting in Western Europe Europe* 19

Interactive sessions

Session 1: *Reimagining housing: Innovative designs for thriving communities* 41

Session 2: *Fostering sustainable living: Empowering communities for inclusivity and resilience* 49

Session 3: *Reconsidering regulatory frameworks: Policies and financing for affordable and sustainable housing* 53

Papers and long abstracts

Mahmoud Alsaeed, Karim Hadjri, Krzysztof Nawratek, *Exploring the building blocks of sustainable social housing frameworks* 57

Adirane Calvo, Álvaro Sicilia, *Fostering sustainable renovation: Enhancing building Renovation Passport through large-scale retrofitting evaluation* 65

Ebru Erdogan, Abdullah Erdogan, S. Didem Boztepe Erkis, *Planning proposal for the future of traditional Sille houses in the context of sustainable historical fabric using the shape grammar method* 79

Saskia Furman, Anna Martínez, Xavier Martín, *Social housing retrofit: Case studies in resident engagement* 99

Marko Horvat, *Improving housing affordability through housing allowances: a pilot project in Croatia* 103

Margaux Lespagnard, Waldo Galle, Niels De Temmerman, *Spectrum thinking for an equitable housing landscape* 111

Aboli Mangire, *Socio-spatiality as a methodological lens . Architectural building assessment of contemporary social mass housing in India* 127

Andreas Panagidis, Effrosyni Roussou, *Clientelism and infrastructural gaps in Southern Europe: The implications on housing and urban governance* 137

Newsha Salari, *Unfulfilled promises and unintended permanence: The evaluation of the Temporary Relocation Areas (TRA) in Stjwetla, Johannesburg, South Africa* 145

Zoe Tzika, Carla Sentieri, Anna Martínez, *Key topics and challenges for creating community-led, inclusive, and sustainable housing: Grant-of-use cooperative housing in Catalonia* 157

Visual essays and posters

Aya Badawy, *A simulation model of the negotiations on affordable housing in England* 165

Noémi Gyárfás, *Opportunities and limits. Spatial sustainability of apartment buildings in Buda, built in the 1970s*..... 167

Lorenzo Stefano Iannizzotto, Alexandra Paio, *Is there life between buildings? Observing the potential of Terrain Vague for fostering sustainable living*..... 169

Fabio Lepratto, Giuliana Miglierina, Stefano Guidarini, *Regenerating San Valentino public housing estate in Terni, Italy. Experimenting with urban and architectural regeneration*..... 171

Farishtay Zaidi, Zohaib Zuby, *An experiment for affordable design*..... 173

About the conference

The RE-DWELL conference **"Sustainable Living, Affordable Homes: Meeting the Challenge Together"** took place at the School of Architecture La Salle on May 16 and 17, 2024.

This was RE-DWELL's second conference, following the one held in Grenoble in December 2022, and it served as the concluding activity for the network's work. Its aim was to showcase the network's achievements over its three-year duration and to facilitate discussions between RE-DWELL members and external participants from academia, policy, and practice on the challenges of delivering affordable and sustainable housing. The conference provided a platform for addressing current issues and exploring future directions to tackle the societal challenge of sustainable and affordable housing in Europe.

A total of 46 delegates were present at the conference, from them 33 RE-DWELL members (including ESRs, supervisors and partner organisations) and 13 external participants. The programme featured sites visits, debates, a keynote address and hands-on activities.

The day before the conference, guided visits were conducted in the Barcelona metropolitan area. These included an ongoing urban regeneration project in the La Mina neighbourhood of Sant Adrià del Besòs, managed by RE-DWELL partner organization Incàsol; a recently completed social housing project in Masnou by architects Peris+Toral; and a student housing project in Sant Cugat del Vallès by HARQUITECTES.

The first day featured three interactive sessions, moderated by early-stage researchers, bringing together RE-DWELL members, guest speakers, and external presenters selected through an open call.

Each session brought together topics spanning the three core areas of the RE-DWELL research framework: Design, Planning, Building; Community Participation; and Policy and Financing:

Session 1. Reimagining housing: Innovative designs for thriving communities (see video recording)

Session 2. Fostering sustainable living: Empowering communities for inclusivity and resilience (see video recording)

Session 3. Reconsidering regulatory frameworks: Policies and financing for affordable and sustainable housing (see video recording)

The first day concluded with the presentations of the work by two architectural firms — HARQUITECTES and Peris+Toral—which are approaching social housing from an innovative and sustainable perspective (see video recording).

On the second day, Michelle Norris from University College Dublin delivered a keynote speech (see video recording) examining the literature on social rented housing systems since the 1980s.

The closing session introduced the RE-DWELL transdisciplinary research framework for affordable and sustainable housing, developed collaboratively by network members, including early-stage researchers, supervisors, and partner organizations. Participants divided in teams engaged in a hands-on session to apply the framework to specific case studies.

An exhibition showcasing the network's work over the three-year project was on display throughout the conference.

Introduction

Leandro Madrazo, *Conference chair*
School of Architecture La Salle, Ramon Llull University, Barcelona

This proceedings includes the keynote address, summaries of the three interactive sessions, ten papers and long abstracts, and five visual essays presented as posters at the conference.

The contributions encompass a diverse array of topics and challenges faced by sustainable and affordable housing, spanning multiple scales and domains. Key issues include the declining resilience of social housing systems due to reduced public funding, privatization, and political factors, alongside internal issues like financing and governance; the necessity to ensure residents' participation in the planning and retrofitting processes for ensuring that housing solutions address their actual needs and foster a sense of ownership and trust among them; the role of cooperative housing as alternative to privatised housing market; collaborative approaches that integrate residents' knowledge with expert insights in the upgrade of the living areas, formal and informal, at the building and urban scales; the pressing need to address climate change impacts through energy-efficient building retrofitting and the application of circular economy principles; the application of vernacular housing principles, incorporating passive solutions, to contemporary housing, along with the adaptation of traditional and historic homes to meet the needs of today's dwellers; the importance of aligning policies and financing mechanisms to support affordable housing along with the utilisation of tools like housing allowances and renovation passports to promote equitable and sustainable housing, and the need of innovative frameworks that integrate sustainability and community engagement in the provision of affordable housing.

Keynote address

In her speech, *Resilient and Fragile Social Housing Systems,* Michelle Norris examined the declining resilience of social housing sectors, particularly noticeable in the Anglophone world and in former communist countries of Central and Eastern Europe. Since the late 1970s, social housing has faced significant cuts in public spending, resulting in its contraction and a shift toward exclusively serving the most vulnerable population. The privatisation of state-owned housing in Central and Eastern Europe subsequent to the dissolution of the Soviet Union serves to reinforce this vulnerability, given that it frequently failed to correspond with a need-based allocation of resources. This overall trend illustrates a broader pattern of weakening social housing tenures, indicating their precarious status within the welfare state.

The decline of social housing systems is often linked to macro-level political and economic factors, such as their roles in the housing market and the level of political support they receive. However, Norris highlighted that, in addition to these external drivers, there are internal factors that significantly influence the resilience and fragility of social housing systems, including financing arrangements, the role of non-governmental and community-based organizations, the socio-economic profiles of tenants, their political engagement, and the legal status and governance of social housing landlords.

Norris challenged prevailing narratives that depict social housing as primarily in decline. While acknowledging that the sector has contracted in many developed countries, she pointed out that significant areas of resilience persist, particularly in Western European nations where social housing remains stable or even grows. She advocated shifting the focus from a purely negative

view of fragility to understanding the micro-level factors that contribute to resilience in certain contexts, exploring why social housing thrives in some regions while struggling in others.

Interactive sessions

Session 1: Reimagining housing: Innovative designs for thriving communities

Moderated by: Mahmoud Alsaeed and Leonardo Ricaurte

The discussion focused on the importance of a transdisciplinary approach to housing innovation, particularly in incorporating resident engagement in retrofitting projects. A balanced approach to standardization—integrating elements of vernacular architecture with industrialised construction and circular building practices—is essential for developing sustainable housing that can address future challenges.

Panellists explored the tension between standardization for profitability and the need for individualization in housing, particularly regarding building retrofitting. Concerns were raised that while standardization can enhance profitability and support modern construction methods, it may also hinder creativity and flexibility if not aligned with future needs. The complexities of retrofitting existing housing in response to climate emergencies were also examined, addressing key issues such as reliance on energy-intensive technologies and insufficient policy guidelines for large-scale renovations.

Participatory methods for involving residents in building retrofitting were examined. While there was scepticism about the effectiveness of focus groups—viewed as better suited for generating ideas and feedback—they can still assist in mapping local dynamics. The involvement of local officials was recognised as crucial for understanding community needs. Participants expressed concern about the pressure on housing associations to meet ambitious goals, which can compromise meaningful engagement with residents. Advocates for qualitative methods highlighted the need to build trust and obtain genuine feedback, while the importance of expert guidance in decision-making was underscored, stressing that collaboration with residents is vital for successful outcomes.

Proposals for innovation in housing included designing entire housing blocks to support diverse, intergenerational solutions, calling for flexible regulatory frameworks and a dynamic view of home ownership. The need for evolving management practices was emphasised, along with the role of social housing providers in fostering innovative housing schemes.

Session 2: Fostering sustainable living: Empowering communities for inclusivity and resilience

Moderated by: Lucia Chaloin, Androniki Pappa and Zoe Tzika

This session focused on community participation in shaping sustainable and equitable housing solutions, addressing urbanization processes, alternative housing models, and housing provision in the context of increasing financialization and speculation in urban development.

Municipalities, increasingly reliant on profit-seeking private investments, often hinder innovation due to regulatory limitations. To foster sustainable housing development, it is essential to integrate diverse interests and resources from the public, private, and third sectors. Effective housing solutions must take into account broader economic and political dynamics, necessitating coordination across various levels of governance.

Cooperative housing initiatives can play a crucial role in combating speculation and social isolation. Additionally, equitable circular housing models aimed at minimising waste provide communities with the opportunity to manage their resources effectively. Emphasising co-design

and co-management in district-level renovations can ensure that developments meet the specific needs of residents.

Panellists remarked the critical importance of community participation in fostering sustainable living environments. By addressing mistrust, embracing alternative housing models, and promoting collaborative governance, communities can create resilient and inclusive housing solutions that counteract financialization and urban inequality. Transitioning to these collaborative housing models is essential; however, it requires public support to mitigate speculation and encourage development.

Session 3: Reconsidering regulatory frameworks: Policies and financing for affordable and sustainable housing

Moderated by: Tijn Croon and Marko Horvat

This session explored the critical relationship between policy and financing mechanisms that support sustainable and affordable housing, emphasising the challenge of balancing these objectives within local contexts. The significance of green and public investments was underscored, as they are essential for both encouraging the construction of new affordable homes and facilitating the retrofitting of existing housing stock. The role of fiscal policies and legal frameworks in promoting environmental justice was also discussed, underscoring the necessity for coordinated efforts across policy, financing, and community engagement to develop effective housing solutions.

Addressing the needs of marginalised populations in housing decision-making is vital for creating equitable solutions that benefit all community members. Strong political will and commitment are essential for advancing social housing initiatives and overcoming existing barriers to funding and development. Innovative tools, such as building renovation passports and flexible housing allowances, can enhance energy efficiency and accessibility for diverse demographics.

Rising interest rates and the accumulation of vacant properties in tourist areas demonstrate the need for strategic planning and policies to attract private investment to the most critical locations. Finally, improving the visibility and political framing of housing initiatives is critical for encouraging participation and achieving desired outcomes in housing policy.

Papers and long abstracts

In *Exploring the Building Blocks of Sustainable Social Housing Frameworks,* Alsaeed, Hadjri, and Nawratek examine how to integrate sustainability into social housing. Drawing on a combination of literature review and semi-structured interviews, the authors analyse existing sustainability frameworks and identify three major challenges—organizational, methodological, and fiscal—that hinder effective implementation. They call for comprehensive frameworks to guide planning and decision-making, structured around three essential pillars: sustainability dimensions, social housing processes, and the roles of public authorities. The authors advocate for a framework that clearly defines social housing criteria, emphasises sustainability, and optimises regulatory structures. By addressing these interconnected challenges, the proposed framework aims to effectively meet immediate housing needs while advancing broader social, environmental, and economic goals.

Fostering sustainable renovation: Enhancing building Renovation Passport through large-scale retrofitting evaluation by Calvo and Sicilia outlines the plan of an ongoing PhD thesis conducted in conjunction with the Retabit, a research project dedicated to developing a digital

platform to foster building renovation as part of the overall urban sustainable development, including economic, social, and environmental dimensions. The research explores how the Renovation Passport, introduced in the latest recast of the EU Energy Performance of Buildings Directive (EPBD), can be effectively integrated with urban-scale assessment methods to support comprehensive building renewal programs. These retrofitting initiatives are frequently launched without a thorough understanding of the existing building stock. To address this, the study aims to examine current methods for assessing sustainable retrofitting across various scales—from individual housing units to buildings, neighbourhoods, and cities. Moreover, it intends to identify deficiencies in existing practices and find opportunities for advancing the Renovation Passport.

Planning proposal for the future of traditional Sille houses in the context of sustainable historical fabric using the shape grammar method by Erdogan, Erdogan, and Boztepe Erkis focuses on preserving and sustainably developing the town's historical fabric using the shape grammar method. The Sille region, situated in the vicinity of Konya in Turkey, boasts a rich history spanning approximately 6,000 years and a diverse cultural heritage, as reflected in its distinctive architectural style. The study addresses the challenges posed by population changes and modern needs, emphasising the importance of understanding and maintaining Sille's architectural identity. In order to achieve this objective, the authors employ the shape grammar method to analyse the spatial components and rules that define the traditional architectural style. The application of shape grammars to derive architectural styles from precedents has been extensive, demonstrating their adaptability across a range of contexts. The proposed grammar enables the creation of new designs that align with Sille's historical character while accommodating contemporary requirements. The study concludes that this approach can guide sustainable renovations and new constructions in Sille, preserving its architectural language while allowing for thoughtful adaptation. Furthermore, integrating shape grammar with AI could further enhance the design process, supporting the development of new homes that respect the town's heritage and meet the needs of today's dwellers.

Social housing retrofit: Case studies in resident engagement by Furman, Martínez, and Martín examines the role of resident involvement in social housing with the objective of achieving energy efficiency goals. The work addresses the discrepancy between projected and actual energy performance in retrofitting projects, which is often due to resident behaviour and installation flaws. The authors highlight the importance of resident engagement, given that residents typically value non-energy benefits, and this is essential for enhancing sustainability and the overall quality of life. The analyses of case studies from the Netherlands, Spain, and the UK to aim to demonstrate how different decision-making approaches—top-down, bottom-up, and hybrid—affect retrofit outcomes. It argues that involving residents early and meaningfully can lower costs, boost energy efficiency, and empower communities. Furthermore, it advocates for integrating resident needs into planning and post-retrofit support, underscoring that effective engagement is vital for achieving sustainable results in social housing retrofits.

In *Improving Housing Affordability through Housing Allowances: A Pilot Project in Croatia,* Horvat examines the potential of housing allowances as a solution to housing affordability issues in Croatia. As housing costs continue to rise, especially in cities like Zagreb and along the Adriatic coast, many households are struggling to find adequate, affordable housing. This problem is exacerbated by the country's fragmented housing market, where housing demand is high in urban centres but low in rural areas. The study focuses on a Croatian pilot project that provides housing allowances to younger individuals and families with incomes below the national average, aiming to improve access to rental housing. The research involves a literature review, interviews with Croatian authorities, and a survey of subsidy recipients to evaluate the project's

effectiveness and explore its potential for broader implementation. The findings suggest that while housing allowances can temporarily alleviate affordability issues, they must be tailored to regional conditions due to varying property prices and supply across Croatia. Horvat concludes that expanding and modernising housing allowances could help address the affordability crisis, particularly for the younger generation, until more public and social rental housing is available. This could also mitigate the trend of young Croatians emigrating in search of better living conditions.

Spectrum thinking for an equitable housing landscape by Lespagnard, Galle and De Temmerman discusses the urgent need for equitable housing solutions in the face of a growing housing crisis exacerbated by gentrification and profit-driven real estate practices. It critiques traditional housing models—like owner-occupied and rental options—that often fail to meet diverse household needs and contribute to inequalities. The authors propose a "housing spectrum" methodology that categorises housing models based on four dimensions: resident responsibility, initial costs, long-term costs, and residential equity. By analysing 16 case studies across Europe, the research highlights how different models can address various household capabilities and needs. Key findings include the relationship between resident participation and reduced long-term costs, as well as the importance of diverse housing options. The spectrum serves as a visual and interactive tool for policymakers and practitioners to explore and compare housing models, ultimately advocating for a more inclusive housing landscape that meets the needs of underserved communities.

Mangire's *Socio-spatiality as a methodological lens: Architectural building assessment of contemporary social mass housing in India* examines liveability in Indian social housing, focusing on thermal comfort and social cohesion through a socio-spatial methodology. In the hot and dry regions of India, architects have traditionally employed passive cooling techniques to prevent overheating and improve thermal comfort, using elements such as solar shading, cantilevers, courtyards, light shafts, and semi-open corridors to regulate heat and airflow. However, the shift from low-rise to mid-rise housing, along with rising land costs, has led to a decline in these spacious, sustainable designs. Green spaces also play a crucial role in improving liability and social cohesion but are often poorly designed, resulting in neglect and social challenges. Her research examines liveability in Indian social housing by focusing on thermal comfort and social cohesion through a socio-spatial methodology. Preliminary findings underscore the need for integrated housing, climate, and transport policies to address post-occupancy needs and enhance long-term sustainability.

Panagidis and Roussou argue in *Clientelism and infrastructural gaps in Southern Europe: The implications on housing and urban governance* that unaffordable housing is a consequence of pro-market policies, which lead to distrust in governance and exacerbate inadequacies in transportation, housing, utilities, and public services. Clientelism and collusion, particularly prevalent in Southern Europe, hinder citizen participation in urban planning, as seen in scandals like Mafia Capitale and the Mall of Athens. The authors aim to examine the impact of clientelism on local planning, contrasting state-market alliances with community-organised initiatives that challenge neoliberal approaches. Their findings reveal that institutional dynamics shape urban development, while ongoing corruption undermines trust in public institutions. Although grassroots movements resist exclusionary practices, their influence on policy remains limited. Consequently, they emphasise the need for dialogue between clientelist practices and grassroots efforts to improve citizen participation in infrastructure development.

In *Unfulfilled Promises and Unintended Permanence: The Evaluation of the Temporary Relocation Areas (TRA) in Stjwetla, Johannesburg, South Africa,* Salari examines the stark inequalities in urban areas, focusing on Stjwetla, an impoverished settlement in Johannesburg facing inadequate housing, a lack of basic services, and high unemployment. Despite government initiatives to improve living conditions, such as temporary relocation units, many efforts have failed due to poor execution, lack of community involvement, and insufficient monitoring. Her research seeks to bridge the gap between expert knowledge and community needs in Stjwetla by prioritizing urgent issues aligned with the Sustainable Development Goals (SDGs). It underscores the importance of community involvement in urban development projects to ensure that proposed solutions effectively address local challenges. The field research involved surveys and interviews to gather Stjwetla residents' perspectives, which were then analysed using the Analytic Network Process (ANP) to prioritise needs. The results indicate that poverty and unemployment are the most pressing issues facing the community. Addressing these challenges requires comprehensive, sustainable solutions that not only tackle immediate needs but also promote long-term economic stability. Salari concludes that effectively transforming Stjwetla necessitates increased support from government and organizations, the development of infrastructure, and active participation from residents to achieve lasting improvements in living conditions.

Over the past two decades, Barcelona has experienced a rise in cooperative housing through the grant-of-use model, driven by socio-political changes following the global financial crisis. This grassroots movement aims to provide affordable housing while adapting to demographic shifts, characterised by long-term occupancy rights, active resident participation, and communal living arrangements. In *Key topics and challenges for creating community-led, inclusive, and sustainable housing: Grant-of-use cooperative housing in Catalonia,* Tzika, Sentieri, and Martínez applied a mixed-method approach to examine 66 cooperative projects in Catalonia through case studies and interviews with various stakeholders. The findings reveal that these projects promote community engagement, combat loneliness, and foster interpersonal relationships, with groups adopting various strategies for project realization, ranging from self-management to collaboration with umbrella cooperatives. This engagement creates a sense of belonging and empowers community members to contribute to the decision-making process, ultimately enhancing the effectiveness and sustainability of the housing initiatives.

Visual essays

In *A Simulation Model of the Negotiations on Affordable Housing in England,* Badawy examines the negotiation process involving private developers, Registered Social Landlords (RSLs), and local authorities in the provision of affordable housing. Their analysis demonstrates how negotiators' emotions and expectations significantly influence the outcomes, often leading to substantial discrepancies in the number of affordable units created. The proposed RUNE model illustrates this dynamic, emphasising the importance of training negotiators to enhance their skills and effectively navigate the complexities of these discussions to improve affordable housing provision..

Gyárfás's *Opportunities and Limits: Spatial Sustainability of Apartment Buildings in Buda, Built in the 1970s,* focuses on small-scale apartment buildings constructed in Buda during the late 1960s, which sought to address housing shortages while allowing for private property ownership. Despite operating under budget constraints, these buildings featured innovative designs driven by local artisanry and the ingenuity of entrepreneurial architects. While they

provide spatial adaptability and are made from high-quality materials, many are struggling to meet contemporary expectations, resulting in plans for demolition in some cases.

Is There Life Between Buildings? Observing the Potential of Terrain Vague for Fostering Sustainable Living, by Iannizzotto and Paio, investigates the emergence of Terrain Vague, also known as Urban Voids. These abandoned spaces, which merge urban and natural elements, present opportunities for sustainable living. Often overlooked, such areas have the potential to foster community engagement, enhance biodiversity, and encourage creative practices. By acknowledging and promoting the spontaneous uses of these spaces, they can be transformed into valuable urban resources that enrich local community

In *Regenerating San Valentino Public Housing Estate in Terni, Italy: Experimenting with Urban and Architectural Regeneration,* Lepratto, Miglierina, and Guidarini present a comprehensive project aimed at revitalising the San Valentino public housing estate, a complex built in the 1960s that is currently suffering from decline and neglect due to its isolated location, outdated buildings, and poor-quality public spaces. This initiative, implemented by a regional public entity responsible for public housing in collaboration with a university research group, seeks to address issues of decay and enhance public spaces through new designs that prioritise community connectivity and diversified uses. By incorporating flexible housing solutions and innovative construction methods, the project aims to meet the evolving needs of residents while fostering a more vibrant urban environment.

Finally, in *An Experiment for Affordable Design,* Zaidi and Zuby tackle Karachi's pressing affordable housing crisis, exacerbated by socio-economic inequalities and inadequate urban planning in Pakistan. Their research focuses on two cases, Fozia's House and Wallah's House, each employing distinct financing strategies to alleviate housing shortages and promote community involvement. The success of Wallah's House demonstrates the value of empowering residents through co-financing and participatory design, whereas the challenges encountered by Fozia's House underscore the essential role of occupant engagement in the housing development process

Keynote address

Resilient and fragile social housing systems: The micro political economy of social renting in Western Europe

Michelle Norris

Professor of Social Policy and Director of the Geary Institute for Public Policy, University College Dublin, Ireland

Recording available

1. Introduction

Housing is often described as "the wobbly pillar under the welfare state" (Torgersen, 1987) because many scholars think that housing plays a modest role in welfare states and is more prone to retrenchment than other welfare services and social security benefits. Kemeny (1995) points out that substantial nonmarket decommodified housing provision – in the form of social rented housing - has emerged only in a select group of advanced countries, primarily in Western Europe and to a lesser extent in the Anglophone countries outside Europe and the advanced economies in East Asia. Harloe (1995) agrees that housing has remained the 'the least decommodified, most market determined' sector of the welfare state because, even in those countries, where social housing is provided, it has remained a minority and very fragile tenure in every free-market economy. In his view large scale social housing is an 'abnormal' form of provision, which only emerges as part of an effort to resolve a systemic social and economic crisis and, when this crisis is resolved, the sector tends to shrink and revert to what he considers the more normal, small and targeted model of provision. Lundqvist echoes this view He argues that large scale social housing provision became too expensive for governments by the 1990s and government intervention in housing provision shifted from 'the comprehensive and general to the supplementary and specific' (Lundqvist, 1992). Pierson's (1994) study of neo-liberal inspired attempts at Dismantling the Welfare State in the UK and USA during the 1980s concludes that these were largely unsuccessful with the notable exception of social housing, which he suggests is far more vulnerable to retrenchment that other welfare programmes.

This pessimistic view of the resilience of social housing sectors reflects the evidence regarding the direction of policy change in recent decades, particularly in the Anglophone world and in most former communist countries of Central and Eastern Europe. A sizeable literature has accumulated which indicates that social housing has borne the brunt of public spending cuts introduced since the late 1970s in Australia, Canada, England, Ireland and the United States and, as a result, it has contracted and also residualised (i.e. become increasingly focused on housing the poorest and most socially excluded households) (Scanlon, Whitehead & Arrigoitia, 2014; Byrne & Norris, 2018; Pawson, 2006; Dalton, 2009; Vale & Freemark, 2012). Following the fall of communism in the late 1990s/ early 2000s the state-owned housing which had been provided under this system in Central and Eastern Europe was privatised in many countries by means of sales to tenants or sometimes given away free of charge. Although this tenure was not entirely equivalent to social housing in the West (because it was not always allocated according to need), the two sectors shared much in common (both are non-market tenures, subsidised by government) (Hegedus & Tosics, 1996). Therefore, this development could be interpreted as further evidence of the fragility of the social housing tenure (Lux & Sunega, 2014).

The literature offers a wide variety of explanations for the particular fragility of social housing compared to the other elements of the welfare state. Harloe's explanation emphasises housing's asset value - because private property rights are central to the operation of market economies, proposals that threaten such rights are more strongly resisted than efforts to decommodify provision of other less economically important and lucrative services such as health. In his view, this explains why large-scale social housing sectors only emerge when limitations on provision of housing by the market are of "strategic importance for the maintenance and development of the capitalist social and economic system" (Harloe, 1995). He suggests that these conditions existed during the Fordist period which followed World War II in some Western European countries, so large social housing sectors emerged at this time but, since the rise of post-Fordism in the 1970s, the social housing sector contracted, and home ownership has come to dominate. Pierson (1994) identifies the 'lumpy' and capital focused nature of government investment in social housing, which is characterised by large one-off investments whose effects are spread over a long period of time, as factors which render this sector uniquely vulnerable to retrenchment. This means that a government can enjoy the benefits of selling social housing to tenants or cutting capital funding for the sector, while the disbenefits in terms of lack of affordable housing supply will be felt by future governments and future generations. The 'tenure modernisation' thesis proposed by Malpass and Murie (1987) and refined by Malpass and Victory (2010) proffers a more directly, functionalist explanation for rise and fall of social housing in the UK. They argue that in the UK social housing provision played a key role in transforming the housing market and underpinning economic and social progress during the mid-twentieth century by providing good quality, and affordable homes to the skilled working class who were both economically and politically powerful during this period. However, the expansion in home ownership drew more middle and lower-income household into this sector while the concurrent contraction of the private rented sector reduced the availability of this housing option. Both of these factors increased the political pressure to target social housing on low-income households only. More recent research points to the role of neo-liberal ideology in justifying reductions in public spending on social housing and privatisation of the sector (e.g. (Rolnik, 2013; Blessing, 2016). However, these studies echo functionalist analyses as far as they also emphasise the practical function of these policy changes in the wider neo-liberalisation project. This commentary has focussed on the role which falling social housing provision has played in forcing more households to look to the private sector for housing and thereby supporting the growth of housing markets and also financial markets which proponents of neo liberalisation believe are the most efficient and effective mode of service delivery and funding (McCabe, 2011; Meek, 2014).

This paper adopts a different approach to these dominant narratives in the literature on social housing. Firstly, it departs from the declinist interpretations of this tenure's trajectory which dominate the literature on social housing. While there is no doubt that this sector has contracted in many developed countries since the late 1970s, more detailed analysis reveals that significant pockets of resilience remain amid this fragility. Most notably, in terms of the proportion of households accommodated in social housing, tenure is static or growing in several of the Western European countries where it has traditionally been strong. Similarly, new output remains high, while outside Europe reliance is also evident in the pockets of social housing provision which exist in the advanced economies of East Asia such as Hong Kong (Ronald & Doling, 2014). Thus, instead of focusing solely on the *fragility of social housing systems* this paper focuses instead on these significant vestiges of *resilience* that have persisted in this tenure and tries to clarify why it has proved resilient in some countries, but fragile in others.

Secondly, although the analysis presented here acknowledges that macro political economy factors, such as the role of social housing in resolving social and economic crises, its function in the housing market and economy and the related issue of the strength or weakness of the political and ideological support it receives play a critical role in shaping the resilience and fragility of the tenure in different countries, these 'big picture' factors are not the focus of this paper. In contrast to the norm in the literature, rather than concentrating on the macro level and on the role which political and economic factors primarily external to the social housing system play in shaping its resilience and fragility, this paper focuses on the micro level and on the influence of political and economic factors which are primarily internal to the social housing system. As its title explains, this paper examines the micro-political economy of social housing.

The remainder of the paper is organised into three further sections. The next section outlines the concepts which underpin the analysis and how the countries examined were selected. The main body of the paper then focus on four key micro political economy factors which have exerted the resilience and fragility of social housing systems in these countries. These are:

- social housing financing arrangements
- arrangements for procuring and paying for land for social housing and land use planning arrangements
- the legal status, organisation, and governance of social housing landlords, and
- the socio-economic profile of social housing tenants and the related issue of the nature and focus of tenant politics and campaigns

For reasons of space, however, the paper focuses primarily on the first two of these themes. The conclusions to the paper reflect on the implications of the analysis for the social housing literature.

2. Concepts and cases

2.1 Focus, aims and definition of terms

The terms resilience and fragility have a variety of meanings in the social scientific literature (Jacobs & Malpas, 2018). However, in this paper these terms are used in a specific and rather narrow way to refer to:

– The tendency of social housing sectors to expand (in resilient cases) or contract (which indicates fragility) over the long run in terms of the proportion of all households accommodated and,
– The ability or inability of these sectors to continue to expand or at least retain their share of households accommodated in context of challenges related to the wider political economy (e.g. economic, fiscal or banking crises, ideological and/or political opposition). The ability to withstand adverse changes in the wider political economy context is a key feature of resilient social housing sectors, fragile sectors don't share this characteristic.

The definition of what constitutes social housing varies significantly between countries and the size and characterists of the sector also varies depending on the particular definition used (Granath Hansson & Lundgren, 2019). Here this term is deployed in a relatively inclusive way to mean rented housing allocated according to non-market criteria (such as need or waiting time) rather than ability to pay. Other social housing researchers limit their analysis to dwellings provided by non profit or government agencies and/or let at sub-market rents, but this approach excludes large numbers

dwellings which are defined by both governments and populations as social housing. Sometimes properties for sale (at below market value or on a shared equity basis) are categorised as social housing because they are commonly provided by social landlords, but these dwellings are no longer in the control of these organisations once sold, therefore there are excluded from the analysis set out in this paper.

2.2 Which fragile and resilient social housing systems?

The analysis presented here focuses on developments since 1980 in selected social housing sectors in Western Europe. This admittedly Eurocentric focus, which ignores the significant social housing sectors in North America, Australia, New Zealand, and several of the advanced East Asian economies, was selected for pragmatic and purposeful reasons. Pragmatically, it reflects the focus of the author's previous research, publications and therefore expertise on comparative housing policy. In addition, most countries in Western Europe have social rented housing sectors which fit within the definition of social housing set out above.

For logistical reasons it was not possible to examine all Western European countries, so only six cases are examined here. Austria, Denmark, England, France, Ireland and the Netherlands were selected as case studies for examination primarily because the varying patterns of resilience and fragility evident in their social housing sectors in recent decades means that they are particularly useful for exploring this paper's central focus (see Table 1). Austria and the Netherlands are defined as having high levels of social housing in Scanlon, Whitehead & Arrigoitia (2014) comparative analysis of social housing in Europe–this tenure accomodated 23.6 and 34.1 per cent of households in these countries respectively in 2020. While Denmark and France are have medium-sized social housing sectors (21.4 per cent of Danish households and 14.0 per cent of French households were social renters in 2020 and 2018 respectively). Social renting has expanded significantly in both Austria and Denmark since 1980–by 7.6 per cent in the former and 7.4 per cent in the latter, therefore both fall within the definition of resilient proposed above. Concurrently the sector grew marginally in France and remained static in the Netherlands which suggests that these sectors are resilient too but somewhat less so than their Austrian and Danish counterparts. Furthermore, the Dutch social housing sector has contracted over the longer term – it accomodated 41.1 per cent of households in 1979–so, in long term perspectve, this sector appears more fragile (Elsinga & Wassenberg, 2014). Ireland's social housing sector is small–it accomodated 12.7 per cent of households in 2020 compared to 12 per cent in 1980, but contracted during some of the intervening period. Therefore this country is categorised as a fragile case in this analysis. Responsibility for housing policy was fully devolved to the governments of the countries which make up the United Kingdom in 1999 and since then significant differences have emerged between the social housing sectors of these countries (Stephens, 2019). Therefore only the English social housing sector is examined in this paper. This sector is medium-sized compared to the rest of North Western Europe (it accomodated 16.5 per cent of households in 2020) but is the most fragile of the cases examined here because it has contracted by almost half since 1980.

Table 1. Social Housing as a % of all occupied dwellings in the European Union, 1980-2020

	1980	1990	2000	Mid/late 2000s	2015	2020
Austria	16	22	23	23[2]	26.2	23.6[9]
Belgium	Nav	Nav	7	7[3]	Nav	4.2[10]
Bulgaria	Nav	Nav	Nav	Nav	Nav	Nav
Cyprus	Nav	0	Nav	0[4]	Nav	Nav
Czech Republic	Nav	40[1]	Nav	20[4]	0.5	Nav
Denmark	14	17	19	19[2]	22.2	21.4
Estonia	Nav	Nav	Nav	1[4]	1.4	1.1[12]
Finland	Nav	Nav	16	16[3]	12.8	10.5[12]
France	15	17	17	15[5]	18.7	Nav
Germany	Nav	Nav	6	5[3]	3.9	2.7[9]
Former East Germany	Nav	74[1]	-	-	-	-
Greece	0	0	0	0[3]	Nav	Nav
Hungary	Nav	26[1]	Nav	3[3]	4.0	2.6[10]
Ireland	12	10	8	8[4]	8.7	12.7[11]
Italy	5	6	5	4[3]	Nav	Nav
Latvia	Nav	74[1]	Nav	0	0.2	1.9[11]
Lithuania	Nav	Nav	Nav	Nav	Nav	0.8
Luxembourg	Nav	Nav	Nav	Nav	1.6	Nav
Malta	Nav	Nav	Nav	6[4]	5.5	Nav
Netherlands	34	38	34	32[3]	34.1	34.4
Poland	Nav	Nav	Nav	12	8.3	7.6[11]
Portugal	Nav	Nav	Nav	Nav	2	Nav
Romania	Nav	Nav	Nav	Nav	Nav	Nav
Slovakia	Nav	27[1]	4	4[4]	1.6	Nav
Slovenia	Nav	Nav	Nav	6[4]	6.4	4.7[10]
Spain	Nav	2	Nav	Nav	Nav	1.1[9]
Sweden	20	22	18	17[3]	Nav	Nav
United Kingdom	31	25	20	20[4]	17.6	16.7[9]
England	31.7[7]	23.0[8]	19.5	18.6[4]	17.1	16.5

Note: 1=: all rented housing is categorised as social housing, on the grounds that it was mostly state owned in 1990 and although this the two sectors are not entirely equivalent, they share many key characteristics in common 2 = 2009 data. 3 = 2008 data. 4= 2004 data. 5 = 2006 data. 6 = 2007 data. 7= 1981 data. 8= 1991 data. 9 = 2019 data. 10= 2018 data. 11= 2016 data. 12= 2017 data.

Source: (Norris and Shieds, 2004; Dol and Haffner, 2010); (Ministry of Housing Communities and Local Government, no date) and (OECD, 2022). The information from all of these sources is derived from census or register data.

The particular internal features of these social housing systems which this analysis suggests have contributed to these patterns of resilience and fragility have been flagged in the introduction to the paper. Their operation in the six case study countries is outlined in Table 2 which that marked inter-country variations in this regard. In terms of the characteristics of its social housing sector, Ireland stands out as an extreme case. Its small and highly residualised social housing sector is mainly delivered by local government and almost entirely government funded (see Table 2). Local government historically also played the dominant role in the provision of social housing in England, but this is no longer the case.

Table 2. Contributors to resilient and fragile social housing systems in case study countries

Explanatory variables		Case study countries					
Theme	Details	Austria	England	Denmark	France	Ireland	Netherlands
Land for social housing	Procured at full market value?	Rarely	Sometimes	Mainly	Rarely	Almost always	Rarely until recent decades, more often in recent decades
	Procurement methods most commonly used	Public land banking	Inclusionary zoning.	Public land banking.	Inclusionary zoning.	Purchase on open market using public loans. Inclusionary zoning.	Public land banking. Inclusionary zoning
Social Housing Finance	Main source of capital funding	Private mortage banks	Private bank loans and bonds (for housing associations). Government loans (local authorities)	Private mortgage banks	Non-market loans funded by tax free savings.	Government grants for construction, purchase and upgrading of dwellings	Private banks.
	Main source of revenue funding	Rents which reflect the cost of housing provision	Rents linked to the dwelling value and quality or to market rents (for designated new tenancies)	Rents which reflect the cost of housing provision	Rents linked to the building and financing costs.	Rents reflect tenants' incomes and generate minimal revenue.	Rents linked to housing quality (except for new dwellings).
	Number of sources of housing finance	Multiple: rents, government, bank loans and social landlords' equity.	Multiple: rents, government grants, bank loans and bonds	Multiple: rents, government, private loans, and social landlords' equity.	Multiple: rents, government, off market loans, landlords' equity.	One (almost entirely government funded)	Multiple: rents, bank loans, landlords' equity. No public supply side subsidies
	Social housing privatisation	Very limited	Extensive and highly subsidised	Very limited	None	Extensive and highly subsidised	Low pre 1990s, but high since then and subsidised.
Social Housing Landlords	Main providers of social housing	Limited profit housing associations	Non-profit housing associations (58.8%) and local authorities (41.2%)	Non-profit housing associations	Municipal housing companies and non-profit housing associations.	Local authorities (80%) and non-profit housing associations (20%).	Non-profit housing associations

Tenants	Allocation criteria	Targeted at employees/ the working class.	Targeted at the most vulnerable	Universalistic (i.e., open to most or all households).	Targeted at employees/ the working class.	Targeted at the most vulnerable	Universalistic
	Income characteristics of tenants	Middle income in housing association provided dwellings. But tenants of local authority provided social housing tend to have lower incomes.	Disadvantaged. 45% of social renting households had incomes in the lowest quintile and 37% were employed compared to 59% in all households in 2016.	Marginally below average. Average social housing tenants' household income is 68% of national average.	Average tenant household income is 74% of national average.	Disadvantaged. 35.9% of social renters had incomes below 60% of equivalised mean income in 2013, compared to 15% of homeowners.	Lower than average and falling but still contains significant mix of incomes.

Source: Carnegie, Byrne and Norris (2017); Czischke (2006); Lawson and Ruonavaara (2020) Tunstall and Pleace (2018), Scanlon, Whitehead and Arrigoitia (2014); Whitehead (2014); Wilson, (2019).

Instead non-profit sector housing associations now dominate new provision (Malpass, 2005). Housing associations are also the main social housing poviders of social housing in Austria, Denmark and the Netherlands and are significant providers in France too (as are muncipal housing companies which are separate from but, controlled by, local government). In Austria, Denmark, France, the Netherlands and the UK, a wide variety of sources of capital funding are used to fund the provision of new social housing, including: government grants and loans, commercial and non profit loans and tenants' and social landlords' own equity contributions (Whitehead, 2014). Table 2 also demonstrates that mechanisms employed to procure land for social housing and the extent to which land is procured at open market value or at sub market prices varies between the case study countries. In Ireland and Denmark land is mainly procured at full market prices, whereas in the other case study countries this is rarely the case.

3. Micro political economy drivers of social housing fragility and resilience

3.1 Finance

Financing arrangements exert a stronger influence on the resilience and fragility of the social housing sector compared to other pillars of the welfare state. This is because housing provision requires lumpy, up front capital spending before the service can be provided, consequently the sources, form and cost of this funding are key determinants of this tenure's strength or weakness (Ryan-Collins, Loyd & Macfarlane, 2017).

As well as being significant for the trajectories of social housing sectors, financing systems are also complex and varied between countries. This is illustrated by Table 3 which outlines the difference sources of capital funding used to build or buy new social housing or land for its development in the six case study countries. Notably, despite the level and complexity of information it presents, Table 3 does not paint a complete picture of these financing systems. It just captures funding that is monetised and therefore measurable, but non monetised mechanisms are widely used to help finance social housing in these countries. The latter includes government guarantees of borrowing, guarantee funds and transfer of cheap land and of dwellings at cost or below price by private developers (Whitehead, 2014).

Analysis of social housing systems in the six case study countries under examination indicates that three features of their capital financing arrangements have a particularly strong influence on their resilience and fragility. The first of these is the breath of these arrangements – meaning the number and variety of sources used to fund the social housing sector and the relationship between them. Table 3 reveals marked variation between the six case study countries in this regard. Sources of capital finance vary from a single source in Ireland, whereas English and Dutch social housing providers both draw on three sources of finance, and their counterparts in Austria, Denmark and France draw on at least five. Thus, financial circuits are narrower in the countries identified as fragile in the preceding section (England, Ireland and the Netherlands) and broader in the resilient cases (Austria, Denmark and France).

Table 3. Sources of Capital Funding for New Social Housing Provision in the Case Study Countries

% of capital funding	Austria (Limited Profit Housing Associations)	Denmark	England (Housing Associations))	France	Ireland (council housing)	Netherlands
0-10	Tenants' security deposits (0-10%)	Loans from mortgage banks (86-90%)	Public capital grants (0-30%)	loans from the Caisse des Dépôts et Consignations (70%)	Central government capital grants (70-100%)	Bank loans (70-80%)
11-20	Loan from the Lander (30-40%)					
21-30						
31-40			Cross subsidies from cheap land or provision of market price housing for sale or rent (0-30%)			
41-50	**LPHA's own equity (10-20%)**					
51-60						
61-70	Private bank mortgage (40-60%)		**Bond issues and priuvate bank loans (30-70%)**			
71-80				Social landlords' own equity (12-17%)	**Local authority capital funds (0-30%)**	
81-90				12-18% local or regional government subsidies		**Social Landlords' own equity (20-30%)**
91-100		**Local government loans (8-12%)**				
Minor and/ or irregular contribtors		tenants' security deposits (2%). Interest rate subsidies (funded by government and the National Building Fund). Govervent grants of up to 5% for costs which reflect public policy priorities such as energy efficieny.		1 % employer tax which part funds the government subsidies. Reduced VAT on new housing, exemption from business taxes and land purchase tax	Local property taxes (in recent years only)	

Note: Capital funding in Austria is provided within specified ranges which vary according to the project and regionally between the lander in this federal state. Capital funding in France varies according to the incomes of the tenants who qualify for the accommodation. The summary set out above VAT means Value Added Tax i.e. sales tax. Source: CECODHAS (2013) Gilmour, Washer and Lawson, (2012); Whitehead (2014); Norris and Byrne, (2017, 2018), Watt and Hodkinson, (2023).

One obvious explanation for this correspondence between the breath of financing circuits and the resilience of social housing sectors is that the combination of multiple sources of finance is more likely to result in greater funding availability and vice versa. This is clearly the case in Ireland, where the social housing sector's almost complete reliance on central government funding has severely limited levels of capital investment, particularly during periods of austerity, such as the mid-1980s and the years after the Global Financial Crisis, when government capital funding for the social house building in Ireland was radically reduced and housing output contracted radically as a result (Dukelow, 2014; Byrne & Norris, 2018). Similarly, availability of the bank lending, which provided the main source of capital funding for housing associations in England in the 1990s and early-2000s, declined significantly during the Global Financial Crisis and it took several years until alternative sources of debt from capital markets could be sourced (Williams & Whitehead, 2015). In contrast, the broad financial circuits used to fund social housing provision in Austria, Denmark and France are more likely to provide stable and adequate volumes of finance because the large number and variety of public, private and non-profit sector sources of finance reduce the likelihood that the availability of finance will be undermined by a crisis or scarcity in single funding source (Norris & Byrne, 2017).

Stability in terms of the volume and cost of capital finance provided over the medium to long term is a second feature of social housing financing arrangements that exerts a strong influence over the fragility and resilience of this tenure. Stability in the volume of capital finance is significant in this regard because fragile social housing sectors are characterised by sharp peaks and throughs its availability (e.g. Ireland) and declining availability over the long term (e.g. England and the Netherlands) whereas more resilient social housing sectors, such as the Austrian and Danish systems, are characterised by more stable availability of finance and therefore of housing output. Byrne & Norris (2018) argue that Ireland's highly unstable and also pro-cyclical (in economic and fiscal terms) pattern of social housing funding and output also results in critical supply inefficiencies because social housing output increases in line with fiscal expansion and economic growth, construction resources and land for social housing are procured at the top of the market when value for money is poor. Furthermore, social landlords often face challenges in reviving output following periods of cuts, because they may have laid off housing development staff, for instance, or not replenished land banks or secured planning permissions (Lewis, 2019; Norris & Hayden, 2020).

As mentioned above, stability in the volume of social housing capital finance is related to the breath of financial circuits. However, this is not the only reason for the stability of capital funding in Austria, Denmark and France. In these countries social housing financing arrangements are explicitly designed to provide sufficient and stable capital funding for the sector (Norris & Byrne, 2017). In Austria, for instance, the allocation of government capital subsidies for social house building is decided on the basis of four-year agreements between central and regional government. These planning cycles associated are considered to be key to the stability of social housing output and also help ensure that public capital funding is allocated to the regions that need it most (Amann & Mundt, 2005).

In addition to stable availability of capital for housing, stability in its cost is also an important enabler of resilient social housing system. Fluctuating cost of capital make it very difficult for social landlords to plan housing development programmes and, if the costs of funds rise sharply, landlords may decide that the risks of initiating development are too high (Oxley, 2009). The capital financing arrangements employed in the Austrian, Danish and French social housing sectors are strongly focused on keeping funding costs stable, low and predictable over the long term. Four primary explicit mechanisms are used for this purpose (see Table 3). First, in Denmark interest rate subsidies (co-funded by government and the Danish National Housing fund) ensure that costs of

loans from mortgage banks remain predictable. Second, in Austria 30 per cent of development costs are covered by regional government loans, which have a fixed interest rate, set at 1 per cent at the time of writing. Third, although non-government sources provide the most of capital funding for social housing development in Austria, Denmark and France, in each case this finance is sourced from markets that are highly regulated by government to ensure that costs are low and predictable. Thus the interest rates charged by commercial banks in Austria, the government subsidised savings scheme (the Caisse des Dépôts et Consignations) which finances social housing development loans in and the yields that mortgage banks in Denmark can obtain from lending to social housing providers are all regulated by government (Norris & Byrne, 2018; Pittini, Turnbull & Yordanova, 2021). In addition, the use of equity finance, in the form of government grants (in France) and social landlords' and tenants' equity contributions (in Denmark and Austria) also insulates the sector from the risk of interest rate fluctuations on debt (Amann, Lawson & Mundt, 2009; Norris & Byrne, 2018). In contrast, housing associations in England source most of their housing capital from commercial bank loans or raise it directly on capital markets, consequently they are more directly exposed to fluctuating financial market interest rates, fees and other lender requirements (Oxley, 2009; Wainwright & Manville, 2016).

The third characteristic of arrangements for capital funding of social housing provision which is significant from the perspective of the discussion at hand is their 'permeability' – ie. the extent to which investment in social housing provision is retained within the relevant financing circuit or it seeps out. This feature is significant because, if the value generated from investment in the sector the form of rents, assets, debt repayment/ equity and most importantly surpluses (i.e. excess of revenue over costs) can be retained in the system and recycled to fund the provision of new housing or the renovation of existing dwellings to ensure they remain occupied; this contributes to the resilience of the sector Conversely, if social housing financing circuits are permeable and the value of this investment seeps out and is captured by external actors- in the form of profits, rents, assets, equity, levies, interest payments or dividends for instance - this means that the tenure will require further investment to maintain or increase its share of the housing stock. Thus, permeable circuits of finance are associated with fragile social housing systems and sealed circuits are associated with resilience (Norris & Byrne, 2017).

In contrast the Austrian, Danish and French social housing sectors employ sealed circuits of finance whereby loans (supplemented by public subsidies) are raised to fund housing development, these debts are serviced using rents and, when they have been repaid in full, rents continue to be paid and generate a surplus which funds new development. Thus, these systems are essentially 'revolving funds' although the details of their design and operation varies between countries (OECD, 2021). Denmark has a distinctive centralised mechanism for pooling the social housing surpluses and redistributing them among social landlords via its National Building Fund. Whereas in Austria revolving funds operate at individual social landlord level. Here Limited Profit Housing Associations which are required by law to reinvest surpluses in new output and receive government subsidies (of up to 3.5 per cent) for doing so (Amann, Lawson & Mundt, 2009; Pittini, Turnbull & Yordanova, 2021). Relatively low rates of sales of dwellings to tenants at below replacement price also help to minimise leakage of surpluses from the social housing sectors in all three countries and facilitate their reinvestment, as do thresholds on interest rates and/or fees that banks and other non-governmental providers of debt finance can charge for social housing development loans.

By enabling the recycling of surpluses and their reinvestment in social housing provision, these sealed financing circuits reinforce the resilience of this tenure in several important respects. First, they enable social landlords to build up equity to contribute to the costs of social housing development, thereby increasing the stability, breath and the diversity of financing circuits. Second,

they introduce a strong element of internal or self-financing into these circuits. The Austrian, Danish and French social housing sectors are not entirely self-financing because a proportion of tenants receive housing allowances in all cases but, over the very long term, they are in large part self-financing in terms of the cost of capital for new housing provision. Oxley (2009) points out that the a "high level of internal funding implies a large degree of independence for the [social] housing provider", this insulates it from fluctuations in the availability of government and market finance and thereby reinforces its financial resilience. A third, related benefit of these self-financing arrangements, is that these mitigate the risks of political opposition to the tenure. They do this by reducing the potential for political opposition because largely self-financed social housing sector are less likely to have to compete with other pillars of the welfare state for scarce public resources and reducing its potential practical impact because by reducing reliance on public subsidies, which could be the target of retrenchment by political opponents of social housing.

The most obvious and significant fracture in social housing financing circuits through which investment can leak is via privatisation of dwellings. This has a particularly negative impact on the sector's resilience if dwellings are sold at below replacement value and/or if there are restrictions on the reinvestment of the capital generated from sales into provision of replacement dwellings. While privatisation of social housing, via sales to tenants is permitted in all the case study countries, but the length of time for which sales have been permitted, the rate of sales and the level of the discount applied to sale prices are generally significantly higher in the fragile cases and lower in resilient social housing systems. Sales have been particularly low in Denmark; they are higher in France and Austria but remain well below the norm in the fragile social housing systems under examination here. Furthermore, in Austria dwellings are sold at market value which is likely to reflect the replacement cost (Turnbull, 2020). In contrast, sales of social housing, have been widespread in Ireland since the 1930s and (Norris, 2016) estimates that some two thirds of the total social housing stock built by local authorities in this country have been sold to tenants (see also: (O'Connell, 2007). Similarly, sales of council housing to tenants at a discount following the introduction the 'right to buy' in 1981 is the primary reason the English social housing sector has contracted by almost half since then (Malpass, 1990; Forrest & Murie, 2010). Crucially, successive UK governments have also placed limits on the proportion of sale proceeds which can be reinvested in in new social housing provision (Forrest & Murie, 2010).

Although the proceeding discussion has focused on the impact which arrangements for capital funding of social housing provision have on the fragility and resilience of social housing systems, it is important to note that revenue funding arrangements are also significant in this regard. In most countries rents provide the main source of revenue funding and functions in revenue flow from rents not only create difficulties for meeting local landlords' existing management and maintenance and debt service obligations but also for securing further debt capital to develop additional housing. Thus, for revenue surety reasons, Oxley (2009) argues that setting rents at cost recovery levels (often called 'cost rents') has important benefits over other rent determination systems. In his view it is "better to make the link with ability to pay through housing allowances rather than using income-based rents. If it is dependent only on incomes, that revenue flow is less certain than when rents are underwritten by a housing allowance system" (Oxley, 2009). Notably, Austria, Denmark and France all employ cost rent setting arrangements, while in the three more fragile social housing sectors (Ireland, England and the Netherlands) rent is linked to income or another metric such as dwelling quality or local market rents rather than cost (see Table 3).

The cost rents paid by social housing tenants in Austria, Denmark and France play a key role in enabling stable supply and cost of capital finance for new social housing development by assuring lenders of the sector's debt servicing capacity and low risk of default which helps to reduce interest

rates (Oxley, 2009; Pittini, Turnbull & Yordanova, 2021). In contrast the rents paid by social housing tenants in Ireland are linked progressively to incomes (higher income tenants pay higher rents and vice versa). However, in the context of a very strongly targeted social housing sector, rents generate very modest revenue which is insufficient to support access to capital by enabling debt servicing. Although, social housing rents in England do contribute to debt servicing costs (but do not cover this entirely) recent changes to rent setting that were imposed by government to reduce public spending on the housing allowances paid to tenants who can't afford their rents have reinforced the fragility of the sector. Housing associations in England were forced to cut rents by 1 per cent per annum for four years from 2016 (Wilson, 2019). This undermined the sector's creditworthiness among banks and capital market lenders and therefore their ability to borrow for long terms and at low interest rates to provide additional housing (Wilson & Barton, 2022). Cuts to housing benefit and to social security benefits more broadly introduced since 2010 have further undermined the sector's creditworthiness by reducing tenants' ability to pay and therefore the reliability of the rental income stream (Goulding, 2018 ; Beatty & Fothergill, 2014; Power et al., 2014).

3.2 Organisations

Notably, the arguments presented above about the importance of diverse sources of finance, including commercial and non-profit finance, in supporting the resilience of social housing systems support the enormously influential thesis proffered in Kemeny's (1995) landmark book on systems of rented housing provision–From Public Housing to the Social Market. Here Kemeny posits that independence from government, including financial independence but also organisational independence (which is achieved by having non-governmental organisations provide social housing) is associated with larger and more resilient social housing sectors. Conversely, he argues that direct government provision of social housing and reliance on the exchequer to fund this sector is associated with small and residualised social housing sectors. Among the six cases under examination Ireland, which is one of the least resilient, is the only one where most social housing is provided directly by municipalities. Although this was also the case until the late 1980s in England.

3.3 Tenants

Tenants' ability to pay cost rents, which support the financial resilience of the social housing sector, is strongly related to the socio-economic profile for the tenant population. If social housing is strongly focussed on very low-income tenants, the ability of the tenant body to pay cost rents is obviously limited and they require an either a significant subsidy from government or rents that don't reflect cost but are related to incomes or some other measure of affordability. As explained above, this would be expected to constrain new housing output and thereby the size of the social housing sector. Whereas, in less progressively targeted systems tenants can afford to make a more substantial contribution to funding costs or fund the service in its entirety which suggests that constraints on output are weaker.

However, the significance of targeting for social housing resilience and fragility is not only financial but also political, because larger and less residualised social housing sectors are less likely to be marginalised from mainstream political concerns. Malpass and Victory (2010) argue that this has happened in the UK since its social housing sector has contracted and become increasingly targeted on the poorest (Bradley, 2014). As the ethnic minority population has become more concentrated in social housing across many Western European countries, the political marginalization of this sector has also become more racialised (Arbaci, 2007). Conversely, although there are examples of resistance against the residualisation of social housing by tenants across Western Europe (McCormack, 2009; Hodkinson, 2011), higher income tenants are more likely to

have the resources and political influence to campaign successfully to protect and expand their tenure. This is evident in Denmark where tenants play a central role and have a say in social housing management decisions, which has helped to maintain the size of the sector and opposing politicians' privatisation efforts in recent years (Cole & Etherington, 2005; Lennartz, 2011).

3.4 Land

Social housing is distinctive amongst the core elements of the welfare state as far as access to land is vital for its supply and the costs of this land must generally be paid for in full before the dwellings are provided. However, particularly in cities, where affordability challenges and therefore social housing need is most acute, sites for housing are in short supply and are expensive and have become more so in recent decades due to the impact of financialisation on land markets and also due to land use planning which has constrained land development opportunities. In some cases, such as Hong Kong, the provision of free land by government has enabled the social housing sector to expand rapidly (Chui, 2013). Whereas in many other countries social landlords must complete against speculative private investors and developers for sites which significantly increases their costs and therefore the challenges associated with supplying the new social housing (Ryan-Collins, Loyd & Macfarlane, 2017). Therefore, the willingness of government to engage in 'active management' of the supply and cost of land for social housing is a key influence on the resilience and fragility of social housing systems.

With this in mind, there has been a clear and visible change in the arrangements for procuring land for social housing and reducing the cost of this land in several of the case study countries since World War II. The enormous expansion of the English and Dutch social housing sectors in the post-war period was underpinned by measures to actively manage the supply and reduce the cost of land for social housing that were very radical by contemporary standards. English municipalities enjoyed the power to compulsorily purchase land at existing use value during the post-War period and in the Netherlands municipalities' procured servicing of almost all raw development land and thereby were the main source of land for all housing tenures, not just social housing (Cox, 1984; Needham, Koenders & Kruijt, 1993; Needham, 1997). These mechanisms helped to decommodify land markets in both countries, which reduced the prices paid for land for social housing and thereby provided an enormous invisible subsidy to this sector that reduced the subsidy it required from government to provide new housing. However, English municipalities compulsory purchase powers were dismantled of from the 1960s contributed to declining social house building from the 1960s. Active management of land arrangements remained in place in the Netherlands for much longer and enabled much higher levels of social housing output in this country until recent decades. However, the rolling back of these measures since the 1990s has made an important contribution to the contraction of Dutch social housing sector by significantly increasing the price and restricting the supply of land for social house building (Buitelaar, 2010).

Among the three countries categorised as resilient in recent decades. only Denmark has consistently employed active land management measures since World War II. It introduced a land tax in the early twentieth century which has remained in place since then. While not specifically intended to directly support the management of land supply for social housing this land tax provides important indirect support for the tenure, by improving the functioning of the land use planning system and increasing the costs of land hoarding when land prices are high and thereby encouraging counter-cyclical land supply. Active land management measures were introduced in France in the mid-1950s but only began to effectively operate a decade later, while this policy emerged in Austria during the 1980s (Pearsall, 2021). In both countries this policy has been

consistently reformed, updated, and expanded since its introduction and has played an important role in enabling the expansion of the social housing sector in recent decades.

The chronological review of active management of land for social housing outlined above also suggest that the importance of active land management policies to the resilience of this tenure has increased in recent decades. During the post-war decades, commercial house building sector was non-operational or weak, which reduced competition for land and land prices. Thus, in Ireland and Austria municipalities managed to accumulate substantial land banks for social house building during this period in the absence of any active land management policies. Since the late 1960s and 1970s however, residential land to restrictions on land uses related to the expansion of land use planning systems and increased flows of investment into land and property related to financialisation among other factors have contributed to marked increases in development land prices, particularly in high-growth Western European cities (Buitelaar & de Kam, 2012; Watling & Breach, 2023b). Thus, as the land market context in which social housing landlords operate has become more challenging, active management of land has become even more vital for sourcing affordable land for social housing building.

4. Conclusions

The long term trajectories of social rented housing systems, in terms of the proportion of households they accommodate, are undoubtedly shaped by the macro political context in which they operate. However, this paper has argued that social housing systems also have an 'internal' economy, politics and social profile and this 'micro-political economy' also influences their fragility and resilience.

My presentation today has presented analysis of the implications of this for the dominant analyses for the research literature on social housing. However, the ideas presented here can also inform the design of policies and campaigns to protect and expand social housing.

References

Amann, W., Lawson, J., & Mundt, A. (2009). Structured Financing Allows for Affordable Rental Housing in Austria. *Housing Finance International*, 23(4), pp. 14–18.

Amann, W., & Mundt, A. (2005). *The Austrian System of Social Housing Finance.* Stockholm: International Union of Tenants.

Arbaci, S. (2007). Ethnic segregation, housing systems and welfare regimes in Europe. *European Journal of Housing Policy*, 7(4), pp. 401–433.

Beatty, C., & Fothergill, S. (2014). The local and regional impact of the UK's welfare reforms, *Cambridge Journal of Regions, Economy and Society*, 7(1), pp. 63-79.

Blessing, A. (2016) 'Repackaging the poor? Conceptualising neoliberal reforms of social rental housing', *Housing Studies*, 31(4), pp. 1–24.

Bradley, Q. (2014). *The tenants' movement: resident involvement, community action and the contentious politics of housing*. London: Routledge.

Buitelaar, E. (2010). Cracks in The Myth: Challenges To Land Policy in The Netherlands. *Tijdschrift voor economische en sociale geografie*, 101(1), pp. 349-356.

Buitelaar, E. & de Kam, G. (2012) .The Emergence of Inclusionary Housing: Continuity and Change in the Provision of Land for Social Housing in the Netherlands. *Housing, Theory and Society*, 29(1), pp. 56–74.

Byrne, M. & Norris, M. (2018). Pro-cyclical social housing and the crisis of Irish housing policy: marketization, social housing and the property boom and bust. *Housing Policy Debate*, 28(1), pp. 50-63.

Carnegie, A., Byrne, M. & Norris, M. (2017). *Changing Perceptions: Stigma and Social Housing in Ireland.* Dublin: Clúid Housing.

CECODHAS (2013). *Study on Financing of Social Housing in in 6 European countries.* Brussels.

Chui, R. (2013). The Transferrability of Public Housing Policy Within Asia: reflections from the Hong Kong- Mainland China Case Study. In J. Chung, M. Stephens, & Y. Man (Eds.) *The future of public housing: Ongoing trends in the East and the West* (pp. 3–13). New York: Springer.

Cole, I. & Etherington, D. (2005), Neighbourhood renewal policy and spatial differentiation in housing markets: Recent trends in England and Denmark. *European Journal of Housing Policy*, 5(1), pp. 77–97.

Cox, A. (1984). *Adversary Politics and Land: The Conflict Over Land and Property Policy in Post-War Britain*. Cambridge: Cambridge University Press.

Czischke, D. (2006). Social housing in the European Union: Overview of key approaches, trends and issues. In D. Czischke (Ed.) *Current developments in housing policies and housing markets in Europe: implications for the social housing sector* (pp. 7–15). Brussels: CEDOCHAS, European Social Housing Observatory

Dalton, T. (2009). Housing Policy Retrenchment: Australia and Canada Compared. *Urban Studies*, 46(1), pp. 63–91.

Dol, K. & Haffner, M. (2010). *Housing Statistics in the European Union, 2010*. Delft: TU Delft.

Dukelow, F. (2014). "Pushing against an open door": Reinforcing the neo-liberal policy paradigm in Ireland and the impact of EU intrusion. *Comparative European Politics*, 13(1), pp. 93–111.

Elsinga, M. & Wassenberg, F. (2014). Social Housing in the Netherlands. In K. Scanlon, C. Whitehead, & M. Fernández Arrigiotia (Eds.), *Social Housing in Europe* (pp. 25-42) Wiley Blackwell.

Forrest, R. & Murie, A. (2010). *Selling the Welfare State the Privatisation of Public Housing*. London: Routledge.

Gilmour, T., Washer, M. & Lawson, J. (2012). *International measures to channel investment towards affordable rental housing: English case study*. Melbourne: Australian Housing and Urban Research Institute RMIT Research Centre UNSW-UWS Research Centre.

Goulding, R. (2018). Governing risk and uncertainty: financialisation and the regulatory framework of housing associations. In H. Carr, B. Edgeworth, & C. Hunte (Eds.), *Law and the Precarious Home: socio-legal perspectives on home in insecure times* (pp. 159–179). Oxford: Hart.

Granath Hansson, A. & Lundgren, B. (2019). Defining Social Housing: A Discussion on the Suitable Criteria', *Housing, Theory and Society*, 36(2), pp. 149–166.

Harloe, M. (1995). *The People's Home? Social Rented Housing in Europe and America*. Oxford: Basil Blackwell.

Hegedus, J. & Tosics, I. (1996). The Disintegration of the East European Housing Model. In D. Clapham et al. (Eds.), *Housing Privatization in Eastern Europe* (pp. 15-40). London: Greenwood,

Hodkinson, S. (2011). Housing Regeneration and the Private Finance Initiative in England: Unstitching the Neoliberal Urban Straitjacket, *Antipode*, 43(2), pp. 358–383.

Jacobs, K. & Malpas, J. (2018). The Language of Resilience: Ideas and Action in Contemporary Policymaking. *Housing, Theory and Society*, 35(4), pp. 394–409.

Kemeny, J. (1995). *From Public Housing to the Social Market: Rental Policy Strategies in Comparative Perspective.* London: Routledge.

Lawson, J. & Ruonavaara, H. (2020). *Land Policies for Affordable and Inclusive Housing: An International Review*. Helsinki: Smartland.

Lennartz, C. (2011). Power Structures and Privatization across Integrated Rental Markets: Exploring the Cleavage between Typologies of Welfare Regimes and Housing Systems. *Housing, Theory and Society*, 28(4), pp. 342–359.

Lewis, E. (2019). *Social Housing Policy in Ireland: new directions*. Dublin: Institute of Public Administration.

Lundqvist, L. J. (1992). *Dislodging the Welfare State? Housing and Privatization in Four European Nations*. Delft: Delft University Press.

Lux, M. & Sunega, P. (2014). Public Housing in the Post-Socialist States of Central and Eastern Europe: Decline and an Open Future'. *Housing Studies*, 29(4), pp. 501–519.

Malpass, P. (1990). *Reshaping Housing Policy: Subsidies, Rents and Residualisation*. London: Sage.

Malpass, P. (2005). *Housing and the Welfare State: The Development of Housing Policy in Britain*. Basingstoke: Palgrave.

Malpass, P. & Murie, M. (1987). *Housing Policy and Practice*. Basingstoke: Macmillan.

Malpass, P. & Victory, C. (2010). The Modernisation of Social Housing in England', *European Journal of Housing Policy*, 10(1), pp. 3–18.

McCabe, C. (2011). *Sins of the Father: tracing the decisions that shaped the Irish economy*. Dublin: History Press Ireland.

McCormack, J. (2009). "Better the devil you know": Submerged consciousness and tenant participation in housing stock transfers. *Urban Studies*, 46(2), pp. 391–411.

Meek, J. (2014). *Private Island: Why Britain now belongs to someone else*. London: Verso.

Ministry of Housing Communities and Local Government (no date). *Latest Statistics Releases and Live Tables.* London.

Needham, B. (1997). Land policy in the Netherlands. *Tijdschrift voor Economische en Sociale Geografie*, 88(3), pp. 291–296.

Needham, B., Koenders, P. & Kruijt, B. (1993). *Urban Land and Property Markets in the Netherlands*. London: UCL Press.

Norris, M. (2016). *Property, Family and the Irish Welfare State*. Basignstoke: Palgrave Macmillan.

Norris, M. & Byrne, M. (2017). Funding resilient and fragile social housing systems in Ireland and Denmark. *Housing Studies*, 6(9), pp. 1469-1489,

Norris, M. & Byrne, M. (2018). Housing market (in)stability and social rented housing: comparing Austria and Ireland during the global financial crisis. *Journal of Housing and the Built Environment*, 33(2), pp. 227–245.

Norris, M. and Hayden, A. (2020). Funding incentives, disincentives and vulnerabilities in the Irish council housing sector. *Housing Studies* [Preprint]. Available at: https://doi.org/10.1080/02673037.2019.1707781

Norris, M. & Shieds, P. (2004). *Regular National Report on Housing Developments in European Countries - Synthesis Report*. Dublin: Stationery Office.

O'Connell, C. (2007). *The State and Housing in Ireland: Ideology, Policy and Practice*. London: Nova Science.

OECD (2021). *Brick by Brick. Building Better Housing Policies.* Paris: OECD.

OECD (2022). *Affordable Housing Database*. Paris.

Oxley, M. (2009). *Financing Affordable Social Housing in Europe.* Nairobi: UN Habitat.

Pawson, H. (2006). Restructuring England's social housing sector since 1989: Undermining or underpinning the fundamentals of public housing?. *Housing Studies*, pp. 767–783.

Pearsall, J. (2021). France, in *Land and Housing Policies in Europe and the USA.* London: Taylor & Francis.

Pierson, P. (1994). *Dismantling the Welfare State? Regan, Thatcher and the politics of retrenchment*. Cambridge: Cambridge University Press.

Pittini, A., Turnbull, D. & Yordanova, D. (2021). *Cost-Based Social Rental Housing in Europe The cases of Austria, Denmark, and Finland*. Dublin: Housing Agency.

Power, A. *et al.* (2014). *The impact of welfare reform on social landlords and tenants*, *Joseph Rowntree Foundation*. York.

Rolnik, R. (2013). Late Neoliberalism: The Financialization of Homeownership and Housing Rights. *International Journal of Urban and Regional Research*, 37(3), pp. 1058–1066.

Ryan-Collins, J., Loyd, T. & Macfarlane, L. (2017). *Rethinking the Economics of Land and Housing*. London: Zed Books.

Scanlon, K., Whitehead, C. & Arrigoitia, M.F. (2014). Introduction. In K. Scanlon, C. Whitehead, and M.F. Arrigoitia (Eds.), *Social Housing in Europe* (pp. 1–21). London: Wiley-Blackwell.

Stephens, M. (2019). Social Rented Housing in the (DIS)United Kingdom: Can Different Social Housing Regime Types Exist within the Same Nation State?. *Urban Research and Practice*, 12(1–2), pp. 38–60.

Torgersen, U. (1987) 'Housing: the wobbly pillar under the welfare state', in B. Turner, J. Kemeny, and L. Lundqvist (eds) *In Between State and Market: Housing in the Post-industrial Era*. Gavle: Almqvist and Wiksell International, pp. 116–127.

Tunstall, R. & Pleace, N. (2018). *Social Housing Evidence Review*. York: University of York.

Turnbull, D. (2020). *The Sale of Social and Public in Europe*. Brussels: Housing Europe.

Vale, L.J. & Freemark, Y. (2012). From Public Housing to Public-Private Housing: 75 years of american social experimentation. *Journal of the American Planning Association*, 78(4), pp. 379–402.

Wainwright, T. & Manville, G. (2016). Financialization and the third sector: Innovation in social housing bond markets. *Environment and Planning A*, 49(4), pp. 819–838.

Watling, S. & Breach, A. (2023). *The housebuilding crisis The UK's 4 million missing homes*. London: Centre for Cities.

Watt, P. & Hodkinson, S. (2023). London: Housing Financialisation in a Neoliberal Global City, In A. Holm, G. Alexandri, & M. Bernt (Eds.), *Housing policy under the conditions of financialisation: The impact of institutional investors on housing in European Cities* (pp. 78–91). Berlin: HoPoFin,

Whitehead, C. (2014). Financing Social Rented Housing in Europe. In K. Scanlon, Whitehead, & M. Fernández Arrigotia (Eds.) *Social Housing in Europe* (pp. 315–330). Basingstoke: Wiley-Blackwell.

Wilson, W. (2019). *Rent setting: social housing (England): Briefing Paper Number 01090*. London: House of Commons Library.

Wilson, W. & Barton, C. (2022). *Social rented housing (England): Past trends and prospects*. London: House of Commons Library.

Interactive sessions

Session 1: Reimagining housing: Innovative designs for thriving communities

Recording available

Moderators:

Mahmoud Alsaeed (University of Sheffield), and Leonardo Ricaurte (University of Reading)

Participants:

Eira Capelán (South Yorkshire Housing Association)
Lorraine Farrelly (York School of Architecture)
Saskia Furman (School of Architecture La Salle)
Noémi Gyárfás (Budapest University of Technology and Economics)
Karim Hadjri (University of Sheffield)
Aboli Mangire (HafenCity University Hamburg)
Carolina Martín (ISCTE-UL)
Krzysztof Nawratek (University of Sheffield)
Bruno Saurer (Green Building Council Spain)
Elanor Warwick (Clarion Housing Association)

Innovation in housing design, planning, and construction—whether through new builds or retrofits—is crucial for advancing affordable and sustainable housing solutions. The discourse on innovation intersects with a range of topics, from practical applications to research methods and pedagogical approaches. However, despite its importance in tackling the housing crisis, the debate on innovation has often become overly focused on techno-centric narratives.

This session aimed to foster a collaborative and productive dialogue, addressing overlooked issues related to long-term sustainability and responsiveness to local needs. It focused on the pivotal role of innovation in overcoming the challenges of creating sustainable, affordable, accessible, and community-oriented housing solutions for vibrant communities. The session was divided into two main parts focusing on standardization and resident needs.

1. Beyond standardisation: Housing innovation and contextual adaptation

Aboli Mangire, started the session with a presentation on her doctoral research into modern mass social housing in India. Her focus was on incorporating passive cooling and green spaces to address rising temperatures and frequent heat waves. Mangire noted the importance of heat-conscious design and advocated for the standardization of design practices. She highlighted the advantages of incorporating cantilevered spaces, such as private green refuges on cantilevered balconies and enhanced air circulation through passive cooling elements such as corridors and courtyards.

Mahmoud Alsaeed, a PhD candidate and RE-DWELL early-stage researcher, followed with a comprehensive overview of sustainable and affordable housing. He outlined four key components for future frameworks: 1) the well-being of residents and related parameters, 2) conventional features of social housing including benefits, tenure, providers, ownership, and funding mechanisms, 3) sustainability aspects such as energy efficiency, emissions reduction, resource management, and the balance between nature and the built environment, and 4) economic factors, particularly ancillary costs such as maintenance and operational costs.

Standardising an opportunity or a calculated risk?

The discussion with participants, speakers, and the audience began with the question: How can we ensure that standardization, which aims to enhance system profitability, effectively meets the needs of customers and the community? The panellists explored the benefits and limitations of standardization as a strategy for addressing housing challenges. Dr Bruno Saurer, Technical Director at Green Building Council España, emphasised the importance of understanding both the advantages and limitations of standardization. While recognising its strengths, he cautioned that it could potentially stifle creativity in housing and urban planning:

> *“It’s one of these constant instruments that we use to transform markets. It’s a powerful one for sure, but it can also be restrictive […]. Standardisation most of the time goes against individualisation, as everyone wants to have their own house […] So if you work on standardisation, it has to be done constantly looking to the future. It is not something that is just for today; it is an instrument to make a flexible use, to optimise resources in the future .”*

Eira Capelán, Programme Lead for Development and Asset Management at South Yorkshire Housing Association (SYHA), recalled the opportunities that standardization presents for modern housing. Capelán discussed how housing associations can leverage standardization to enhance development capacity and incorporate innovative construction methods. She pointed out the need for careful calculation and risk management associated with standardization.

Dr Elanor Warwick, Head of Strategic Policy and Research at Clarion Housing Group, explained that standardization spans a wide range, from neighbourhood-level master planning to flat layout and design. Warwick stressed the importance of understanding and rethinking standardization as a tool to enhance accessibility, health, and other key aspects of housing.

Housing vs climate emergency

The question posed to all participants was: What are the main challenges facing the existing housing stock in European cities and internationally concerning climate emergencies, such as rising temperatures and energy usage?

Saskia Furman, a PhD candidate and RE-DWELL early-stage researcher, mentioned the complex challenges facing the existing housing stock in European cities and globally regarding climate emergencies including rising temperatures and energy consumption. She highlighted a major issue: the heavy reliance on technology-based solutions, which often maintain high levels of energy consumption without fundamentally altering habits or reducing overall consumption. For instance, while photovoltaic (PV) cells offer benefits, their production is still carbon-intensive, and issues such as non-recyclable lithium batteries complicate disposal.

In contrast, Capelán and Warwick discussed structural challenges, particularly in the UK. They noted that the existing housing stock suffers from poor insulation, making installation of new insulation systems complex and costly. Additionally, educating residents about new technologies like air source heat pumps is challenging, leading to inefficiencies and discomfort. There is also significant uncertainty regarding the effectiveness and durability of current technological solutions, which complicates long-term planning and investment.

Policy guidelines and funding for climate adaptation measures are currently inadequate, making large-scale renovation and retrofitting of the housing stock seem unfeasible. There is also a lack of social activation to engage homeowners in these renovations. Saurer noted that, while Europe has made progress in regulation and standardization, there is a pressing need to focus more on adaptability rather than just functionality. This includes innovative strategies like renting out facades to reduce acquisition costs and promoting regular updates to housing components in response to climate changes. Current policy guidelines and funding for climate adaptation measures are inadequate, hindering the feasibility of large-scale renovations and retrofitting of housing stock.

A fundamental shift in attitudes towards housing and climate adaptation is required. People need to be persuaded of the necessity to regularly update and renovate their homes to effectively address climate challenges. Immediate solutions are also needed to address rising temperatures and inefficient infrastructure. Examples include installing heating stations for winter and cooling stations for summer to provide temporary relief. These soft retrofits are essential transitional measures while planning and implementing major adaptations.

Participants concurred that these challenges illustrate the complex interplay of technological, structural, financial, social, and political factors that must be addressed to improve the resilience of the existing housing stock against climate disasters..

Conclusion

The exploration of housing innovation and contextual adaptation presents a multifaceted challenge that demands a transdisciplinary approach. The debate on standardization versus individualization in housing has revealed that while standardization can enhance profitability and support modern construction methods, it may also impede creativity and flexibility if not tailored to future needs.

Figure 1. Terminologies used in the first part of the session. Source: Mahmoud Alsaeed, Leonardo Ricaurte, 2024

Addressing the climate emergency underscores the complexity of retrofitting existing housing to improve energy efficiency and reduce carbon footprints. The reliance on technologies like photovoltaic cells and air source heat pumps introduces challenges related to cost, effectiveness, and resident adaptability, indicating the need for solutions that are more adaptable and less dependent on technology. Figure 1 illustrates the key concepts discussed in the first part of the session.

2. Resident needs in transition from techno-centrism to adaptability in housing design and retrofit

Noémi Gyárfás, a PhD candidate, presented her research on 1970s housing blocks in Budapest, which despite their notable spatial qualities, face the risk of demolition. She challenged current policies on housing standards, arguing that these older buildings offer valuable spatial configurations and lifestyle adaptations. Gyárfás focused on identifying characteristics that make these buildings "spatially sustainable," such as architectural features that support adaptation and enhance long-term performance. Her examples underscored the significance of factors like building placement, mass, and connections to the surroundings in terms of adaptability. She also noted that strategically placing service cores, such as kitchens and bathrooms, can enhance the flexibility of interior layouts.

Saskia Furman's presentation addressed the critical role of resident engagement in refurbishing social housing, especially in light of the EU goal to achieve net-zero energy by 2050. Her research explores how engaging residents in the decision-making process can greatly enhance the sustainability of retrofit projects. By examining case studies with varying levels of resident involvement—from top-down approaches with limited resident input to highly cooperative bottom-up methods—Furman's study highlights the positive effects of resident empowerment on the success and sustainability of retrofit projects. The presentation underscored the importance of integrating resident feedback and participation as essential elements in developing energy-efficient and sustainable social housing solutions.

Supporting decision-making processes and mapping local dynamics

In this segment of the session, the focus was on two key questions: 1) Which innovative methods can be used to map these dynamic, hyper-local situations that concern building retrofitting ? and 2) How can tools such as focus groups be effectively integrated to support decision-making in the retrofitting of social housing?

Participants expressed scepticism about the effectiveness of focus groups as a decision-making tool in retrofit or regeneration processes involving residents. One participant argued that focus groups are primarily useful in exploratory or validating phases of research, rather than for making final decisions:

> *"I think it would be difficult to involve focus groups directly in the decision-making process. They are more suited to serving as part of the feedback loop. We typically use them to generate ideas, identify gaps, and so on. Sometimes, we also use them at the end of the research process for validation, to test ideas, and to gather feedback."*

Although focus groups were not deemed highly effective for decision-making, Warwick argued that they could be valuable for mapping local and hyperlocal dynamics while Capelán pointed out the crucial role of local officials in understanding local needs comprehensively, noting that their involvement is a significant asset throughout the decision-making process.

Warwick mentioned the pressure on housing associations to achieve high-end objectives in regeneration and retrofit projects, often at the expense of meaningful community engagement. This issue stems from the scarcity of post-occupancy evaluations and a limited understanding of their potential to support organizational goals. She suggested incorporating more qualitative

methodologies into the toolkit of housing associations to enhance resident engagement, emphasising that building trust and obtaining genuine feedback requires both time and effort.

Sauer contributed to the discussion by emphasising the crucial role of experts and specialists in guiding decision-making processes. He argued that residents should not be expected to make decisions independently. Instead, the success of a project depends on the ability of technical experts to listen to residents' concerns and needs, and to engage in a collaborative, iterative process. This approach fosters trust and enables productive and insightful conversations that ultimately lead to effective solutions

Housing adaptability

In the final part of the session, the discussion turned to the concept of flexibility and adaptability in housing. Participants acknowledged that understanding adaptability requires a multifaceted approach, encompassing social, technical, and environmental dimensions. Warwick highlighted the importance of social adaptability, which involves negotiating and compromising on space usage, resource management, and consumption among residents. She argued that by examining housing through this perspective, we can develop better designs and solutions that effectively respond to the evolving needs of communities.

One participant noted the need to differentiate between flexibility and adaptability in housing, explaining that these concepts are not always synonymous. For instance, future-proofing measures like the Lifetime Home Standard are relevant for ensuring flexibility, allowing homes to accommodate an ageing population. However, a space can be adapted and repurposed but remain inflexible if its design restricts the range of users who can effectively use it. The participant illustrated this with an example of his own home—a converted attic that currently meets his needs but has limited accessibility due to features like two staircases, which could pose challenges for future use or different occupants.

Sauer suggested that achieving adaptability and flexibility requires a broader perspective that extends beyond individual dwellings to encompass entire housing blocks. He proposed that housing blocks should be designed to offer a variety of housing solutions suitable for an intergenerational community, allowing people at different life stages and ages to live together. This approach would support the concept of lifetime neighbourhoods, where residents can remain within the same building or even the same block as their needs and circumstances change. To implement such solutions, more flexible regulatory frameworks are needed, as well as a shift in how ownership and tenure rights are established, recognising homes as dynamic rather than static assets. Warwick agreed, noting that management practices must evolve to support flexible arrangements and recognising the important role that social housing providers play in encouraging experimentation with new housing schemes.

Conclusion

The significance of spatial sustainability and resident engagement in retrofit projects was underscored through examples of apartment blocks from the 1970s. The discussions highlighted how involving residents in the decision-making process profoundly affects the sustainability of retrofits in social housing.

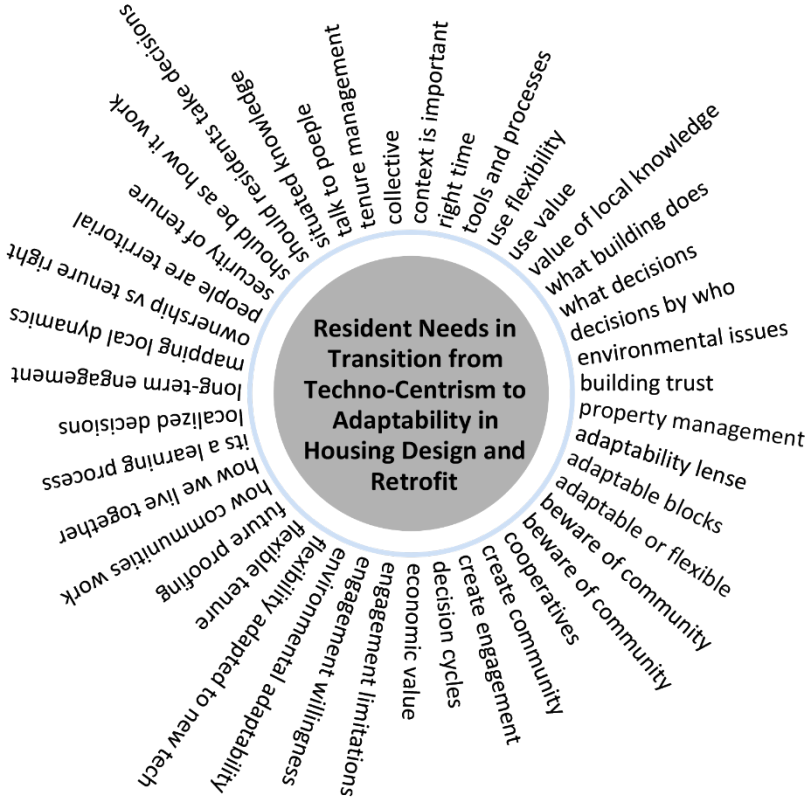


Figure 2. Terminologies used in the second part of the session. Source: Mahmoud Alsaeed, Leonardo Ricaurte, 2024

Overall, the conversation emphasised the intricate interplay of technological, structural, financial, social, and political factors necessary to enhance housing resilience and adaptability to future challenges. Effective resident engagement and a balanced approach to standardization are essential to achieve sustainable housing development. Figure 2 illustrates the key terminologies discussed in the second part of the session

Session 2: Fostering sustainable living: Empowering communities for inclusivity and resilience

Recording available

Moderators:

Lucia Chaloin (Université Grenoble Alpes), Androniki Pappa (ISCTE-UL) and Zoe Tzika (Universitat Politècnica de València)

Participants:

Josep Maria Borrell (Impsol)
Adriana Diaconu (Université Grenoble Alpes)
Margaux Lespagnard (Vrije Universiteit Brussel)
Margherita Marinelli (Housing Europe)
Ángel Martín (School of Architecture La Salle)
Michelle Norris (University College Dublin)
Andreas Panagidis (University of Cyprus)
Newsha Salari (School of Architecture La Salle)
Angelos Varvarousis (Autonomous University of Barcelona)
Ana Vaz Milheiro (ISCTE-UL)

This session explores the implications of community participation in shaping sustainable and equitable housing and urban living solutions, focusing on three key topics: 1) Urbanization processes and social infrastructure, 2) Alternative housing models, and 3) Housing provision.

The goal is to explore alternative responses to the increasing financialization and speculation in housing and urban development, which intensify inequalities. This encompasses a variety of contexts, including temporary settlements, degrowth approaches, neighbourhood planning, integrated district renovation projects, community-led, circular, and cooperative housing, social housing developments, and retrofitting. The discussion addresses contemporary multidimensional and multisectoral mechanisms and challenges related to community participation, emphasising inclusivity, collaborative governance, process impacts, innovation effects, scaling-up, and replication.

1. Urbanisation processes and social infrastructure

In his presentation, Angelos Varvarousis, an urban planner engaged in post-growth planning from a multi-scalar perspective, reflected on the lock-in mechanisms that hinder innovation. These mechanisms arise from the lack of regulatory power in municipalities that have lost land ownership and have become increasingly dependent on taxation from profit-seeking private investments. He proposed discussing the neoliberal economy's "growth dependency" on urban development, which struggles to adopt more alternative and sustainable approaches. According to Varvarousis, to overcome these growth dependencies, society should pursue systemic urban development supported by synergistic regulations through multi-scalar processes, including state, regional, European, and global levels.

Andreas Panagidis, a PhD candidate, highlighted the tensions in the dialogue between residents and municipalities. From his observations of community participation initiatives, Panagidis concluded that municipalities often lack the trust of residents. He described a "cycle of mistrust" where residents are aware of clientelist relationships between public authorities and urban and economic development actors, particularly in southern European countries, leading them to disengage from participation initiatives. In the context of affordable housing, this mistrust extends to interactions between technical professionals and residents. Technical experts may underestimate residents' ability to understand technical details, while residents may distrust the patronising attitude of technicians. The core issue is the absence of a system that fosters a sense of community, instead perpetuating patron-client relationships and an individualistic approach to housing and development.

Newsha Salari, a PhD candidate, presented her research on slum upgrading in relation to the Sustainable Development Goals (SDGs), particularly focusing on resident participation in sustainable development. She emphasised the challenge of identifying priorities for effective slum upgrading. To address this, Salari employs a combination of qualitative and quantitative data using the Analytical Network Process (ANP). This approach has proven effective to reveal misunderstandings between governments, technical experts, and residents in community-based development. Salari detailed how she applies these techniques in her research on the slums of Stjwetla, Johannesburg, South Africa.

The discussion following the presentations cantered on the role of citizens in urban processes. Participants distinguished between neutral and meaningful participation, where citizens have actual influence over decisions on relevant issues. According to the speakers, the core problem lies in the inadequacy of mechanisms for following up on participative events, which fail to drive institutional innovation in decision-making and policies. There is a significant gap between local

activism and policy-making, which could potentially be bridged by “intrapreneurs”—individuals who work from within institutions to drive change. However, this institutional support could be undermined by corruption, which might lead to resource exploitation.

2. Alternative housing models

Zoe Tzika, a PhD candidate, presented her research on alternative housing provision in Europe, with a focus on Catalonia. Her study examines initiatives that use hybrid approaches to housing production and management, incorporating strategies for collectivising property and tenure to combat speculation and social isolation. Tzika employs both qualitative and quantitative methods to explore how to support these alternative housing models. She categorises various management types, community-building processes, neighbourhood relationships, and property types while analysing values and conceptual orientations related to sustainability, inclusion, and empowerment.

Margaux Lespagnard, a PhD candidate, is researching equitable circular housing, focusing on minimising waste in building construction. Her study examines these housing models as interconnected ecosystems, considering aspects such as financing, management, and decision-making processes. She is particularly interested in mapping participation processes and the varying levels of responsibility residents have in financing and managing buildings. To this end, she is developing a spectrum of implications based on different engagement configurations, which could inform the development of future projects.

The core element of these alternative initiatives is the collaboration between various stakeholders and the varying degrees of resident involvement in housing production and management. This collaboration encourages stakeholders to move beyond their traditional roles. Public bodies play a crucial role in including financially vulnerable groups and in enacting regulations to support these models. However, a potential limitation is their scalability and adaptability for mass housing provision, as their current quantitative impact on the social housing system is relatively small. Despite this, these alternative models hold promise for mainstream adoption due to their potential to address speculation and meet the relational and social needs of people.

3. Housing provision

Margherita Marinelli from Housing Europe presented her work on capacity building and knowledge sharing for integrated district-level renovations, aimed at improving both resident well-being and building performance. She underscored the importance of co-design and co-management in renovation projects to effectively address residents' needs and aspirations.

Ana Vaz Milheiro, a senior researcher in colonial and post-colonial studies, examines housing from a historical perspective. Through a case study in Luanda, Angola, she examined the challenges faced by social housing designers in involving residents, particularly vulnerable groups, in the project development process. She argued that incorporating the principles of vernacular housing from pre-colonial communities, which were based on self-sufficiency, could enhance social housing projects with new concepts and self-building improvements. Vaz Milheiro stated that integrating residents’ knowledge of their own priorities and needs is crucial for effective social housing design.

Josep Maria Borrell, from Impsol, a non-profit organization dedicated to promoting social housing in the metropolitan area of Barcelona, shared insights from recent social housing projects undertaken by this organisation. These projects feature innovative typological designs

and initiatives aimed at fostering more collective and sustainable living environments. Borrell brought attention to the importance of housing flexibility to accommodate a diverse range of residents. However, he also highlighted the challenge of fostering personalization and a sense of belonging among residents, which currently depends on top-down encouragement from the housing organization.

The subsequent discussion focused on the role of architects in designing spaces for residents' intimate domesticity and daily activities. While flexible housing design can facilitate customization, effective vertical communication between top-down providers and residents remains a significant challenge. Housing providers need to move beyond traditional methods and cultural assumptions associated with public service, which are often constrained by rigid financial and administrative frameworks.

In sum, participants identified several key issues and opportunities related to community participation in housing provision and management:

- **Client-User Relationship:** Shifting from established protocols and practices, which are culturally entrenched among both providers and users, is challenging. Collaborative and cooperative housing models offer potential for new relationship frameworks. However, these models are still niche and require public support and regulatory frameworks to prevent speculation and promote their development.
- **Heterogeneous Networks of Collaboration:** The public, private, and third sectors have varying (and sometimes conflicting) interests and resources. Effective housing development requires integrating these diverse perspectives with residents' knowledge to achieve sustainability in social, economic, and environmental aspects.
- **Integration at Multiple Scales:** Housing is influenced by broader economic, historical, and political dynamics. Therefore, multi-scale collaboration and coordination of goals and strategies across project, city, territorial, and national levels are essential for effective housing integration.

Session 3: Reconsidering regulatory frameworks: Policies and financing for affordable and sustainable housing

Recording available

Moderators:

Tijn Croon (TU Delft) and Marko Horvat (University of Zagreb)

Participants:

Gojko Bežovan (University of Zagreb)
Adirane Calvo (School of Architecture La Salle)
Gábor Csanádi (Hungarian Academy of Sciences)
Marja Elsinga (TU Delft)
Charalambos Iacovou (Cyprus Land Development Corporation)
Pere Picorelli (Incàsol)
Jordi Serrano-Codina (Incàsol)
Ana Zadelj Kovač (Ceraneo)

This session focused on the interplay between policy and financing mechanisms, which are essential for fostering an environment that supports sustainable and affordable housing solutions. It involves navigating the balance between two sometimes opposing objectives: affordability and sustainability—concepts that are open to debate and require contextual understanding within local settings. The goal of the session was to discuss how fiscal policies and legal frameworks can create housing regimes that promote environmental justice at the national, regional, and local levels. We also examined the importance of green and public investments, not only for encouraging the construction of new affordable and sustainable homes but also for facilitating the retrofitting of existing housing stock. Finally, we discussed the importance of implementing effective social policies to support disadvantaged households as society grapples with the challenges arising from energy, climate, and housing crises.

The session began with stark statistics on Europe's aging housing stock, which is poorly insulated and contributes to high carbon emissions and significant energy demands for heating and cooling. Rising energy prices have turned this issue into a severe burden for vulnerable groups. High energy costs further compound already elevated housing expenses and rents, a problem worsened by the declining availability of social housing.

Dr Gábor Csanádi, sociology professor, pointed out the lack of attention given to marginalised groups in decision-making, a sentiment shared by all participants. The housing crisis only gained prominence on political agendas when it began to affect middle-income households, despite persistent issues of homelessness and precariousness. Ana Zadelj Kovač from Ceraneo underscored the need to build social capital and involve marginalised groups in the decision-making process.

A primary issue identified was the lack of political will to develop social housing, as highlighted by speakers from Croatia, Cyprus, and Catalonia. Governments are often reluctant to allocate sufficient resources for housing development. Charalambos Iacovou, architect and project coordinator at the Cyprus Land Development Corporation suggested that removing VAT on social housing could be beneficial, but governments resist such measures due to concerns about potential tax revenue loss. Jordi Serrano-Codina, financial administered at Incàsol, noted that despite efforts, social housing in Catalonia makes up only 1% of the total stock. Although regional and national resources are considerable, a European housing fund would also be a significant contribution, as advocated by Housing Europe in their manifesto for the upcoming European elections.

Incremental reforms to enhance sustainability and affordability were also discussed. Adriane Calvo, a PhD candidate presented her work on building renovation passports, a promising policy tool designed to integrate energy efficiency into housing prices while focusing on user needs. She pointed out the need to increase Spain's renovation rates, which are among the lowest in Europe, and suggested that energy communities could be a potential strategy. Marko Horvat's presentation on pilot housing allowances for young renters in Croatia revealed that stringent conditions, such as requiring formal rental contracts, prevented many potential beneficiaries from accessing aid. This underscored the importance of clear guidelines that take local contexts into account.

Serrano-Codina addressed a question about private investment in social housing, stating that rising interest rates have diminished opportunities for private investors. Regarding empty housing, he pointed out that most vacant properties are located in tourist areas, rather than where housing is most needed. Although renovating these properties is a sensible approach, the

high costs must be taken into account. He linked the rising housing costs to gentrification and tourism and also addressed the raise of informal rents in Spain and Croatia. When his colleague at Incàsol, Pere Picorelli, was asked about the previous day's field visit to the La Mina area in Barcelona, he argued for the importance of creating mixed neighbourhoods to avoid concentrating all socially disadvantaged households in a single area.

Charalambos Iacovou shared the success of delivering 4,000 residential units for low- and middle-income residents in Cyprus. However, changes in government and board composition at the Cyprus Land Development Corporation halted further opportunities. He stressed the importance of political will in housing development. Horvat discussed the need to improve visibility and political framing for housing programmes, highlighting that short call periods and inadequate advertising had hampered participation. Dr Gojko Bežovan stressed the need for adaptable housing allowances for younger generations, as home ownership is increasingly unaffordable.

Papers and long abstracts

Exploring the building blocks of sustainable social housing frameworks

Mahmoud Alsaeed, Karim Hadjri, Krzysztof Nawratek

School of Architecture, The University of Sheffield, Sheffield, the UK

Keywords: social housing, sustainability, frameworks

1. Introduction

The nexus between housing and sustainability is a multi-layered discourse often characterised by its ambiguity and complexity (Matthews, 2016). The realisation of large-scale, sustainable social housing projects is therefore associated with various challenges which require a comprehensive and systematic approach that transcends disciplinary boundaries. At the centre of this approach are frameworks that serve as fundamental constructs for planning and decision-making processes (Moghayedi et al., 2021). These frameworks embody a structured system of rules and ideologies that act as a supportive scaffold on which decisions are formulated. They also facilitate the formulation of standardised practices, principles, and detailed operational guidelines for sustainable housing provisions.

The development of a robust framework, regardless of its nature, requires the definition of a core set of pillars with careful attention to their structuring, organisation and interlinkage Furthermore, these pillars are crucial in addressing real-world challenges that arise from both theoretical and practical perspectives in the delivery of sustainable social housing. To this end, the parameters that define social housing and sustainable housing frameworks are first examined through an exploratory literature review. Then, the challenges associated with the delivery of sustainable housing are identified through a synthesis of literature and semi-structured interviews with housing associations, designers, and sustainability specialists.

A trilogy of pillars needed for the development of sustainable social housing frameworks is proposed; this is established around three thematic areas: Sustainability and its dimensions, social housing processes and perceptions, and the roles and responsibilities of public authorities. It is important to note that while this mapping represents a first step for housing researchers and industry professionals seeking to develop operational frameworks for sustainable social housing projects, it is not itself a framework. Instead, it lays the foundation for a common understanding of future sustainable social housing frameworks.

2. Context

The theoretical context of this paper is based on three pillars, starting with the definition criteria of social housing, then the concepts of sustainable social housing and the sustainability frameworks that are often used in housing provisions.

2.1 Social housing narratives

As social housing is highly context-dependent, there is no universal definition. Nonetheless, critical concepts from scholars such as Harriott et al. (2004); Malpass & Victory (2010); Priemus (2013); Oyebanji (2014); Stephens (2013); and others are presented. In its broadest sense, social housing encompasses a housing model with four defining features. Firstly, the type of

beneficiaries (target groups) often denotes housing availability to specific population groups. Secondly, the funding mechanisms (subsidies) usually involve significant public support. Thirdly, the type of provider varies, ranging from public bodies in the case of councils housing to third-sector organisations such as housing associations. Fourthly, ownership options include social renting or shared ownership. Consequently, social housing functions as a "system" that provides housing to households with limited means, ensuring their needs are met through public subsidies (Granath Hansson & Lundgren, 2019). Local authorities, housing associations and other non-profit and for-profit organisations are involved in the provision and management of social housing, all of which are subject to government regulation (Harriott et al., 2004).

Given the highly context-dependent nature of social housing, it is not possible to define it in a universal sense. Nevertheless, the work of scholars such as Harriott et al. (2004), Malpass & Victory (2010), Priemus (2013), Oyebanji (2014), Stephens (2013), and others is referenced in order to present critical concepts. In its broadest sense, social housing can be defined as a housing model that is characterised by four defining features. Firstly, the type of beneficiary (target group) frequently indicates the availability of housing for particular population groups. Secondly, the funding mechanisms, which typically take the form of subsidies, often entail substantial public support. Thirdly, the type of provider varies, encompassing both public bodies, as exemplified by councils housing, and third-sector organisations, such as housing associations. Fourthly, there are two principal forms of ownership: social renting and shared ownership. Consequently, social housing functions as a "system" that provides housing to households with limited means, provided that their needs, often supported by public subsidies, are confirmed (Granath Hansson & Lundgren, 2019). Local authorities, housing associations, and other non-profit and for-profit organisations are involved in the provision and management of social housing, all of which are subject to government regulation (Harriott et al., 2004).

2.2 Sustainable social housing structure

The term "sustainable social housing" lacks a generally accepted definition. Instead, it encompasses a continuum of terms and concepts from different sources which have been explored and mapped in this article. The rationale behind this approach is the need to clarify the existing narratives and highlight the similarities and differences between these concepts and any links contributing to the overarching perception of sustainable social housing. To this end, the work of Kruger & Seville (2012), Murphy (2003), Udomiaye et al. (2018), Attia (2016), and Peters (2013) was reviewed. However, the reviewed literature does not provide a precise classification method for the concepts in question. A classification is, therefore, proposed (Figure 1) based on (1) definitional goups, defined by the authors with similar views on the meaning of sustainable buildings, (2) the terminology used to describe the building system, which typically represents a relationship between the building and the environment, and (3) the definition criteria that explain the terminologies used and the inter-relations between humans, the built environment, and nature.

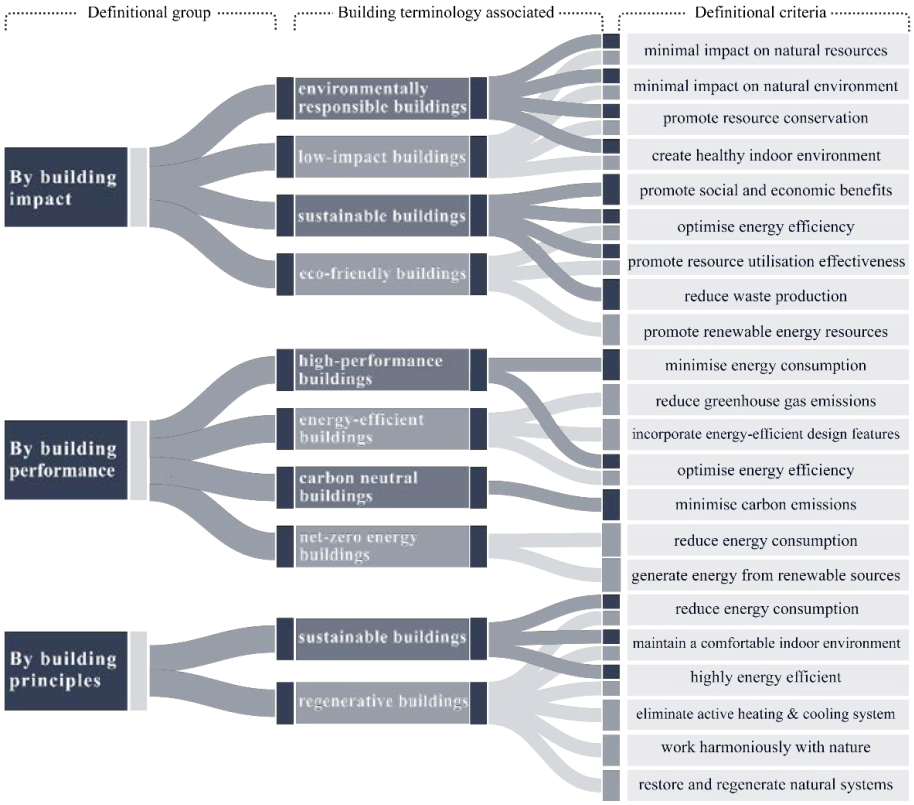


Figure 1. Sustainable housing concepts. Source: Authors, 2024

Three different groups of definitions emerged from this mapping. Firstly, the definition by the buildings impact: the scholars in this category highlight the need to minimise the negative impact of the built environment on natural ecosystems. Secondly, the building performance definition demonstrates the superiority of building systems in terms of electricity consumption, water consumption and heating and cooling efficiency. Thirdly, by design principle, scholars in this group use proven design methods to explain how buildings can be made more sustainable. They suggest moving away from conventional heating and cooling systems to make ecosystems healthier and more resilient.

Although this classification and mapping are rather argumentative, they feed directly into the development of the concept of the sustainable building components, which are advocated as one of the critical dimensions of sustainable social housing.

2.3 Sustainable social housing structure

In response to the complexity of sustainability, several frameworks have been created to guide the development process and clarify possible areas for intervention. These frameworks are also known as sustainability assessment and certification schemes. To identify and map the components of the most prominent sustainability frameworks, the recent Policy Playbook published by the UK Green Buildings Council (2020), the Handbook of best practices published by Housing Europe (2023), as well as the work of Knox (2015); Fokaides et al (2017); Garde (2009); Kubba (2012) and others, were examined. Six primary frameworks emerged as the predominant systems currently used by practitioners (Figure 2). These frameworks were analysed through descriptive definitions of their structure and the areas of intervention they support. In addition, the relationships between these areas were clarified by examining the scope of their intervention. For example, when assessing the sustainable location criterion, both the Leadership in Energy

and Environmental Design (LEED) and the Building Research Establishment Environmental Assessment Method (BREEAM) show a common interest in promoting and facilitating the use of well-connected sites, emphasising the use of existing infrastructure. In contrast, ISO 14001 focuses on establishing guidelines and standardised processes for environmental management, rather than targeting specific criteria.

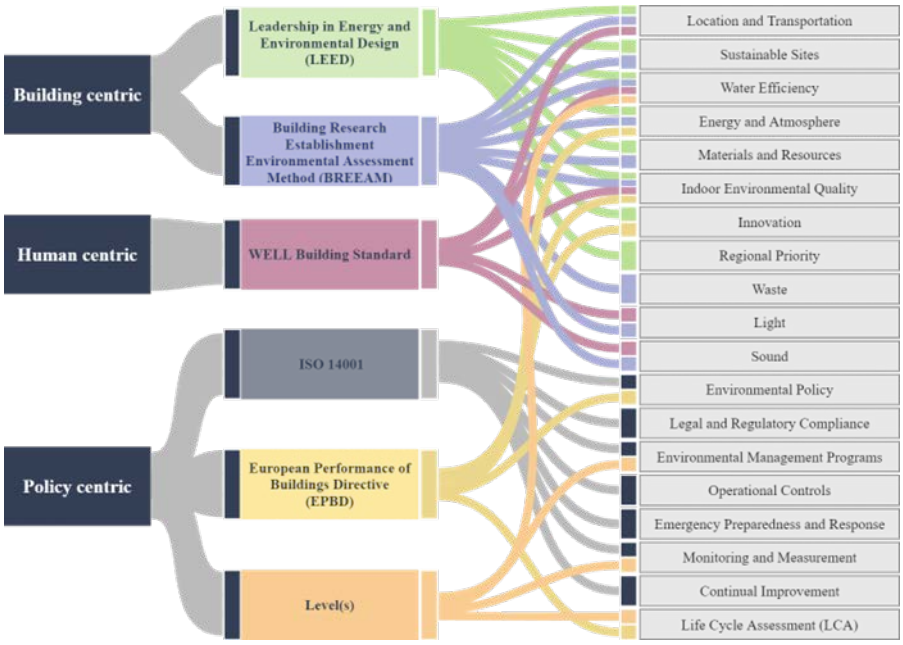


Figure 2. Identified sustainability frameworks. Source: Authors as adapted from BRE (2016); Kubba (2012) and others

To map the components of these systems, the explanation of the field of intervention, which is often aimed at building systems, human welfare, or policy development, was examined. Therefore, a trilogy of classifications is formed that explains the rationale behind these system constructs. While LEED and BREEAM are building-centric and focus on building system improvement to support ecological systems, the second class, such as the WELL Building Standards, was created to put well-being and health at the heart of building design and construction. The third class is policy-centric and focuses on the role of policy in balancing building systems, natural systems, and human well-being. To this end, environmental sustainability, regardless of the assessment approach or system, must strike a perfect balance between human needs, health and well-being, and the built environment (Poveda & Lipsett, 2011).

3. Methods

This study used a dual method consisting of an exploratory literature review and semi-structured interviews. The literature was examined using sources such as peer-reviewed articles, books, and other documents from specialised databases, including the Web of Science. A combination of keywords was used, such as sustainability framework, social housing, and sustainability in housing. The search's temporal scope was limited to the 2000s onward. A selection criterion based on the parameters of relevance, authority, and influence, as described by Mensah and Enu-Kwesi (2018), was used to narrow down a pool of 400 sources to 50 sources that were deemed most relevant to this study. The selected literature was then analysed to compare and contrast

the narratives on the topics under investigation. The analysis results were then mapped to build the argumentation of the findings.

The semi-structured interviews, on the other hand, helped to gain insights into the challenges of developing sustainable social housing from the practice perspective by either confirming existing theoretical narratives or uncovering new insights. Between September 2022 and November 2023, 25 interviews were conducted with various stakeholders from England, including development and asset managers, sustainability team leaders from housing associations, design architects and planners from architectural practices, and sustainability designers and systems specialists from sustainability services providers.

The questions followed a funnelled structure and began with general enquiries about the participants' definitions of sustainability and social housing. They then moved on to integrating sustainability into housing and finally to identifying challenges and the strategies to overcome them. The data collected was analysed thematically using NVivo software. An inductive coding approach was followed, as Joffe & Yardley (2003) explained, considering the principles of reliability and validity. The resulting themes were grouped around three overarching codes: funding, practices and associated challenges, and the role of regulators in sustainable housing development. The outcome of the analysis was then structured to describe the challenges related to sustainable practices in social housing, and to clarify weaknesses and areas for further investigation in the development of sustainable social housing frameworks.

4. Findings

This section describes the findings of this study. It is structured to present the construct of sustainable social housing and the components of the existing sustainability framework and ends with the challenges in practice. To answer the question of what constitutes the construct of sustainable social housing, it is imperative to align the insights gained from the literature reviewed and the interviews. Therefore, Figure 3 was created to outline the identified components of the narratives. This outline begins with the conventional definition of social housing, as a housing system tailored to specific demographic groups that promote social integration and are overseen and supported by specialised and public agencies. Consequently, “sustainable social housing” is proposed as a system and a development model that encompasses a quadrant of concepts.

Firstly, it promotes the adaptation and integration of sustainable building features and characteristics with the aim of mitigating negative environmental impacts, promoting resource efficiency and reducing carbon emissions. This particular focus revolves around the building components, including the physical characteristics of the structure such as building systems, energy efficiency measures and water conservation strategies. It also considers the human experience, explaining and examining the elements of the building that interact with occupants, such as the quality of the indoor and outdoor environment and structural considerations to improve occupant wellbeing. Secondly, it addresses social cohesion and the well-being of residents by promoting social benefits and creating a healthy and comfortable living environment. Thirdly, it focuses on the economic sustainability of the building, which aims to reduce energy consumption and operating costs while minimising maintenance expenditure. Fourthly, it recognises the central role of the public sector in disbursing subsidies, promoting transparent governance models, and regulating practices through established rules and guidelines.

Figure 3. Sustainable social housing narratives construct. Source: Authors, 2024

Three different categories of challenges emerge from the interviews. The organisational challenges relate primarily to the role of authorities and government agencies in sustainability in the housing sector. This encompasses diverse issues such as policy complexity, fragmentation, and potential misinterpretation of regulations objectives. A notable challenge is the scarcity of funds and investments allocated to sustainable social housing initiatives. Secondly, methodological challenges underscore the pivotal role of practical implementation in sustainable housing provision. Participants highlighted concerns regarding the absence of data, sustainable supply chain management, inadequate funding streams, and insufficient collaboration among developers, hindering effective implementation strategies. Lastly, fiscal challenges centre on the financial feasibility of development projects when integrating sustainability principles. This includes challenges regarding a clear housing vision, contributing to market instability and impeding long-term planning efforts.

5. Conclusion

Based on the sustainable social housing narratives described in Figure 3, and the insights gained from interviews, it was concluded that when a framework for sustainable social housing is proposed, it should be structured around three defining pillars: Housing, Sustainability and Regulatory structure.

- The first pillar refers to the essential criteria that define social housing (such as tenure, provider participation, target group and financing mechanisms). It sets out a clear explanation of the operational parameters of the social housing frameworks and responds to the methodological challenges of the sector.
- The second pillar determines sustainability as a crucial theme encompassing various dimensions, including mitigating environmental impact, integrating energy-efficient and resilient building components, promoting resident well-being through thoughtful design and amenity, and assessing economic viability over the lifecycle of the housing project. This pillar ensures that housing initiatives not only meet immediate needs but also positively contribute to the well-being of the environment and the community in the long term.
- The third pillar focuses on optimising the regulatory framework for social housing and sustainability integration. By simplifying processes and regulations, obstacles can be minimised, project realisation can be accelerated, and innovation and efficiency within the sector can be promoted. This pillar must also set aims to promote a favourable environment for the sustainable development of social housing among practitioners and providers.

In addition, it is essential to recognise and address cross-cutting challenges that intersect these pillars. These challenges include organisational aspects, methodological approaches and fiscal considerations. Proactively identifying and mitigating these challenges will improve the framework's ability to manage complexity and ensure that it effectively achieves the goals of sustainable social housing. By integrating these pillars and addressing overarching challenges, a robust framework can be developed to meet immediate housing needs while advancing broader social, environmental and economic goals for the future.

Acknowledgement

The work presented in this publication has been conducted within the RE-DWELL Innovative Training Network, funded by the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement no. 956082.

References

Fokaides, P. A., Polycarpou, K., & Kalogirou, S. (2017). The impact of the implementation of the European Energy Performance of Buildings Directive on the European building stock: The case of the Cyprus Land Development Corporation. *Energy policy, 111*, 1-8.

Granath Hansson, A., & Lundgren, B. (2019). Defining social housing: A discussion on the suitable criteria. *Housing, Theory and Society, 36*(2), 149-166.

Harriott, S., Matthews, L., & Grainger, P. (2004). *Introducing social housing*. Chartered Institute of Housing.

Joffe, H., & Yardley, L. (2003). Chapter four: content and thematic analysis. *Research Methods for Clinical and Health Psychology. Marks D, Yardley L (ed): Sage Publications, London*, 56-68.

Knox, N. (2015). *What is WELL? The WELL Building Standard*. WELL Building Institute (IWBI).

Kruger, A., & Seville, C. (2012). *Green building: principles and practices in residential construction*. Cengage Learning.

Kubba, S. (2012). *Handbook of green building design and construction: LEED, BREEAM, and Green Globes*. Butterworth-Heinemann.

Malpass, P., & Victory, C. (2010). The modernisation of social housing in England. *International Journal of Housing Policy, 10*(1), 3-18.

Matthews, P. (2016, 2016/05/18). What is housing studies for and what impact does it have? *Housing Studies, 31*(4), 490-493. https://doi.org/10.1080/02673037.2016.1152028

Moghayedi, A., Awuzie, B., Omotayo, T., Le Jeune, K., Massyn, M., Ekpo, C. O., Braune, M., & Byron, P. (2021). A critical success factor framework for implementing sustainable innovative and affordable housing: a systematic review and bibliometric analysis. *Buildings, 11*(8), 317.

Murphy, R. (2012). Sustainability: A wicked problem. *Sociologica, 6*(2).

Oyebanji, A. O. (2014). *Development of a framework for sustainable social housing provision (SSHP) in England* University of Central Lancashire].

Peters, R. W. (2013). *Green building, principles and practices in residential construction*. Wiley Online Library.

Poveda, C. A., & Lipsett, M. G. (2011). A review of sustainability assessment and sustainability/environmental rating systems and credit weighting tools. *Journal of Sustainable Development, 4*(6), 36.

Priemus, H. (2013). The future of social housing. The Dutch case. *International Journal of co-operative management, 6*(2), 13-24.

Stephens, M. (2013). Social housing in the United Kingdom. In *The future of public housing* (pp. 199-213). Springer.

Udomiaye, E., Okon, I. U., Uzodimma, O. C., & Patrick, N. (2018). Eco-friendly buildings: the architect's perspectives. *International Journal of Civil Engineering, Construction and Estate Management, 6*(2), 14-26.

UKGBC. (2021). *The New Homes Policy Playbook: driving sustainability in new homes*. UK Green Building Council. https://ukgbc.org/resources/new-homes-policy-playbook/

Fostering sustainable renovation: Enhancing building Renovation Passport through large-scale retrofitting evaluation

Adirane Calvo, Álvaro Sicilia
School of Architecture La Salle
Ramon Llull University, Barcelona, Spain

Keywords: building renovation passport, energy retrofit, building decarbonization, large- scale retrofitting

1. Introduction

The construction sector significantly impacts climate change, with buildings responsible for 40% of Europe's energy consumption and 36% of greenhouse gas emissions, These impacts persist over the years because 75% of existing buildings remain inefficient, and the annual rehabilitation rate is less than 1%, hindering EU's decarbonization goals (European Commission, 2024).

In response to this pressing issue, the European Commission has set the goal of achieving carbon-neutral cities by 2050 (European Commission, 2019). Despite previous efforts to improve building energy efficiency through policies such as the 2002 Energy performance of Buildings first EU-wide directive (European Commission, 2002), and subsequent updates in Directive 2010/31/EU (European Commission, 2010) and 2018/844/EU (European Commission, 2018), progress has been limited. Consequently, this has led to a strategic shift towards implementing new tools to increase renovation rate, but also to the consideration of prioritising broader sustainability factors, including energy efficiency, affordability, decarbonization, and health standards (European Commission, 2020).

In this context, the building Renovation Passport (RP) has emerged as a critical tool under the Renovation Wave. Designed to act as a pillar to drive buildings' energy efficiency, the RP aims to facilitate tailored building retrofitting through citizen engagement (European Commission, 2024).

To effectively address the energy efficiency of buildings as a key element within the framework of sustainable urban development, it is crucial to understand that cities operate as complex systems. Building renovation cannot be approached in isolation; rather, it must be integrated into a broader, multidimensional strategy that considers social, economic, and environmental factors. This approach ensures that renovations positively contribute to the overall urban fabric (Eames et al., 2013).

Achieving meaningful and sustainable outcomes requires a holistic diagnosis of the built environment across various scales. Actions taken at the building scale can significantly impact the urban scale, and therefore, renovation objectives at the building level should align with broader sustainability goals. Cross-scale building assessments are essential for identifying comprehensive solutions that address both immediate and long-term needs (Barbano & Egusquiza, 2015). Moreover, scaling up building evaluation provides a strategic vision for city transformation, enabling stakeholders to develop building renovation programs that avoid fragmentation and ensure coherence across urban development efforts (Dixon & Eames, 2013). By incorporating these principles, building renovations can contribute more effectively to urban sustainability and resilience.

A pertinent example of addressing the challenges of integrating building renovation into broader urban sustainability efforts is the Retabit project. As a cofinanced initiative supported by the Spanish Ministry, the project aims to develop a data-driven platform designed to enhance cross-scale, multidimensional evaluation of buildings to be renovated. Consequently, Retabit aims to contribute to more effective and integrated building renovation strategies, addressing the complex interplay of factors that influence both individual building performance and overall urban resilience.

Given the complexities of urban sustainability and the need for comprehensive building renovation strategies, it is crucial to look beyond the implementation of individual evaluation tools, such as the RP. While both building-level tools and urban-scale strategies share the common goal of improving sustainability and efficiency, we are still missing tools that facilitate the integration between these two scales. Bridging this gap could enable building-level tools to address issues arising from the broader urban context, while urban-scale strategies could benefit from detailed building-level data to make more informed and comprehensive decisions.

This research, part of an ongoing PhD thesis, is conducted in conjunction with the Retabit project. It focuses on how the Renovation Passport can be effectively integrated with large-scale assessment methods to enhance comprehensive urban renewal strategies. Additionally, this research tackles the affordability challenges related to environmental assessments, aiming to contribute to a more sustainable, inclusive, and equitable urban transformation agenda.

2. Scope and methodology

This research has two primary objectives. First, it aims to review current methods for assessing sustainable retrofitting of buildings across various scales, examining their benefits and barriers in relation to European sustainability objectives. Second, it seeks to identify areas for improvement by pinpointing gaps in current practices, highlighting opportunities for enhancement of the RP within the framework of RETABIT project.

The objectives rely on introducing approaches that are both affordable and scalable, while providing a comprehensive assessment of how renovations affect the overall sustainability of the built environment.

The methodology applied on this research consists of three stages:

1. **Literature review**: Examining large-scale building retrofitting strategies, discussing associated benefits, challenges, and emerging evaluation tools. Additionally, it explores the RP as a novel tool for building-scale evaluation, addressing implementation challenges, and identifying areas for improvement. The information related to this stage is further elaborated in Sections 3 and 4.

2. **Case study evaluation**: Focused on ongoing sustainability initiatives in Spain, with focus on building renovation projects. This includes an analysis of current strategies, identified gaps, and future trends to contextualise subsequent analysis phases. Detailed information about this stage can be found in Section 5.

3. **Proposed line of work:** This involves combining cross-scale evaluation methods and synthesising findings from previous stages to propose potential implementation examples and benefits. Recommendations for future research and development are also provided, with further discussion in Sections 6 and 7.

3. Large-scale building retrofitting strategies

The necessity for a strategic holistic sustainability evaluation and the limited impact of individual building retrofitting on EU goals have prompted a re-evaluation of retrofitting strategies. Large-scale urban retrofitting programs are emerging as viable options for upgrading existing building stock (He et al., 2015), offering comprehensive assessments of energy efficiency and proposing renovation scenarios and coordinated plans for sustainable built environments.

However, retrofitting programs are often initiated without comprehensive knowledge of the existing building stock. To address this lack, two primary approaches are commonly employed to get data about the status of the buildings: top-down and bottom-up. The first relies on statistical techniques to gather and analyse aggregated data, which is then segmented into smaller geographic areas. In contrast, the second begins with an in-depth examination of individual buildings, or similar building types, leveraging the findings to generalise improvements across larger areas. This often involves the use of archetypes, which serve as representative models for buildings sharing common characteristics (Thrampoulidis et al., 2023).

Moreover, a comprehensive assessment of building stock on a large scale encompasses various sustainability factors, including the ecological footprint, economic security, social well-being, and resilience (Eames et al., 2013). This expanded scope of building evaluation has been further advanced by the Renovation Wave and the recast proposal of the Energy Performance of Buildings Directive (EPBD) (European Commission, 2021) and has been incorporated into the new EPBD (European Commission, 2024). However, sustainability factors are often assessed individually, failing to reflect the interconnection of the environmental, socioeconomic and architectural dimensions for urban regeneration (Mauree et al., 2019; Rosales, 2011). Incorporating interconnected environmental, social, and economic aspects into large-scale building stock assessment would allow for a broader analysis of issues within an urban area and facilitates the achievement of the sustainable development goals.

The Retabit project is aligned with this approach as it incorporates economic, social, and environmental sustainability considerations to develop comprehensive large-scale rehabilitation programmes. Retabit integrates diverse building data from open data sources, structured as Key Performance Indicators (KPIs), enabling a comprehensive evaluation of economic, social, and environmental factors affecting the building renovation measures. Using scaling computations, assessments can be extended to larger areas like census units and cities. The process combines specific building data with archetypes, useful for analysing buildings with limited information or computational constraints, particularly for tasks like energy performance evaluation.

This integrated approach will allow users to conduct large-scale assessments, identifying areas for sustainable retrofitting initiatives in urban communities. Additionally, KPI-derived information guides the development of tailored retrofitting solutions for individual or clustered buildings.

4. Building-scale evaluation: building Renovation Passport

In recent years, the building Renovation Passport has been posited as a valuable informative resource, providing insights and economic relief for building renovation challenge. Initially, the passport lacked a standardised definition (Sesana & Salvalai, 2018). It then gained clarity after a definition provided by the BPIE institute (Fabbri et al., 2016). Conceived as a document outlining a long-term renovation roadmap based on an energy audit, the RP aimed to improve a building's energy performance through collaboration with owners (Fabbri et al., 2016). A more detailed

discussion of the RP's structure revealed its purpose as a digital tool for evaluating sequential renovation activities, emphasizing user-friendliness (Fabbri, 2017). Subsequently, the RP was integrated into European legislative documents, named in 2019 and fully integrated in 2021, emphasising the staged retrofitting approach with the fewest steps as possible (European Commission, 2019b; European Commission, 2021).

The final proposal of the building Renovation Passport has been launched in 2024 with the new EPBD under the name of Renovation Passport (RP) and is referred to as "a tailored roadmap for the deep renovation of a specific building in a maximum number of steps that will significantly improve its energy performance", to be implemented according to the methodology outlined in Annex VIII of the EPBD, aiming to achieve zero-emission buildings by 2050 (European Commission, 2024). Since its initial conception, the RP has evolved significantly. Previously, evaluation was required through energy auditing, but the revised proposal has shifted away from this condition, focusing instead on streamlining retrofitting stages to achieve targets within a specified timeframe. It also considers the integration of the RP with Energy Performance Certificates (EPCs) instead of the more detailed energy auditing.

The RP still has the potential to offer homeowners a practical solution to retrofitting by reducing uncertainty and alleviating economic challenges (Fabbri, 2017). In fact, RP has key advantages, such as overcoming barriers to initial investment and greater flexibility to adapt to regulatory changes as well as innovations in materials and construction techniques (Fritz et al., 2019).

Moreover, the RP does enable the inclusion of broader aspects beyond energy efficiency in building evaluations, as demonstrated by initiatives such as ALDREN, iBROAD, and the Green Building Passport (ADENE, 2018; Maria Sesana et al., 2020; Small-Warner & Sinclair, 2022). But there is a risk that RP will focus solely on energy efficiency retrofitting, potentially overlooking broader aspects addressed by the Renovation Wave. This consideration is important because, according to the Annex VIII of the new EPBD (European Commission, 2024), mandatory requirements primarily focus on energy, while voluntary requirements —although expanded to include areas such as seismic activity, adaptability, and circularity—remain general and subject to implementation by individual countries.

In summary, while the RP can contribute to Europe's decarbonization goals by 2050, its full potential and societal acceptance may not be fully realised under the current EPBD framework. In contrast, RP's full capabilities can be hindered by the varying interpretations surrounding its broad implementation across European countries, as well as the less stringent and undefined evaluation requirements.

4.1 Challenges in implementing the RP

The RP aims to provide stakeholders with comprehensive information to evaluate and facilitate renovation, ensuring affordable and accessible access for all citizens (Sesana & Salvalai, 2018). However, implementing the RP faces various legal, financial, environmental, social, organizational and technical challenges.

Legal challenges include undefined frameworks, limited access to databases, and fragmented approaches across Member States (Buchholz & Lützkendorf, 2023; Small-Warner & Sinclair, 2022). Ensuring compliance with legal standards and addressing enforcement and voluntary participation issues are also critical issues that need to be addressed (BPIE, 2019).

Financial barriers, such as the cost of the retrofitting actions and a lack of funding schemes are not the only economic challenges the RP is facing. High costs associated with RP itself can further hinder its adoption (Small-Warner & Sinclair, 2022), especially for homeowners with limited financial resources, as these expenses may deter them from pursuing renovations. For example, when energy auditing is used as a more comprehensive method to assess the most cost-effective sequence for building retrofits, the associated costs may increase. Conversely, less detailed assessments, like the site visits currently required for generating EPCs in some Member States, involve lower costs but also present significant limitations. These assessments offer only a baseline evaluation and fail to address many aspects covered by full audits (González Cáceres, 2018). EPCs tend to overlook household equipment usage and patterns, relying instead on theoretical models that do not account for the real energy consumption of the building (Verheyen et al., 2022). This approach can be useful for comparative purposes, but may diminish the accuracy and relevance of energy evaluation results, limiting retrofit options and potentially leading to overly generalised, low-cost measures that meet only minimal standards (Thomas, 2021). According to González Cáceres (2018), interviews evaluating EPC Recommendation Lists suggest that a methodology between basic site visits and full energy audits should be considered for EPCs to reduce costs and increase assessment scope. In this regard, the new EPBD proposes using the RP as tool to define EPCs' retrofitting recommendations (European Commission, 2024), making this idea extendable to the RP framework.

Focusing on the energy audits, the concept encompasses different levels of evaluation depth. Considering their assessment scope, energy audits can be categorised into three models: walk-through, targeted, and detailed (Sharma et al., 2021). Their application in the residential sector additionally faces common barriers like technical complexity, time constraints, high costs, financing difficulties, and lack of awareness. Homeowners' limited understanding exacerbates these barriers, reducing alignment with RP objectives and its acceptance. (Ingle et al., 2012; Palmer et al., 2013). Providing financial support and incentives to building owners is essential to ensure inclusivity in the renovation process (BPIE, 2019).

Environmental challenges arise from inadequate evaluation, focusing solely on operational energy and neglecting aspects like embodied emissions and circularity. This oversight is critical as enhancing energy efficiency in building stock underscores the importance of embodied energy, especially during rehabilitation (GBCe & Cíclica, 2022). Integrating circular practices like Life Cycle Assessment (LCA), adaptability, and reuse into renovation can align with EU sustainability goals, reduce costs, and enhance resilience (Edwards et al., 2019). However, this process also faces difficulties such as the absence of standardised framework defined parameters (Vilches et al., 2017), and the timing and cost constraints of the process, that could deter building owners of integrating it within the RP.

Social issues include a lack of awareness and understanding of the need for building renovation, leading to reluctance to participate (Abreu et al., 2023). Additionally, focusing on buildings over inhabitants neglects social aspects like cultural context, hindering renovation triggers beyond energy efficiency (Wilson et al., 2018). Equity concerns may arise due to socio-economic barriers in accessing and introducing the passport.

Organizational considerations involve clarifying responsibilities among stakeholders and integrating RPs into complex property schemes (D'Oca et al., 2018). Finally, technical challenges include, among others, stakeholders' technical knowledge, data accuracy, and interoperability between assessment tools (Buchholz & Lützkendorf, 2023).

In addition to the specific challenges mentioned, there are broader multi-scalability issues that arise when integrating long-term plans with individual actions. These include data privacy concerns and the need for alignment between overarching objectives and individual goals, which are crucial for effective communication among various stakeholders (Buchholz & Lützkendorf, 2023; Haase et al., 2020). Addressing these multi-scalability challenges is essential for realising the full potential of RPs and advancing sustainable renovation practices over the long term.

5. Evaluation of Spanish building retrofitting efforts and needs

The "Long-Term Strategy for Energy Renovation in the Building Sector in Spain" (ERESEE) (Secretaría General de Agenda Urbana y Vivienda & Dirección General de Agenda Urbana y Arquitectura, 2020) serves as a comprehensive assessment of the building stock, providing future intervention scenarios aimed at delineating a route map for decarbonising the building sector by 2050. The evaluation of the Spanish building stock in this strategy report underscores that the majority of buildings were constructed before 2010, with 50% of residential buildings predating 1980, most of them being multi-family structures under multi-owner ownership. Furthermore, retrofitting activities, including expansion, restoration, and consolidation, surged by 25.2% from 2017 to 2019, with a median budget of 47,286 euros. This increase is largely credited to established Spanish tools like Building Evaluation Reports (BERs), Technical Inspection of Buildings (TIBs), and EPCs.

Despite progress, challenges persist. The ERESEE 2020 reveals that 7% of buildings, housing 16.7% of the population, are in a state of poor conservation. Additionally, 50.4% of Spaniards are dissatisfied with home accessibility, with 13.5% of multi-story buildings lacking elevators. Energy efficiency measures are absent in over 60% of buildings, with 20.9% lacking heating systems. Prioritising energy efficiency remains low among Spaniards, and the belief that retrofitting can be cost-effective through energy savings is challenged by low energy prices and consumption rates.

Furthermore, economic hurdles (53.7% of Spanish citizens struggle to make ends meet, and 25% are classified as energy poor) and the complexities of the Horizontal Property regime hinder agreements on building and financing options, creating barriers to retrofitting endeavours.

These challenges saw partial alleviation through the Next Generation EU program, endorsed by the European Council, aimed at mobilising funds and investments to bolster sustainability in urban and rural areas. In Spain, the Recovery, Transformation, and Resilience plan was established to administer these funds, structured into four axes and ten policy levers, with one focused on housing renovation, allocating 6.82 billion of euros (Pérez-Navarro et al., 2023). Integrated into Spanish regulations in 2021, the Next Generation Funds provide financing for renovations through six main programs, covering over half of the retrofitting investment costs. Eligibility criteria mandate demonstrating energy savings of 30% for heating and cooling demand and 30%, 40%, or 60% for non-renewable primary energy savings (Hidalgo-Betanzos et al., 2023).

Despite economic aid, Spain has fallen short of the renovation rates proposed by the Renovation Wave, as reported by the ERESEE, indicating a lack of significant citizen-led renovations (Hidalgo-Betanzos et al., 2023). Studies have delved into the obstacles to renovation objectives, even with public funding, through surveys targeting stakeholders involved in construction processes and the approval of Next Generation funds. Participant responses have shed light on the challenges highlighted by the ERESEE.

According to Pérez-Navarro et al. (2023), economic aspects, subsidy difficulties, and a lack of awareness about retrofitting are major hurdles for stakeholders. However, the prioritization of these barriers differs among owners, technicians, and administrations. Owners prioritise economic factors, followed by the scarcity of aid and difficulties due to legal requirements. Technicians stress the lack of owner awareness, economic constraints, and decision-making complexities, especially in multi-family buildings. Additionally, the authors noticed owners' limited knowledge about retrofitting benefit.

A survey of 136 participants in the Basque Country conducted by Hidalgo-Betanzos et al. (2023), revealed similar obstacles. The responses varied by role, but perceptions of the Next Generation Funds ranged from insufficient to neutral. Public administration respondents had positive experiences, overshadowed by bureaucracy and challenges in disseminating information to citizens. Building managers faced difficulties in meeting information requirements and obtaining the information, long response times, and the upfront payment before receiving partial investments through the funds. Owners indicated a lack of information from agents and pointed out difficulties in handling the information. Moreover, there was a general perception of the sector's unpreparedness for proposed retrofitting rates, the need for increased awareness of benefits beyond economics, climate considerations, and improved communication processes.

These aspects hinder retrofitting processes beyond economic constraints, contributing to minimal renovation rate increases in Spain despite widespread Next Generation Fund use. To tackle them, ERESEE (Secretaría General de Agenda Urbana y Vivienda & Dirección General de Agenda Urbana y Arquitectura, 2020) proposes integrated planning, management, and finance strategies across various scales, targeting political, economic, and social evaluations to enhance building sector energy efficiency.

These ERESEE sub-strategies entail cross-sectional coordinated efforts among administrations for long-term building and urban retrofitting planning, regulatory frameworks development to integrate rehabilitation areas, evaluation of retrofitting triggers using instruments like IEEs, ITEs and the inclusion of tools like RP, prioritization of buildings for retrofitting targeting energy efficiency and vulnerable populations, increased funds linked to evaluation tools like RPs, innovation in climate adaptation and bioclimatic solutions, neighbourhood-scale project aggregation for integrated urban regeneration and inclusion of social and environmental measures, retrofitting cooperatives and community associations, citizen empowerment through accessible information dissemination, and establishment of monitoring mechanisms for enhanced energy policies and retrofitting rates, emphasising data-driven decision-making and transparent communication.

In summary, the ERESEE supports collaborative and integrated planning for sustainable building retrofitting and urban regeneration, positioning it as a leading renovation strategy within the EU. It also highlights the role of the Spanish Urban Agenda in promoting sustainable development, focusing on circular economy principles and energy efficiency to drive effective urban transformation and provide non-energy benefits to citizens while addressing microclimate issues. This aligns with recommendations from studies on Next Generation Funds, emphasising a collaborative, multidimensional, and transparent approach to tackle process-related challenges.

However, some of the implementation proposals outlined in the ERESEE remain unspecified and may present implementation challenges due to factors such as the lack of all required data, the population willingness, and the unpreparedness of the construction sector. These persistent challenges underscore the ongoing need for concrete action and innovation across all levels of

administration, stakeholders, and researchers. The integration of available tools and methods derived from large-scale evaluation with the development of new ones, such as RPs, can facilitate the adoption of these new tools and some proposals included in the ERESEE.

6. Large-scale evaluation tools and methods to enhance the RP

Despite policy efforts and economic aids, the situation of the Spanish building stock remains precarious, as indicated by the ERESEE data. According to surveys, citizens are unprepared for the renovation wave crucial for sectoral decarbonization.

Large-scale evaluation methods and tools can improve the RP framework by addressing some of its challenges. These include integrating additional aspects beyond energy efficiency and building scale to properly inform citizenship, favouring the inclusion of cultural triggers and particular economic constraints, and tailoring retrofitting to meet area-specific needs. Moreover, this integration can improve pervading weaknesses in the Spanish long-term renovation strategy. Specifically, by enhancing access to building stock information, facilitating communication between administrations at various levels and building owners, integrating actions to tackle interconnected issues and prioritising them based on societal needs such as assisting poor or energy-poor families in undertaking evaluation and retrofitting activities, and planning integrated urban regeneration based on individual buildings and energy efficiency.

Interlinking sustainable retrofitting tools across different scales offers a comprehensive perspective, covering socio-economic and environmental aspects. The Retabit project aims to achieve this by offering insights into sustainability factors within urban and social contexts through KPIs evaluation. This enables the development of tailored initiatives for diverse contexts, including organizational solutions. Additionally, Retabit employs a bottom-up, archetype-based method to assess building energy performance. This approach presents an opportunity to enhance the RP assessment and scope. Specifically, by integrating comprehensive energy audits as reliable evaluation methods, while exploring alternative methodologies to reduce costs, and addressing broader sustainability dimensions.

The literature provides examples employing this method that have been successfully implemented. Particularly, it has shown promise in energy auditing and Life Cycle Assessment (LCA) evaluations.

For instance, the Colorado College Energy Audit and Retrofit Program employed clustering in residential energy audits, reducing costs while ensuring comprehensive data collection (Wierzba et al., 2011). Similarly, the BOHEEME project used archetypes to assess energy savings and renovation possibilities for EU building stocks constructed before 2010, addressing at the same time uncertainties and comparability issues associated with different LCA assumptions and frameworks (Gulotta et al., 2021).

Le Den et al. (2024) also used archetypes-based LCA to project EU buildings' carbon emissions across three scenarios, aiming to assess pathways to carbon neutrality. These scenarios considered whole-life emissions, retrofitting trends, circular economy potential, and sufficiency measures. Findings suggested that current retrofitting trends might raise embodied emissions, partially countered by operational reductions, achieving CO2 reductions by 2050 but missing net-zero targets. However, escalating renovation rates, as proposed by the renovation wave, may exacerbate embodied emissions beyond operational targets, necessitating circularity principles to mitigate them. Moreover, most embodied emissions from new construction rates are unavoidable. Sufficiency measures can substantially reduce both embodied and operational

emissions, but achieving a true net-zero target requires additional technologies and innovative solutions. Study limitations include the need for a more detailed model, evaluating national archetypes for enhanced granularity, staged renovation approaches for accessible retrofitting, broader LCA scope in renovations, and comprehensive solutions and timeline.

In light of these insights, our research aims to introduce a line of work focused on incorporating archetypes into the RP framework. Integrating archetypes into RP assessments for both energy auditing and LCA offers a chance to reduce costs while ensuring reliability and adherence to sustainability and circularity principles. For instance, combining energy audit models based on archetypes with real sample building evaluations and extrapolating results could distribute costs among participating homeowners. Additionally, broadening the scope to include neighbourhood context can improve citizen communication, promote shared knowledge, and pave the way for strategies like energy communities.

Furthermore, using archetypes for LCA evaluation could guarantee consistency and comparability in certain LCA parameters, increasing the granularity in a national basis. This would enable the identification of the most appropriate retrofitting option for each building based on embodied energy and environmental sustainability impacts. Besides, it could help avoiding the costs associated with conducting an LCA for each building evaluated by the RP, if further environmental impacts want to be assessed.

Furthermore, considering the integration of the Renovation Passport with comprehensive evaluation tools—such as incorporating the resulting assessments into platforms like Retabit—could help address some of the challenges identified by the ERESE.

To advance in this direction, it is crucial to connect large-scale retrofitting initiatives with Renovation Passports by establishing effective communication and common evaluation standards and indicators between them. This integration can harmonise individual and collective sustainability objectives by aligning goals and actions, and by fostering better communication among stakeholders. Moreover, it provides a comprehensive perspective on the broader context in which renovation actions occur, enabling the assessment of factors that may impede renovation efforts.

7. Conclusion

The building Renovation Passport can serve as a tool to propose and guide building retrofitting. It has significant potential when detailed evaluation methods are employed to define renovation pathways. However, the substantial costs associated with these evaluation processes pose a barrier to widespread adoption, particularly for financially constrained homeowners.

Integrating sustainability and circularity considerations into the RP framework is essential to align with broader EU sustainability goals and ensure long-term environmental resilience. However, the integration of RP into this overall assessment may escalate its costs, potentially limiting its accessibility and effectiveness in driving renovation activities. Addressing this challenge is crucial to ensure equitable access to the RP.

In this paper, we have presented an initial exploration of possible enhancements to the building Renovation Passport framework, particularly by considering its integration with large-scale evaluation initiatives. Although this is a work in progress and represents just one of several possible lines of research, it highlights the opportunities to expand the scope of RP and to generate benefits at diverse scales without compromising the reliability or comprehensiveness of user-provided information.

Of particular interest is the use of archetypes for energy auditing and LCA as this would enhance building and promote urban retrofitting initiatives in Spain. By addressing the inherent challenges of the RP, those outlined in the Spanish long-term renovation strategy, and stakeholders' perceptions the following benefits emerge:

- Enhanced accuracy of data inclusion in administrative decision-making processes and progress monitoring through data integration, including vulnerability, social, and energy information from bills derived from energy audits and surveys. This facilitates long-term planning and identifies areas for further action.
- Facilitation of retrofitting and integrated urban regeneration plans at local and regional levels by utilising specific data from audits and LCA evaluations to design more effective actions, including financing, and achieve greater reductions.
- Improved cross-sectional communication between administrations at different scales, fostering dialogue initiatives based on existing open-source databases, and assessing synergies with existing tools such as TIBs and BERs.
- Enablement of demand aggregation at a larger scale, promoting deep renovation and directly informing stakeholders about energy, socioeconomic, and environmental benefits, thus fostering zero carbon emissions and circular economies.
- Mitigation of economic constraints for building owners by improving access to property information and fostering communication with administrative bodies and communities, while also promoting awareness and knowledge about retrofitting, through accessible and affordable evaluation tools.
- Reduction of the time-consuming complexities and information requirements faced by technicians by making relevant data directly accessible to administrative bodies.

Considering these factors can drive significant progress in Spanish retrofitting efforts by aligning all stakeholders involved in the process, balancing stricter retrofitting requirements with equitable opportunities. To achieve this, future research will be essential to evaluate the proposed frameworks, validate their effectiveness, and refine their implementation within the Renovation Passport.

Acknowledgment

This paper constitutes a contribution stemming from the ongoing PhD research at La Salle-Ramon Llull University, which is being conducted in conjunction with the Retabit research project (PID2020-115936RB-C21) co-funded by the Spanish Ministry of Science and Innovation.

References

Abreu, M. I., Pereira, A., & Gervásio, H. (2023). From a Techno-Economic towards a Socio-Technical Approach—A Review of the Influences and Policies on Home Energy Renovations' Decisions. *Buildings*, *13*(3), 761. https://doi.org/10.3390/buildings13030761

ADENE - Agência para a Energia. (2018). *The iBRoad Concept in practice. Report on suggested elements, content and layout of the iBRoad tools*. https://ibroad-project.eu/news/the-ibroad-concept-in-practice/

BPIE (2019). *How can Member States implement iBRoad? Barriers and drivers for countries willing to explore the feasibility and replicability of iBRoad*. https://ibroad-project.eu/news/how-can-member-states-implement-ibroad/

Buchholz, M., & Lützkendorf, T. (2023). European building passports: Developments, challenges and future roles. *Buildings and Cities*, *4*(1), 902-919. https://doi.org/10.5334/bc.355

Dixon, T., & Eames, M. (2013). Scaling up: The challenges of urban retrofit. *Building Research & Information*, *41*(5), 499-503. https://doi.org/10.1080/09613218.2013.812432

D'Oca, S., Ferrante, A., Ferrer, C., Pernetti, R., Gralka, A., Sebastian, R., & Op 't Veld, P. (2018). Technical, Financial, and Social Barriers and Challenges in Deep Building Renovation: Integration of Lessons Learned from the H2020 Cluster Projects. *Buildings*, *8*(12), 174. https://doi.org/10.3390/buildings8120174

Eames, M., Dixon, T., May, T., & Hunt, M. (2013). City futures: Exploring urban retrofit and sustainable transitions. *Building Research & Information*, *41*(5), 504-516. https://doi.org/10.1080/09613218.2013.805063

European Commission (2019b) *Commission Recommendation (EU) 2019/ 786 of 8 May 2019 on Building Renovation*, L 127/34 § Official Journal of the European Union (2019). https://op.europa.eu/en/publication-detail/-/publication/4a4ce303-77a6-11e9-9f05-01aa75ed71a1/language-en

European Commission (2019) *Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions the European Green Deal*, COM(2019) 640 final (2019). https://eur-lex.europa.eu/resource.html?uri=cellar:b828d165-1c22-11ea-8c1f-01aa75ed71a1.0002.02/DOC_1&format=PDF

European Commission (2020). *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. A Renovation Wave for Europe—Greening our buildings, creating jobs, improving lives*. https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1603122220757&uri=CELEX:52020DC0662

European Commission (2002) *Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the Energy Performance of Buildings*, L 1/65 § Official Journal of the European Communities (2002). https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:001:0065:0071:en:PDF

European Commission (2010) *Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the Energy Performance of Buildings (recast)*, L 153/13 § Official Journal of the European Union (2010). https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010L0031

European Commission (2018) *Directive (EU) 2018/844 of the European Parliament and of the Council of 30 May 2018 Amending Directive 2010/31/EU on the Energy Performance of Buildings and Directive 2012/27/EU on Energy Efficiency*, L 156/75 § Official Journal of the European Union (2018). https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L0844

European Commission (2024) *Directive (EU) 2024/1275 of the European Parliament and of the Council of 24 April 2024 on the Energy Performance of Buildings (Recast)*, OJ L, 8.5.2024 § Official Journal of the European Union (2024). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:L_202401275&pk_keyword=Energy&pk_content=Directive

European Commission (2021) *Propuesta de Directiva del Parlamento Europeo y del Consejo relativa a la eficiencia energética de los edificios (refundición)*, COM (2021) 802 final (2021). https://eur-lex.europa.eu/resource.html?uri=cellar:c51fe6d1-5da2-11ec-9c6c-01aa75ed71a1.0023.02/DOC_1&format=PDF

Fabbri, M. (2017). Understanding building renovation passports: Customised solutions to boost deep renovation and increase comfort in a decarbonised Europe. *ECEEE 2017 Summer Study on Energy Efficiency: Consumption, Efficiency and Limits*, 1409-1417. https://www.eceee.org/library/conference_proceedings/eceee_Summer_Studies/2017/

Fabbri, M., De Groote, M., Rapf, O., & BPIE – Buildings Performance Institute Europe. (2016). *Building Renovation Passports. Customised roadmaps towards deep renovation*. BPIE. https://www.bpie.eu/publication/renovation-passports/

Fritz, S., Pehnt, M., & Mellwig, P. (2019). Planned staged deep renovations as the main driver for a decarbonised European building stock. *2019 ECEEE Summer Study on Energy Efficiency: Is Efficient Sufficient?*, *2019-June*, 1279-1288.

GBCe (Green Building Council España), & Cíclica. (2022). *Hoja de ruta para la descarbonización de la edificación en todo su ciclo de vida*. https://gbce.es/blog/2022/02/10/green-building-council-espana-presenta-la-hoja-de-ruta-para-la-descarbonizacion-del-sector-de-la-edificacion/

González Cáceres, A. (2018). Shortcomings and Suggestions to the EPC Recommendation List of Measures: In-Depth Interviews in Six Countries. *Energies*, *11*(10), 2516. https://doi.org/10.3390/en11102516

Haase, M., Lolli, N., & Thunshelle, K. (2020). *Renovation concepts for residential Buildings. Research status, challenges and opportunities* (19). ZEN Research Centre. https://fmezen.no

He, M., Brownlee, A., Lee, T., Wright, J., & Taylor, S. (2015). Multi-objective Optimization for a Large Scale Retrofit Program for the Housing Stock in the North East of England. *Energy Procedia*, *78*, 854-859. https://doi.org/10.1016/j.egypro.2015.11.007

Hidalgo-Betanzos, J. M., Angulo Ortíz de Zárate, L., Sellens-Fernández, I., García-Gáfaro, C., & Picallo-Pérez, A. (2023). Next Generation renovations under the microscope: A failure or success? *EESAP14 International Conference 2023, 4-5 October Donostia-San Sebastián Proceedings book*, 64-74. https://addi.ehu.es/handle/10810/63014

Ingle, A., Moezzi, M., Lutzenhiser, L., & Diamond, R. (2012). How Well Do Home Energy Audits Serve the Homeowner? *Center for Urban Studies Publications and Reports*, *154*. https://pdxscholar.library.pdx.edu/cus_pubs/154

Le Den, X., Steinmann, J., Kovacs, A., Kockat, J., Toth, Z., Röck, M., & Allacker, K. (2024). *Supporting the development of a roadmap for the reduction of whole life carbon of buildings: Final technical report.* European Commission Publications Office. https://data.europa.eu/doi/10.2779/849252

Mauree, D., Naboni, E., Coccolo, S., Perera, A. T. D., Nik, V. M., & Scartezzini, J.-L. (2019). A review of assessment methods for the urban environment and its energy sustainability to guarantee climate adaptation of future cities. *Renewable and Sustainable Energy Reviews*, *112*, 733-746. https://doi.org/10.1016/j.rser.2019.06.005

Palmer, K., Walls, M., Gordon, H., & Gerarden, T. (2013). Assessing the energy-efficiency information gap: Results from a survey of home energy auditors. *Energy Efficiency*, *6*(2), 271-292. https://doi.org/10.1007/s12053-012-9178-2

Pérez-Navarro, J., Bueso, M. C., & Vázquez, G. (2023). Drivers of and Barriers to Energy Renovation in Residential Buildings in Spain—The Challenge of Next Generation EU Funds for Existing Buildings. *Buildings*, *13*(7), 1817. https://doi.org/10.3390/buildings13071817

Rosales, N. (2011). Towards the Modeling of Sustainability into Urban Planning: Using Indicators to Build Sustainable Cities. *Procedia Engineering*, *21*, 641-647. https://doi.org/10.1016/j.proeng.2011.11.2060

Secretaría General de Agenda Urbana y Vivienda & Dirección General de Agenda Urbana y Arquitectura. (2020). *ERESEE 2020. Actualización 2020 de la estrategia a largo plazo para la rehabilitación energética en el sector de la edificación en España*. https://www.transportes.gob.es/el-ministerio/planes-estrategicos/estrategia-a-largo-plazo-para-la-rehabilitacion-energetica-en-el-sector-de-la-edificacion-en-espana/eresse2020

Sesana, M. M., Salvalai, G., Ligier, S., & Rivallain, M. (2020). The ALDREN Building Renovation Passport for Non-Residential buildings: A modular digital instrument to support the Renovation Wave. *REHVA Journal*, *August 2020*, 35-40.

Sesana, M. M., & Salvalai, G. (2018). A review on Building Renovation Passport: Potentialities and barriers on current initiatives. *Energy and Buildings*, *173*, 195-205. https://doi.org/10.1016/j.enbuild.2018.05.027

Sharma, P., Reddy Salkuti, S., & Kim, S.-C. (2021). Energy audit: Types, scope, methodology and report structure. *Indonesian Journal of Electrical Engineering and Computer Science*, *22*(1), 45. https://doi.org/10.11591/ijeecs.v22.i1.pp45-52

Small-Warner, K., & Sinclair, C. (2022). *Green Building Passports: A review for Scotland*. https://doi.org/10.7488/ERA/2075

Thomas, S. (2021). Next-generation energy performance certificates and deep energy renovation. *ECEEE 2021 Summer Study on Energy Efficiency: A New Reality?*, 845-854. https://www.eceee.org/library/conference_proceedings/eceee_Summer_Studies/2021/

Thrampoulidis, E., Hug, G., & Orehounig, K. (2023). Approximating optimal building retrofit solutions for large-scale retrofit analysis. *Applied Energy*, *333*, 120566. https://doi.org/10.1016/j.apenergy.2022.120566

Verheyen, J., Lambie, E., Fernández Boneta, M., María, I., Kranzl, L., Urbanz, T., & Frick, D. (2022). Next generation energy performance assessment methods for EPCs using measured energy data. *CLIMA 2022 Towards a Digitalized, Healthy, Circular and Energy Efficient HVAC*, 2159-2166. https://doi.org/10.34641/mg.33

Vilches, A., García-Martínez, A., & Sánchez-Montañés, B. (2017). Life cycle assessment (LCA) of building refurbishment: A literature review. *Energy and Buildings*, *135*, 286-301. https://doi.org/10.1016/j.enbuild.2016.11.042

Wilson, C., Pettifor, H., & Chryssochoidis, G. (2018). Quantitative modelling of why and how homeowners decide to renovate energy efficiently. *Applied Energy*, *212*, 1333-1344. https://doi.org/10.1016/j.apenergy.2017.11.099

Planning proposal for the future of traditional Sille houses in the context of sustainable historical fabric using the shape grammar method

Ebru Erdogan[1], Abdullah Erdogan[2], S. Didem Boztepe Erkis[3]

[1]Selcuk University, Faculty of Architecture and Design, Department of Architecture, Konya, Turkey

[2]Konya Technical University, Faculty of Architecture and Design, Department of Architecture, Konya, Turkey

[3]Master's Degree Graduate Architect, Antalya, Turkey

Keywords: historical fabric, traditional Sille houses, shape grammar

1. Introduction

Despite its proximity to the city centre of Konya, the geography, culture, lifestyle, beliefs, and traditions of the town of Sille make it stand out as an unusual settlement which is becoming increasingly attractive for local and foreign tourists (Figure 1). Host to various civilizations throughout its 6000-year history, Sille has embraced different faiths and cultures over the years (Tapur, 2009). Situated just a few miles to the north-west of Konya, the town is an Anatolian settlement with a long history, where Orthodox Christian Greeks and Muslim Turks have lived together (Aklanoğlu, 2009). It is the legacy of a historical past stretching from the Neolithic age to the present day. Situated on the sacred pilgrimage route from Rome to Jerusalem, this settlement has also been an important centre in Christian history. During the Ottoman period, it benefited from the socio-political and socio-economic opportunities provided by its location on the historic “Silk and Spice Routes” (Özönder, 1998). Sille, with its rock-cut churches, chapels, mosques, baths, fountains, and still-standing examples of civil architecture, was declared an urban conservation area in 1995, becoming a focus of national and international attention for its sustainable cultural tourism potential (Erdogan & Boztepe Erkış, 2014).

Figure 1. 19th Century General View of Sille. Source: Anonymous

Despite numerous scientific studies on the traditional residential architecture of Konya (Eyice,1966; Çaycı, 1996; Danık, 1997; Özyurt Özcan, 1998; Mimiroğlu, 2006; Sarıköse, 2008), research on Sille's traditional architecture has been limited and mostly focused on urban development. Following the population exchange, a turning point in its history, inhabitants began to abandon Sille, and this inevitably affected the town's reputation as the centre of architectural heritage of Anatolia. Moreover, the needs and characteristics of modern users have evolved over time, leading to changes in both architectural elements and historical texture. If there is a need to preserve the existing historical texture or to make additions, the new part must be in harmony with the architectural language of the region. Understanding the architectural language is therefore a priority.

This study aims to provide a guide for future renovations and new constructions in the historical settlement of Sille, ensuring their compatibility with the historical fabric. Preserving and transmitting the architectural texture of Sille, which has survived through a historical process to the present day, is of great importance for the preservation of its art and cultural identity. This work is expected to contribute architecturally to the cultural heritage, thereby reviving history and ensuring that Sille receives the recognition it deserves.

2. Shape grammar

Shape grammar, a generative system, is a set of formal rules applied to the creation of a design language, containing precise rules related to form. The most significant difference of shape grammar from other generative designs is its narrative of processes through shapes and forms, rather than abstract symbols. Shape grammar has been described by Stiny and Gips (1972) as the earliest algorithmic system made for performing inter-formal computations to design and understand the design process. This design method consists of two phases. Firstly, it is used in the production of standard designs that match the character of an existing style within an architectural context. Secondly, it serves as a tool for the continuous transformation of a certain type within the language into the production of new types. Viewing design as a problem, shape grammar examines this design problem within an algorithmic structure, decrypting the followed steps to make this algorithm definable. In this way, it becomes possible to intervene in every step of the design, to revert within the process, and to utilise the obtained knowledge against similar

design problems. As a rule-based formalism, shape grammar defines the stages of design, responding to both inductive and deductive methods (Özkaraduman, 2007).

Since their introduction in the early 1970s by Stiny and Gips, shape grammars have undergone substantial evolution. Initially focused on two-dimensional compositions for form generation, such as paintings and sculptures in 1971 and 1972, shape grammars explored the boundaries of artistic creation. Notable early works include the analysis of planar compositions and the aesthetic evaluation of artworks by R. Diebenkorn and G. Vantongerloo (Kirsch & Kirsch, 1986; Knight, 1989). Shape grammar research has also been conducted in other arts. In painting, shape grammars have been developed for R. Diebenkorn's paintings (Kirsch & Kirsch, 1988) and for the works of Miro (Kirsch & Kirsch, 1988). In decorative arts, a shape grammar was devised for Hepple-White chair designs (Knight, 1980) and for F. L. Wright's window designs (Rollo, 1995). In industrial design, a shape grammar was created for coffee machines (Agarwal & Cagan, 1998), showcasing the broad applicability of shape grammars across different artistic and design disciplines.

Studies on shape grammar are divided into three categories: analysis, synthesis and hybrid Studies. In 1971, Stiny and Gips developed the concept of shape grammar, which they applied to the generative specification of paintings and sculptures. The initial studies in shape grammar were predominantly analytical. The first study on shape grammars by Stiny in 1977 described the compositions of ice patterns using a grammar consisting of five simple rules. This study demonstrated how existing Chinese ice patterns and numerous designs in the same style could be generated using these grammar rules. Following this, the first analytical study in architecture using shape grammar was conducted by Stiny and Mitchell in 1978. They analysed the ground floor plans of Palladio's Villas to define Palladio's architectural style. The academic inquiry soon expanded into three-dimensional forms, marked by Stiny's introduction of kindergarten grammars in 1980 (Stiny, 1980), using "Froebel Block Grammar", which was the first three-dimensional study developed for shape grammars. Later, Rian (2022) argued that previous research has overlooked the explanation of fractal geometry, which can elucidate shapes that exhibit self-similar or self-affine repetitions at various scales. Adopting an innovative approach, the paper analytically focuses on the fractal characteristics of ice-ray lattice designs and employs fractal geometry as a unique tool for generating different types of ice-ray lattices.

The method used by Stiny later laid the groundwork for the three-dimensional grammars that would be developed for architecture (Knight, 1999).This evolution enabled the detailed exploration of diverse three-dimensional grammars, including those relevant to Frank Lloyd Wright's architectural styles (Koning and Eisenberg, 1981), Queen Anne house designs (Flemming, 1987), Gill architecture (Gibbs, 1997) and the Siza grammar (Duarte, 1998).

In architecture, examples of shape grammars that illustrate traditional and architectural models include the shape grammar developed for Buffalo bungalows (Downing & Flemming, 1981), Japanese tea rooms (Knight, 1981), residential designs by Glenn Murcutt (Hanson & Radford, 1986), city church designs by Wren (Buelinckx, 1993), and traditional Taiwanese house designs (Chiou & Krishnamurti, 1992). Çağdaş (1996a) developed a parametric shape grammar for planning traditional Turkish homes, based on houses built over the past 500 years in Anatolia and Rumelia. In addition she conducted architectural language of the row houses Çağdaş (1996b). In Sarajevo, an analysis was conducted on classical Ottoman architecture examples, specifically the Hayat houses, and a developed shape grammar facilitated the creation of new, contemporary housing types derived from these Hayat houses in the region (Çolakoğlu, 2005).

The hybrid domain where the intersection of these two knowledge areas appears is in line with recent research in shape grammars. These studies aim to shift their focus from basic element

shapes' algebra to object-processing algebras or from shape grammars to creating grammars for object processing (Knight & Stiny, 2015). Lee et al. (2015) propose a combined method of Space Syntax and Shape Grammar approaches in design, initially utilising ten house designs by Glenn Murcutt to understand a characteristic instance of architectural configuration. Knight (2015) pointed out new directions for shape grammars concerning the creation of material things and their making. In his study, Kotsopoulos (2015) presents a novel approach that sets it apart from other research by encoding performance constraints related to interior daylight illuminance and linking them to the visual and symmetry principles of two-dimensional pattern generation. By the late 20th and early 21st centuries, the application of shape grammars had expanded to encompass hybrid domains, incorporating both material and kinetic elements in design, as illustrated by studies from Al-kazzaz and Bridges (2012) and Harrison et al. (2015). These investigations focused on the tangible execution of designs, transitioning from purely visual or abstract applications to include substantive material features and dynamic functionalities. In the study conducted by Lee (2017), a computational and mathematical framework to analyse Wright's Prairie architecture, focusing on its grammar and syntax. The research identifies the main patterns in Wright's design strategies and suggests the specific design permutation that most effectively conveys the linguistic features of the architectural style.

The use of shape grammars in customised mass housing has progressed from Lynn's (2013) Embryological House experiment, which utilised CNC technology, to more sophisticated systems such as Duarte's digital remodel (2001) and further developments by McLeish (2003), Huang and Krawczyk (2006), and Benros and Duarte (2009). This approach refines design rules and expands design options, as illustrated by Duarte's (2005) discursive grammar, the introduction of tools like the 'Home Planner' by Kwieciński and Markusiewicz (2018), and the layout generation system for large-scale apartment customization (Veloso et al., 2018). It is utilised to develop a model for apartment design and architectural element integration, employing a two-phase syntax to study building relationships (Griz et al., 2017). Al-Jokhadar and Jabi (2016) explored courtyard designs in the Middle East and Africa using a discursive coding model, illustrating the diverse analytical applications of shape grammar. Beirão et al. (2010) have conducted significant research in this area, culminating in the development of a GIS-based city generation tool, initially applied in their detailed study of Praia (Beirão et al., 2009). In urban design, Smelik et al. (2014) explored procedural modelling in virtual environments, highlighting the procedural nature of grammar-based methods and the relevance of L-systems. Shape grammar applications were then extended to urban roads and land division, further broadening its scope in urban studies (Klerk & Beirão, 2017, Cassiano et al., 2018). Wang et al. (2020) developed and applied a digital description and generative grammar framework focused on the morphological complexity of block forms. The framework was tested within an urban design practice over Zidong core area located in Nanjing. Wang et al. (2021) demonstrated that shape grammar, capable of analysing design vocabularies and generating new solutions for rural housing, can effectively address the challenge of aligning customised mass housing designs with the varied demands of users.

Recent studies have revealed the versatility of shape grammar in various architectural contexts. El-Mahdy (2022) demonstrates that the application of shape grammars in design studios effectively prepares students at a foundational level for their subsequent learning in computational design. Ligler's (2024) study, sample reconfigurations generated through the use of grammar are provided to enable discussions on the advantages of a metamorphological design approach and its impact on redefining the understanding of Tyng's work, thus fostering ongoing innovation. Castro e Costa et al. (2019) developed a Grasshopper-based system for non-professional users, demonstrating its application with the Santa Marta Urban Grammar. Wang et al. (2024) reviewed forty years of shape grammar applications in vernacular housing analysis

across different regions. In another study, Wang et al. (2023) combined shape grammar with Building Information Modelling (BIM) to design floor plans for a housing project in ShanLiChenJia village. Additionally, Çelik (2023) explored the use of artificial intelligence to generate architectural plans, assessing AI's potential to innovate design through human-computer interactions based on shape grammar principles. These studies underscore shape grammar's capacity to address complex design and planning challenges effectively.

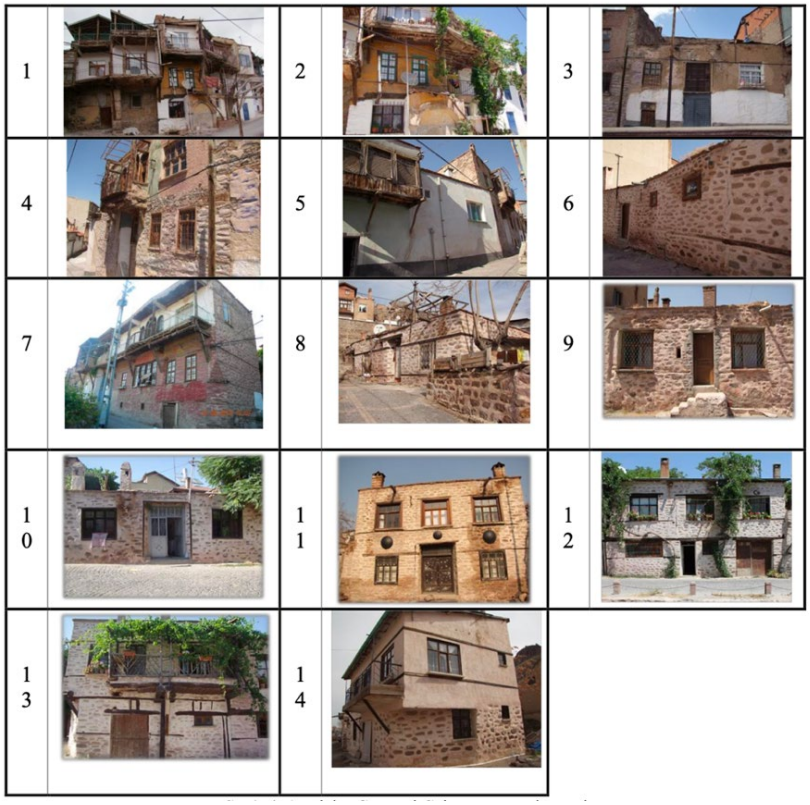
Another approach to the study of shape grammars and computational methods is the analysis of historical and cultural patterns architectural and structures. Stouffs et al. (2015) apply description grammars to understand the architectural typologies of Sinan's Ottoman mosques. Refalian et al. (2021) introduce a new method for digitally visualising Islamic geometric patterns, specifically star patterns, by integrating shape grammars with computer science. Agirbas (2020) performs an algorithmic decomposition of Islamic patterns in tombstones, while Agirbas and Yildiz (2021) investigate the geometric structures of irregular star polygons in muqarnas designs. Giovannini (2023a, 2023b) conducts detailed analyses of Palladio's door ornaments and stair designs, focusing on their proportional and graphical aspects to highlight intricate geometric relationships. Nasiri and Srvdalir (2023) explore the foundations of generative shape grammars within Islamic tectonics, using these grammars to develop new architectural forms. These studies collectively advance the understanding of historical and cultural architectural elements through modern computational approaches.

This expanded timeline illustrates the progressive exploration and applications of shape grammars from artistic beginnings to comprehensive architectural and urban design solutions, reflecting their evolving significance in addressing complex design challenges across different contexts globally.

3. Analysis of traditional Sille houses using the shape grammar method

The traditional architectural texture algorithm is an architectural language with grammar, formed by the repetition of definable rules. To design within this texture and preserve the grammatical structure of the architectural language, it is necessary to define the existing design algorithm, determine the spatial analyses of the elements constituting the texture, and conduct grammatical analyses. Only through these steps can the architectural language be understood. The new design, created based on this data, will not only be appropriate for its location but will also enrich the traditional architectural language. In this context, in this study, within the traditional architectural texture of Sille, new designs are created using the 'Shape Grammar' method, which incorporates rule-based operations, analysis, and synthesis techniques. Initially, defining the components of the architectural language, specifically the spaces and their interrelationships within the plan, forms the basis for the rule schemas. Within the historical texture of Sille, 14 houses that still carry the traditional house characteristic were selected (Table 1), and a two-phase 2D parametric shape grammar study was conducted. In the first phase, the components of the Sille houses were segregated, and their interrelations were determined. The dimensional, formal, and contextual requirements of the floor plans were examined. In the second phase, for ease of analysis, polygonal forms were utilised, and rule formalization was extracted on a virtual grid system. The production process developed with the created shape grammar rule schema is defined, and an algorithm is formulated.

Table 1. Traditional Sille houses analysed by shape grammar



3.1. Description of existing components

The components of traditional Sille houses include the sofa, room, additional room (kitchen, bathroom, WC), and staircase.

The sofa, although seen as a circulation space, is a gathering and meeting space where the household spends time together. In this context, it is the most functional room of the house. The sofa also serves as a passage element connecting private spaces via stairs. Therefore, it is the most crucial space in the floor plan composition. Its shape and location determine the type of house plan. Sofas of varying forms are found in traditional Sille houses in three sub-geometric shapes: rectangular S(I), L-shaped S(L), and T-shaped S(T). Different house types are formed around these sofas based on how the rooms are arranged. From this perspective, the room (O) is the most significant component affecting the overall shape of the plan. The other spatial components of the existing traditional Sille houses are expressed as internal staircase (IM) and external staircase (DM). Additionally, although house entrances (ø) are not a space, they are an important factor from the perspective of shape grammar (Figure 2).

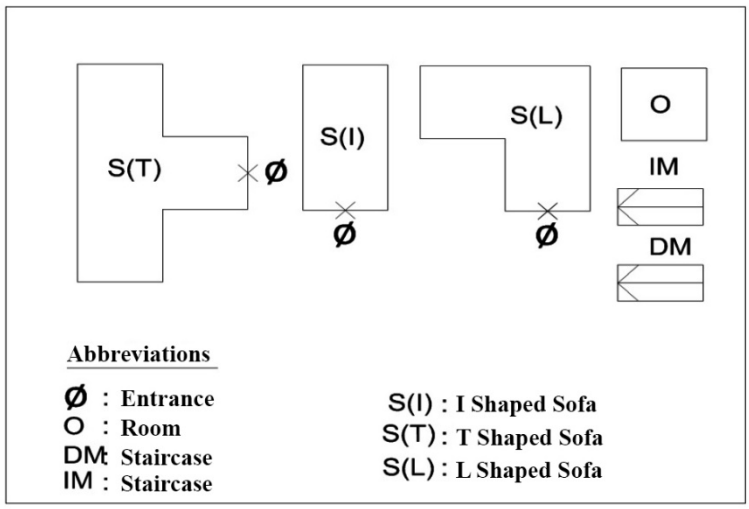


Figure 2. Existing components of traditional Sille houses

3.2. Spatial relationships among components

The relationship between the rooms, facilitated by the sofa which serves as a common area, exists in three subtypes based on its location in the plan. These are external sofa S(D), internal sofa S(K), and central sofa S(O). The sofa is considered a communal area where the inter-room relationships are established, and connections among rooms are only facilitated through this space. In all types of sofas, there is a room designated as the additional room (EO), which can accommodate a kitchen function, thereby allowing the space to be used both as a room and a kitchen, incorporating two functions. The sofa is located at the front of the house's entrance facade. Its position—central or to the side—affects the arrangement of the surrounding rooms, which can be aligned in one, two, or three directions. In multi-story houses, the sofa provides inter-floor connectivity, with the internal staircase being the most crucial unit for this purpose. In contrast, the external staircase is connected to the ground level at the front facade via the sofa. In all types of sofas, external staircases connect to the facade from the sofa. In traditional architecture, the external staircase remains in the public area of the street, while all other components are situated in a private zone (Figure 3).

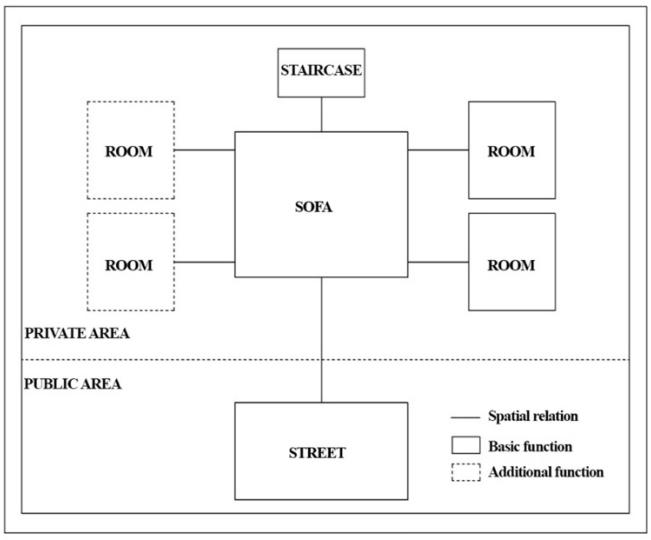


Figure 3. Spatial relationship schema of traditional Sille houses

3.3. Current architectural requirements

Traditional architecture is a formation designed according to the user's needs, narrating the culture of life, and demonstrating traditions and customs. Therefore, the architectural analysis of this formation is contingent upon certain requirements. These requirements can be categorised under three main headings from an architectural perspective. The requirements are: contextual, relating to the topological and morphological status; formal, concerning the existence, number, and geometric shape of spaces in the plan; and dimensional, which involves numerical data such as width, depth, and area (Çağdaş, 1996).

Contextual requirements

In the context analysis, the tableland climate of Sille, its valley settlement, and the sparse and sloped terrain have shaped its settlement character. Sille houses are generally observed to have a contiguous building structure. A characteristic feature of traditional Sille houses is the multiple entrances to the buildings, often on different levels (Figure 5).

Formal requirements

The formal variation in Sille houses is dependent on the number of household members and their economic status. Sille houses, typically two-storied, often feature a plan composition with an internal sofa, with the main sofa usually l-shaped configuration. The geometric shapes of the sofa and the arrangement direction of the rooms dictate the form of the internal staircase. In the formal analysis of the existing building surveys, it has been observed that the projections made to expand spaces and bring the interior to a more regular geometric shape are reflected on the façade. Although these cantilevers vary depending on their location on the façade, an angled cantilever has been observed in House No 2, while in other houses with cantilevers, they have been resolved in a flat form. Examples of jerkinhead roofs, commonly seen in traditional Turkish houses, are rarely found in Sille. In houses that are still in use, it has been observed that jerkinhead roofs have been added later (as seen in House No 1). Most houses feature flat roofs, a characteristic feature of Sille architecture (Figure 5).

Dimensional requirements

Table 2 summarizes the dimensional characteristics, referencing the measurements of floors and spaces.

Table 2. Dimensional requirements of traditional Sille houses

KOD	Sofa (Z) cm	Sofa (B) cm	Sofa (Z) m2	Sofa (B) m2	Sofa (T)	Ground m2	1st Floor m2	Total m2	Additional Spaces
1	2.15*6.36	2.15*6.01	13.30 m2	13.80 m2	27.20 m2	106.62 m2	127.95 m2	234.57 m2	Bath 11.28 m2 Wc 1.68 m2 Kitchen 16.70 m2
2	2.21*7.29	2.19*6.75	14.42 m2	13.64 m2	28.06 m2	115.09 m2	122.21 m2	237.30 m2	Wc 1.70 m2 Kitchen 20.50 m2
3	4.06*5.10	4.16*11.82	14.53 m2	36.60 m2	51.13 m2	151.06 m2	158.96 m2	310.02 m2	Kitchen 22.66 m2 Bath 2.23 m2
4	6.28*7.23	(1) 6.28*7.24 (2) 3.43*5.40	40.81 m2	(1) 48.05 m2 (2) 25.91 m2	114.77 m2	157.32 m2	(1) 149.80 m2 (2) 202.13 m2	509.25 m2	Wc 2.67 m2
5	2.86*3.15	(1) 3.23*5.39 (2) 1.35*0.94	6.39 m2	(1) 16.49 m2 (2) 1.28 m2	23.16 m2	47.83 m2	(1) 173.51 m2 (2) 44.83 m2	266.17 m2	-----
6	2.82*4.42	----------	9.56 m2	----------	9.56 m2	111.52 m2	----------	111.52 m2	-----
7	7.26*5.25	3.68*12.23	29.53 m2	45.34 m2	74.87 m2	199.21 m2	273.11 m2	472.32 m2	Kitchen 14.01 m2 Wc 3.88 m2
8	2.45*5.91	----------	14.56 m2	----------	14.56 m2	57.98 m2	----------	57.98 m2	-----
9	4.56*5.55	----------	13.10 m2	----------	13.10 m2	54.79 m2	----------	54.79 m2	-----
10	2.70*5.73	----------	11.65 m2	----------	11.65 m2	62.48 m2	----------	62.48 m2	-----
11	2.00*5.65	1.98*5.65	11.15 m2	11.19 m2	22.34 m2	64.16 m2	65.37 m2	129.53 m2	-----
12	2.51*7.38	2.75*7.24	18.61 m2	17.97 m2	36.58 m2	70.79 m2	92.24 m2	163.03 m2	Kitchen 13.26 m2
13	6.06*3.01	3.78*7.58	14.75 m2	18.36 m2	33.11 m2	41.46 m2	109.54 m2	151.00 m2	Kitchen 10.38 m2
14	4.94*4.81	2.94*5.48	18.67 m2	12.73 m2	31.40 m2	74.74 m2	73.37 m2	148.11 m2	Wc 1.76 m2 Bath 2.74 m2

3.4. Grammar rules

Following the determined requirement analyses, it is observed that traditional Sille houses have the same architectural language components, but different plan types generated using these components. This indicates that there are specific rules involved in the formation of plans. A two-dimensional shape grammar has been used for the composition of existing architectural components such as the Sofa, Room, and Staircase in the plan. In the presented parametric shape grammar, rectangles are used as components of the language (spaces of the house). Since the dimensions of these components can vary, fixed ratios and parameters are assigned to the polygons. Relationships between spatial components are explained through sets of rules. Spaces represented by polygons and inter-space relationships are organised on a virtual grid system. In this graphical representation, all components have right, left, front, and back orientations, and from the reader's perspective, the front facade (house entrance) is always at the bottom of the plan.

Grammar rules have been developed, including the house entrance rule, rules for sofa types (type I, L, T), internal partition wall rule set, and staircase rule sets. Staircase rules are further divided into internal staircase (I, II and L Type) and external staircase rule sets. Below, the rule set for type I sofa is provided as an example.

I-type sofa

These sofas are rectangular in geometric form. All plans, with the entrance at the front facade, can be mirrored or rotated along the vertical axis (S(Rt)). The distribution of spaces in a I-type sofa is described by four directions: right (Sg), left (Sl), back (Rk), front (On). Rule K.2 initiates the derivation by adding a room to either the right or left (SgSl) of the sofa. Rule K.3 involves adding another room along the same axis, totalling two room placements. Rule K.4 allows rooms to expand horizontally up to the vertical boundaries of the sofa in terms of width and number. Rule K.5 is about mirroring rooms added horizontally aligned with the sofa across its central axis (S(Rt)). Rules K.6, K.7, and K.8 pertain to adding space to the back (Rk(S)) of the sofa. Rule K.6 determines the placement of a room at the back of the sofa. Rule K.7 involves adding another room to the back, thus extending the width of the sofa proportionally. Rule K.8 allows rooms to expand horizontally up to the vertical boundaries of the sofa in terms of width and number (Figure 4).

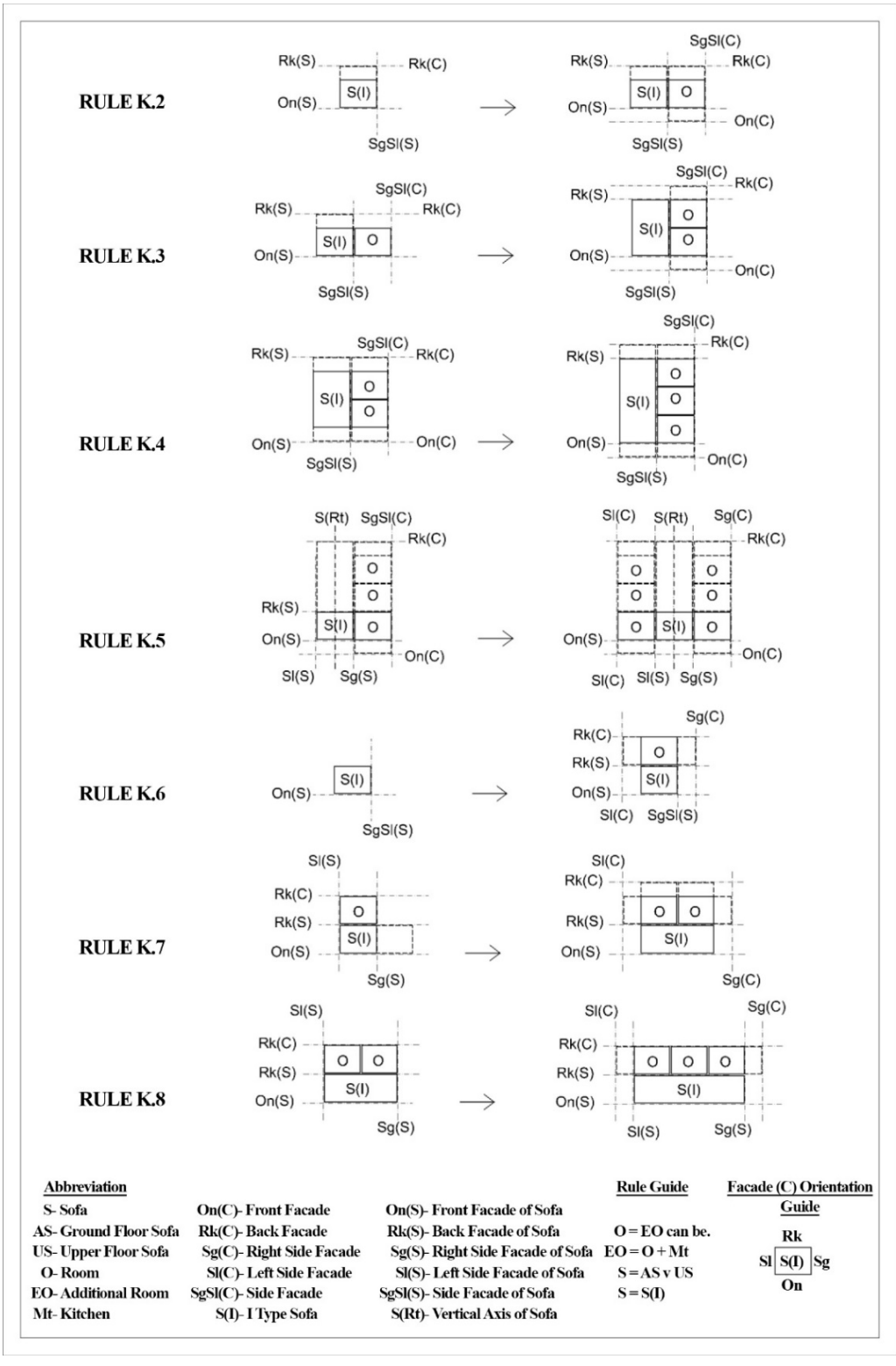


Figure 4. Room arrangement rule set around I-type sofa for traditional Sille houses

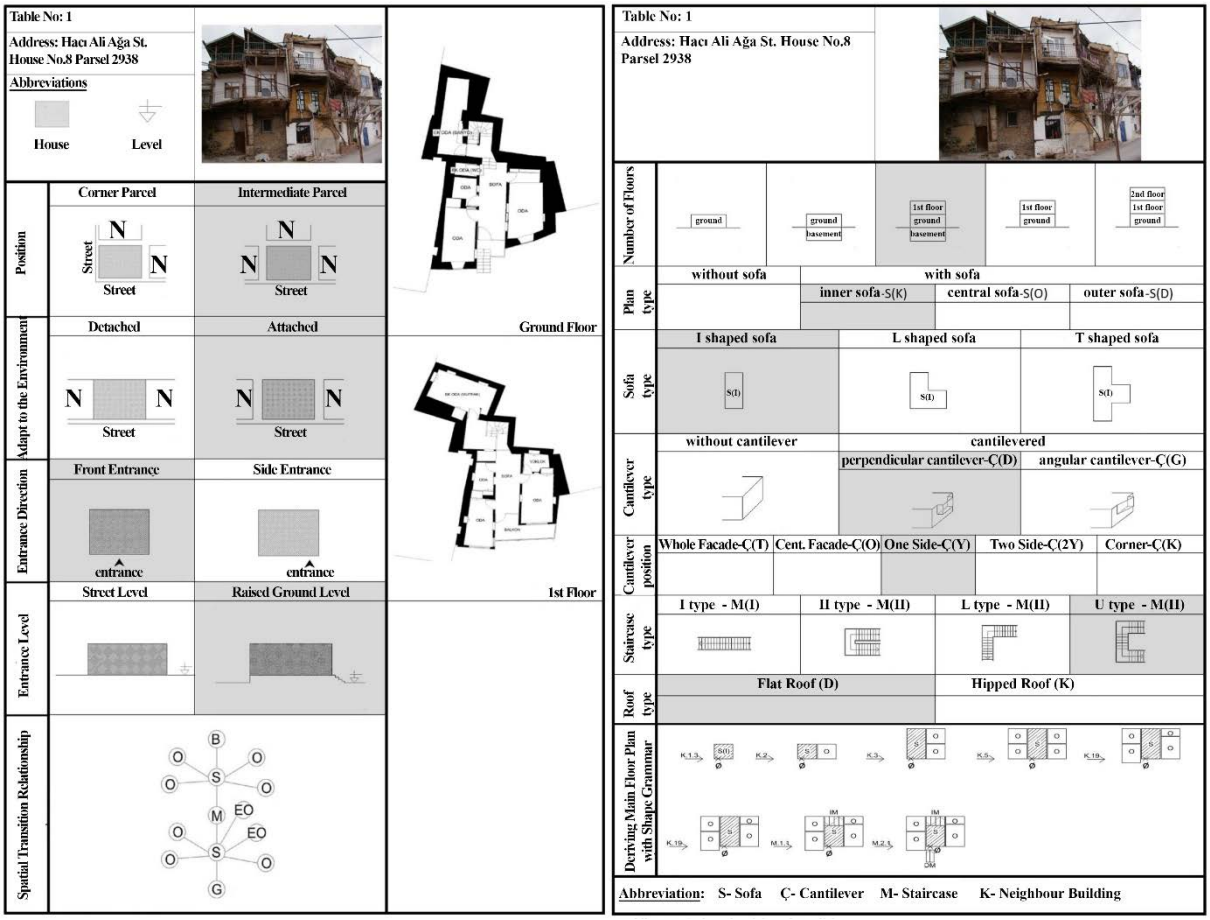


Figure 5. Grammar tables of traditional Sille houses; Contextual analysis (left) and formal analysis (right) of house no. 1

3.5. Adaptation of grammar rules to design (plan derivation for traditional Sille houses)

The plan derivation for traditional Sille houses occurs in six stages. Unlike standard plan analysis, the design phase in Sille houses begins with the selection of a sofa type. This is followed by decisions related to the rooms. These first two rules facilitate achieving the final form of the plan composition. The other four rules involve decisions concerning the internal spaces of the plan. The stages of production for the rule diagrams developed for plan analysis within this study are as follows:

- Determination and positioning of the sofa type (sofa type rule set)
- Determination of the number and position of rooms
- Determination of room sizes (internal partition wall rule set)
- Determination of the type and position of the internal staircase (staircase rule set-IM)
- Determination of the type and position of the external staircase (staircase rule set-DM)
- Determination of the house entrance form (entrance rule)

Different plan types can be obtained with each application of the rules. The rule application can be repeated until the desired result is achieved. By applying these rules, houses that possess the traditional architectural language of the settlement can be produced. Figures 6 and 7 include examples of new housing plans derived according to I-type sofa.

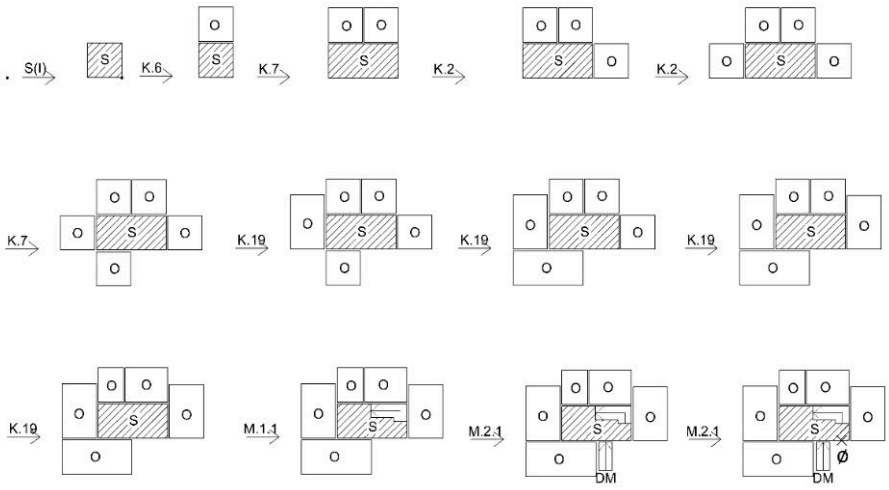


Figure 6. Example of plan derivation with I-type sofa II

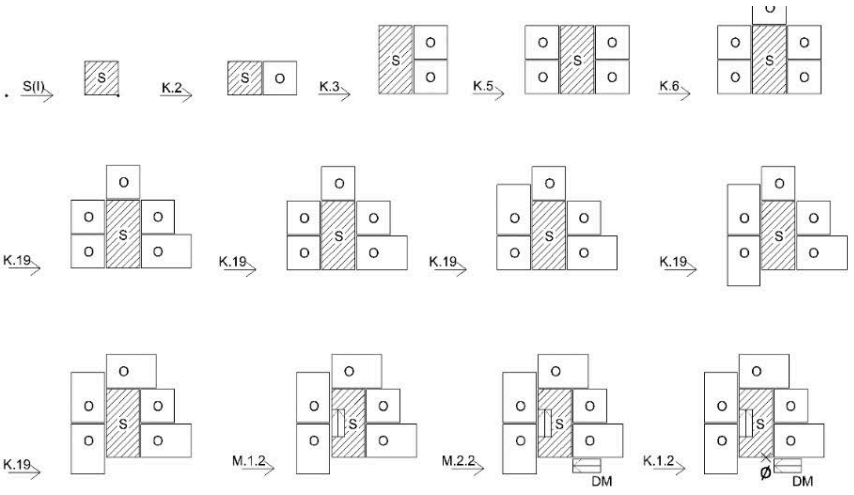


Figure 7. Example of plan derivation with I-type sofa II

4. Conclusion

In this study, the historical significance, geographical, cultural, and social characteristics of the Sille settlement have been highlighted in a bid to ensure that future renovations and constructions respect the town's architectural heritage and are in accordance with the architectural language of the historical texture, while establishing a scientific basis for this purpose. Adding new structures to this existing historical texture is of great importance. Care must be taken to ensure that any new construction or structure conforms to the architectural language of the region. This necessitates understanding the architectural language of the region by comprehending and analysing the rules that constitute this language. The compatibility of renovations and new constructions with the Sille architectural texture, a typology study, and subsequently the creation of a reproduction algorithm can be achieved. In this context, the architectural design language of Sille has been deciphered using the shape grammar method, expressed through rule schemas, and it has been seen that these rules enable the future

additions and new constructions to be organised in a manner that is compatible with the historical texture. Based on this information, it is considered that the additional and new constructions will be compatible with the historical texture and architectural language.

Shape grammar can help identify patterns and rule sets that emerge during the specialization processes of residential textures within a settlement, dependent on culture, time, climate, and topography. With rule sets derived from shape grammar, new residential areas can be designed by integrating new rules obtained from user preferences, resulting in more specialized homes. At this point, the processes can be integrated with generative artificial intelligence systems to offer new design alternatives under different conditions. Following these processes, designers can develop designs that are harmonious with the ancient texture, and maximally responsive to the current needs of the residents of the town.

Shape grammar studies not only allow for the analysis of rule sets of pure geometries but also enable the examination of all environmental and cultural data. Thus, with the cultural transmission of experiences, housing settlements that are sensitive to the environment, correctly utilise site-specific environmental conditions such as solar orientation, wind patterns, and climate, and are based on justice and equity can be designed. These settlements are collaborative, participatory, and cooperative, leading to sustainable textures that optimise material and energy usage under current conditions, adapt quickly and easily to various needs, and can be readily modified. Ultimately, the shape grammar method can provide strong analytical and productive codes for both the design of new structures and the preservation and improvement of existing textures.

Acknowledgment

This paper is based on a master thesis in Architecture studied by Ş.Didem Boztepe Erkiş named as “A Shape Grammar Study on Traditional Sille Houses” at Selcuk University, Graduate School of Natural and Applied Sciences in 2016, supervised by Ebru Erdogan.

References

Agarwal, M., & Cagan, J. (1998). A Blend of Different Tastes: The Language of Coffeemakers. *Environment and Planning B Planning and Design*, 25, 205-226. https://doi.org/10.1068/b25020

Agirbas, A., & Yildiz, G. (2021). Origin of irregular star polygons in ground projection plans of muqarnas. *Nexus Network Journal*, 23, 507-548. https://doi.org/10.1007/s00004-020-00516-x

Aklanoğlu, F. (2009). *Geleneksel yerleşmelerin sürdürülebilirliği ve ekolojik tasarım: Konya-Sille örneği* [Unpublished doctoral dissertation]. Ankara University.

Al-kazzaz, D., & Bridges, A. (2012). A framework for adaptation in shape grammars. *Design Studies*, 33 (4), 342-356. https://doi.org/10.1016/j.destud.2011.11.001

Al-Jokhadar, A. & Jabi, W. (2016). Humanising the computational design process: integrating parametric models with qualitative dimensions. In Parametricism vs. Materialism: Evolution of Digital Technologies for Development, ASCAAD. (pp. 9-18). Imperial House Publishers.

Beirão, J., Duarte, J., Gil, J., & Montenegro, N. (2009). Monitoring urban design through generative design support tools: a generative grammar for Praia. *Regional Networks and Development e Proceedings of the 15th APDR Congress*, 1223-1252.

Beirão, J., Mendes, G., Duarte, J., & Stouffs, R. (2010). Implementing a generative urban design model: Grammar-based design patterns for urban design. *eCAADe 2010 Conference: Future Cities*, 265-274.

Benros, D., & Duarte, J. P. (2009). An integrated system for providing mass customised housing. *Automation in Construction*, 18 (3), 310- 320. https://doi.org/10.1016/j.autcon.2008.09.006

Buelinckx, H. (1993). Wren's language of city church designs: A formal generative classification. *Environment and Planning B Planning and Design*, 20, 645-676. https://doi.org/10.1068/b200645

Cassiano, M., Félix, L.L., & Griz, C. (2018). Shape Grammar applied to urban morphology studies: Land subdivision in urbanized areas. *Proceedings of the 22nd Conference of the Iberoamerican Society of Digital Graphics*, 346-352.

Castro e Costa, E., Verniz, D., Varasteh, S., Miller, M., & Duarte, J. P. (2019). Implementing the Santa Marta Urban Grammar-A pedagogical tool for design computing in architecture. In J.P. Sousa, J.P. Xavier, & G. Castro Henriques (Eds.), *Architecture in the Age of the 4th Industrial Revolution*. Proceedings of the 37th eCAADe and 23rd SIGraDi Conference, vol. 2, 349-358.

Chiou, S.C., & Krishnamurti, R. (1992). The grammar of Taiwanese traditional vernacular dwellings. *Environment and Planning B Planning and Design,* 22, 689-720. https://doi.org/10.1068/b220689

Çağdaş, G. (1996a). A shape grammar: The language of traditional Turkish houses. *Environment and Planning B*, 5, 443-464. https://doi.org/10.1068/b230443

Çağdaş, G. (1996b). A shape grammar model for designing row-houses. *Design Studies*, 17, 35-51. https://doi.org/10.1016/0142-694X(95)00005-C

Çaycı, A. (1996). Türk-İslam mimarisinde Sille çarşı hamamı. *Selçuk Üniversitesi İlâhiyat Fakültesi Dergisi*, 6, 309-319.

Çelik, T. (2023). Generative design experiments with artificial intelligence: Reinterpretation of shape grammar. *Open House International*. https://doi.org/10.1108/OHI-04-2023-0079

Çolakoğlu, B. (2005). An interpretation and generation of vernacular Hayat houses in contemporary context. *Environment and Planning B Planning and Design*, 32(1), 141-149. https://doi.org/10.1068/b3096

Danık, E. (1997). Konya, Sille'deki Aya Elena kilisesi. *Türk Etnografya Dergisi*, 20, 177-193.

Downing, F., & Flemming, U. (1981). The bungalows of Buffalo. *Environment and Planning B*, 8, 269-293. https://doi.org/10.1068/b080269

Duarte, J. P. (1998). Using grammars to customize mass housing: the case of Siza's houses at Malagueira. *IAHS World Congress on Housing*, Lisbon, Portugal.

Duarte, J. P. (2001). Customizing mass housing: a discursive grammar for Siza's Malagueira houses. *Cambridge, MA: Massachusetts Institute of Technology*.

Duarte, J. P. (2005). A Discursive Grammar for Customizing Mass Housing: The Case of Siza's Houses at Malagueira. *Automation in Construction,* 14 (2), 265-275. https://doi.org/10.1016/j.autcon.2004.07.013

El-Mahdy, D. (2022). Learning by Doing: Integrating Shape Grammar as a Visual Coding Tool in Architectural Curricula. *Nexus Network Journal*, 24 (3), 701-716. https://doi.org/10.1007/s00004-022-00608-w

Erdogan, E., & Boztepe Erkış D. (2014). Sille settlement in the context of sustainable historical fabric and façade analysis of its traditional houses. *International Journal of Architectural Research*, 8, 117–135. https://doi.org/10.26687/archnet-ijar.v8i3.214

Eyice, S. (1966). Konya ile Sille Arasında Akmanastır. *Şarkiyat Mecmuası* (VI).

Flemming, U. (1987). More than the sum of its parts: the grammar of Queen Anne houses. *Environment and Planning B: Planning and Design*, 14 (3), 323-350. https://doi.org/10.1068/b140323

Gibbs, J. (1997). *Irving J Gill's architectural grammar* [Ph.D. Dissertation]. University of California, Los Angeles.

Giovannini, E. C. (2023a). Making Palladio digitally explicit: geometrical parameters in door's ornaments. *Nexus Network Journal*, 25(3), 773-794. https://doi.org/10.1007/s00004-023-00658-8

Giovannini, E. C. (2023b). An algorithmic approach to Palladio's design of stairs. *Nexus Network Journal*, 25, 293-301. https://doi.org/10.1007/s00004-023-00668-6

Griz, C., Amorim, L., Mendes, L., Holanda, M. A., & Carvalho, T. (2017). A customization grammar: Describing the customization process of apartment design. *International Journal of Architectural Computing*, 15 (3), 203-214. https://doi.org/10.1177/147807717734671

Harrison, L., Earl, C., & Eckert, C. (2015). Exploratory making: shape, structure and motion. *Design Studies*, 41, 51-78. http://dx.doi.org/10.1016/j.destud.2015.08.003

Kirsch, J. L., & Kirsch, R. A. (1986). The structure of paintings: formal grammars and design. *Environment and Planning B: Planning and Design*,13 (2), 163-176. https://doi.org/10.1068/b130163

Kirsch, J. L. & Kirsch, R. A. (1988) The anatomy of painting style: description with computer rules. *Leonardo*, 21(4), 437-444. https://doi.org/10.2307/1578708

Klerk, R., Beirão, J. (2017). CIM-St. In *International Conference on Computer-Aided Architectural Design Futures* (pp. 42-59). Springer, Singapore.

Knight, T., & Stiny, G. (2015). Making grammars: from computing with shapes to computing with things. *Design Studies,* 41, 8-28. http://dx.doi.org/10.1016/j.destud.2015.08.006

Knight, T. W. (1989). Transformations of de Stijl art: the paintings of Georges Vantongerloo and Fritz Glarner. *Environment and Planning B: Planning and Design*, 16 (1), 51-98. https://doi.org/10.1068/b160051

Knight, T. W. (1980). The Generation of Hepplewhite-Style Chair Back Designs. *Environment and Planning B: Planning and Design*, 7 (2), 227-238. https://doi.org/10.1068/b070227

Knight, T. W. (1981). The forty-one steps: the languages of Japanese tea-room designs. *Environment and Planning B: Planning and Design,* 8 (1), 97-114. https://doi.org/10.1068/b080097

Knight, T. (1999, April). Applications in architectural design, and education and practice. In NSF/MIT Workshop on Shape Computation, Cambridge,MA.

Knight, T., & Stiny, G. (2015). Making grammars: From computing with shapes to computing with things. *Design Studies*, 41 (Part A), 8-28. https://doi.org/10.1016/j.destud.2015.08.006

Koning, H., Eisenberg, J. (1981). The language of the prairie: Frank Lloyd Wright's prairie houses. *Environment and Planning B: Planning and Design,*8 (3), 295-323. https://doi.org/10.1068/b080295

Huang, J., & Krawczyk, R. (September 2006). i_Prefab Home Customizing Prefabricated Houses by Internet-Aided Design. In *Proceedings of the 24th International Conference on Education in Computer Aided Architectural Design in Europe (eCAADe)*, (pp. 690–698). Volos, Greece. https://doi.org/10.52842/conf.ecaade.2006.690

Knight, T. (2015). Shapes and Other Things. *Nexus Network Journal*, 17, 963–980. https://doi.org/10.1007/s00004-015-0267-3

Kotsopoulos, S. D. (2015). Generating a visual language of performance-driven configurations for the principal façade of a prototype sustainable house. *Nexus Network Journal*, 17, 851-874. https://doi.org/10.1007/s00004-015-0273-5

Kwieciński, K., & Markusiewicz, J. (2018). Interfacing Automation for Mass-Customization. In A. Kepczynska-Walczak & S. Bialkowski (Eds*.), Proceedings of the 36th eCAADe Conference* (pp. 159–168). Lodz: Lodz University of Technology.

Lee, J. H., Ostwald, M. J., & Gu, N. (2015). A syntactical and grammatical approach to architectural configuration, analysis and generation. *Architectural Science Review*, 58(3), 189-204. https://doi.org/10.1080/00038628.2015.1015948

Lee, J. H., Ostwald, M. J., & Gu, N. (2017). A Combined plan graph and massing grammar approach to Frank Lloyd Wright's prairie architecture. *Nexus Network Journal*, 19, 279-299. https://doi.org/10.1007/s00004-017-0333-0

Ligler, H. (2024). The Grammar of Anne Tyng's Simpler Space Structures. *Nexus Network Journal*, 1-18. https://doi.org/10.1007/s00004-024-00775-y

Lynn, G. (2013). Embryologic Houses (2000). In The Digital Turn in Architecture 1992–2012, ed. Mario Carpo, 124-130. New Jersey: John Wiley & Sons Inc.

McLeish, T. J. (2003). A platform for consumer driven participative design of open (source) buildings. Cambridge, MA: Massachusetts Institute of Technology.

Mimiroğlu, I. M. (2006). Konya'da Bizans mimarisi. *Yeni İpek Yolu Konya Ticaret Odası Dergisi* (Konya Kitabı IX Özel Sayı), 139-171.

Nasiri, S., & Sarvdalir, A. R. (2024). Geometrical Origin of Generative Shape Grammars for Islamic Tectonics: Chapireh: The Transforming Element from Cubic Chambers to Spheric Domes. *Nexus Network Journal*, 26(1), 177-195. https://doi.org/10.1007/s00004-023-00743-y

Özkaraduman, T. (2007). Geleneksel Mimari Dil için Geliştirilen Tasarım Grameri: Mardin. (Yüksek Lisans Tezi), Yıldız Teknik Üniversitesi.

Özönder, H. (1998). Sille (Tarih- Kültür- Sanat). Konya.

Özyurt Özcan, H. (1998). Sille'de Hıristiyan Mimarisi. *İlgi Dergisi* (95).

Refalian, G., Coloma, E., & Moya, J. N. (2022). Formal grammar methodology for digital visualization of Islamic geometric patterns. *International Journal of Architectural Computing,* 20 (2), 297-315. https://doi.org/10.1177/14780771211039079

Rian, I. M. (2022). Fractal-based algorithmic design of Chinese ice-ray lattices. *Frontiers of Architectural Research*, 11(2), 324-339. https://doi.org/10.1016/j.foar.2021.10.010

Rollo, J. (1995). Triangle and T-Square: The Windows of Frank Lloyd Wright. *Environment and Planning B Planning and Design*, 22 (1), 75-92. https://doi.org/10.1068/b220075

Sarıköse, B. (2008). *Osmanlı Döneminde Sille*. (doctoral dissertation). Selçuk Üniversitesi, Konya.

Smelik, R.M., Tutenel, T., Bidarra, R., & Benes, B. (2014). A survey on procedural modelling for virtual worlds. *Computer Graphics Forum*, 33 (6), 31-50. https://doi.org/10.1111/cgf.12276

Stiny, G., & Gips, J. (1972). Shape Grammars and the Generative Specification of Painting and Sculpture. Paper presented at the IFIP Congress 71, Ljubljana, Yugoslavia.

Stiny, G. (1980). Introduction to shape and shape grammar. *Environment and Planning B*, 7 (3), 343-351. https://doi.org/10.1068/b070343

Stiny, G., & Gips, J. (1972). Shape grammars and the generative specification of painting and sculpture. In *Proceedings of IFIP Congress* (pp. 125-135). North Holland Publishing Co, Amsterdam.

Stiny, G., & Gips, J., (1978). *Algorithmic aesthetics*. University of California Press, Berkeley.

Stiny, G. & Gips, J. (1972), Shape grammars and the generative specification of painting and sculpture. In C. V. Freiman, (Ed.), *Information Processing* 71 (pp. 1460-1465). North Holland, Amsterdam.

Stiny, G. & Mitchell, W.J. (1978). The Palladian grammar. *Environment and Planning B: Planning and Design*, 5 (1), 5-18. https://doi.org/10.1068/b050005

Stouffs, R., & Tunçer, B. (2015). Typological descriptions as generative guides for historical architecture. *Nexus Network Journal*, 17, 785-805. https://doi.org/10.1007/s00004-015-0260-x

Tapur, T. (2009). Konya'da Tarihi Bir Yerleşim Merkezi: Sille. *Türk Coğrafya Dergisi*, Sayı 53:15-30.

Veloso, P., Celani, G.,& Scheeren, R. (2018). From the Generation of Layouts to the Production of Construction Documents: An Application in the Customization of Apartment Plans. *Automation in Construction,* 96, 224-235. https://doi.org/10.1016/j.autcon.2018.09.013

Wang, X., Song, Y., & Tang, P. (2020). Generative urban design using shape grammar and block morphological analysis. *Frontiers of Architectural Research*, 9(4), 914-924. https://doi.org/10.1016/j.foar.2020.09.001

Wang, J., Zhao, B., Fan, W., Yang, Y., & Zhao, J. (2021). A combined shape grammar and housing-space demand approach: customized mass housing design in rural areas of the North China Plain. *Nexus Network Journal*, 24(3), 5-23. https://doi.org/10.1007/s00004-021-00561-0

Wang, J., Zhou, J., & Zhang, S. (2023). Applying shape grammar and BIM for generating the mass modular housing design in ShanLiChenJia village, ZhaoYuan, China. *Journal of Asian Architecture and Building Engineering*, 1-21. https://doi.org/10.1080/13467581.2023.2292081

Wang, J., Zhang, S., & Fan, W. (2024). Application of shape grammar to vernacular houses: A brief case study of Unconventional Villages in the contemporary context. *Journal of Asian Architecture and Building Engineering*, 23 (3), 843-859. https://doi.org/10.1080/13467581.2023.2247465

Social housing retrofit: Case studies in resident engagement

Saskia Furman, Anna Martínez, Xavier Martín

School of Architecture La Salle

Ramon Llull University, Barcelona, Spain

Keywords: social housing, retrofit, case studies, resident engagement

1. Introduction

Social housing retrofit is gaining momentum throughout Europe, in a bid to meet the Net-0 energy targets by 2050. A 2021 recast of the Energy Performance of Buildings Directive stipulates targeting retrofits to those "living in social housing" (European Commission, 2021, p. 14). Movements including the Green New Deal's Renovation Wave and Fit for 55 are supported by funding schemes such as the UK's Social Housing Decarbonisation Fund and the EU's Next Generation Fund. Whole-house deep energy retrofitting (DER) has been popularised by top-down initiatives including Passivhaus' EnerPHit certification, Energy Performance Certificates, and EnergieSprong. However, performance gaps after retrofits can be as high as five times the predicted energy consumption (Traynor, 2019), driven by the rebound effect, the prebound effect, occupant behaviour, improper installation, and simulation uncertainties.

The literature shows that social housing residents are those best placed to describe the way the live and therefore determine their housing needs (Awwal et al., 2022; Boess, 2022; Gianfrate et al., 2017; Lucchi & Delera, 2020; van Hoof & Boerenfijn, 2018; Walker et al., 2014). Residents prioritise non-energy benefits (NEBs) over energy-related benefits (Broers et al., 2022), particularly social housing residents whose needs differ from homeowners (Santangelo & Tondelli, 2017). Resident engagement is therefore a vital component of holistic sustainability in social housing retrofit—social, environmental, and economic—and can increase energy performance, health and wellbeing, quality of life, and user empowerment, thus closing the performance gap.

2. The role of case studies in retrofit research

The focus of this thesis is to examine and develop good practices for socially inclusive, holistic retrofit to engage stakeholder groups. Groat and Wang (2013) (amending Yin, 1981) define case study research as "an empirical inquiry that investigates a phenomenon or setting within its real-life context, especially when the boundary between phenomenon and context are not clearly evident" (p.418). Contextualising resident engagement when retrofitting social housing enables an examination of how the retrofit interacts with complex dynamics—i.e. contextual factors and phenomena (Groat & Wang, 2013)—throughout design and implementation. These dynamics may include engagement tactics, decision-making processes, and architectural infrastructure, among others. In this way, it is possible to ground the theoretical framework in realised, retrofitted homes.

Case studies were identified through convenience sampling via four channels: (1) a systematic literature review, (2) university and secondment contacts, (3) interviewees with high-level stakeholders, and (4) the RE-DWELL project network. Convenience sampling was chosen to increase the probability of access to data, including stakeholders and architectural drawings. Seven potential social housing retrofit case studies were identified. All seven cases satisfied

specific inclusion criteria: European location, energy performance improvements, involved residents from marginalised groups who were actively engaged, and maintained affordable rents. Four cases were selected for further investigation due to data availability and representation of decision-making processes (Figure 1): the Els Mestres retrofit in Spain employed a top-down decision-making approach; the Sutton Estate in England combined top-down and hybrid decision-making; the Liv Inn retrofit in the Netherlands utilised a hybrid decision-making process; and the Clau Mestra retrofit in Spain, characterised by bottom-up decision-making. Investigating the impact of decision-making throughout the retrofit process allows for an examination of successes, simultaneously identifying problems to be overcome. This examination can help identify opportunities to create “good practices” and develop solutions to challenges.

1. El Mestres, Sabadell, Spain, AHC	2. Sutton Estate, London, UK, Clarion	3. Liv Inn, Hilversum, Netherlands, Habion	4. Clau Mestra, La Floresta, Spain, Sostre Civic
TOP-DOWN	TOP-DOWN / HYBRID	HYBRID	BOTTOM-UP
Deep retrofit	Deep retrofit – residents decanted Partial retrofit – residents in situ	Partial retrofit	Deep retrofit
Engagement: - High-level stakeholder workshops - Resident workshops	Engagement: - Resident steering group to give iterative feedback - Public realm, material options - Community events	Engagement: - Resident workshops to integrate needs and wishes - Community events	Engagement: - Resident groups take decisions to bi-monthly assemblies. - Some self-build - Public and community events

Figure 1. Case studies for analysis, representing three methods of decision-making: top-down, hybrid, and bottom-up

The aim of the case study analysis is to investigate whether resident empowerment increases sustainable outcomes in retrofit. Qualitative research, including the results of a semi-systematic literature review, and the thematic analysis of semi-structured interviews with high-level stakeholders, helped identify key components to investigate throughout each case study: (1) passive solutions and design; (2) technical solutions; (3) engagement—before retrofit begins, during retrofit design, during retrofit construction, and after retrofit completion.

The Sutton Estate case study was chosen for the focus group because it employs a combination of top-down and hybrid resident engagement approaches as well as both deep and partial retrofit processes. While remaining critical of different contexts, some findings from this case will be relevant to retrofit case studies employing different decision-making processes. Further, given that building owners commonly adopt a top-down (DER) approach, persuading high-level stakeholders to initially integrate elements of bottom-up decision-making via hybrid methods for resident engagement might yield more successful outcomes.

3. Conclusions

The research shows that greater engagement leads to increased social sustainability in social housing retrofit. Good practices for socially inclusive, holistic retrofit to engage with key actors emerged from a combination of each case. (1) Budget and subsidies—early engagement can save time and money later. Engagement should be budgeted and funding deadlines extended to include these efforts. (2) Technical energy solutions—passive strategies should remain a key component to retrofit, supported by technical intervention. Upskilling from within social housing residents, including energy agents, can promote the adoption of technologies while combating the skilled labour shortage. (3) Participatory processes—hybrid engagement should facilitate knowledge exchange. High-level stakeholders should learn which NEBs are important to the quality of life of residents, while residents should become empowered to engage with low-carbon energies. (4) Inhabitants after retrofit—the housing association should facilitate activities to aid the transition, integrate the wider neighbourhood, promote their social role, and amend misapplied measures. A good practice guide will be tailored to high-level stakeholders, to support their engagement with social housing residents in retrofit decision-making processes.

Acknowledgement

The work presented in this publication has been conducted within the RE-DWELL Innovative Training Network, funded by the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement no. 956082.

References

Awwal, S., Soliman-Junior, J., Ayo-Adejuyigbe, M., Tzortzopoulos, P., & Kagioglou, M. (2022). Social Housing Retrofit Living Lab: Methodological Approach. *IOP Conference Series: Earth and Environmental Science*, *1101*(5), 052020. https://doi.org/10.1088/1755-1315/1101/5/052020

Boess, S. (2022). Let's Get Sociotechnical: A Design Perspective on Zero Energy Renovations. *Urban Planning*, *7*(2), 97–107. https://doi.org/10.17645/up.v7i2.5107

Broers, W., Kemp, R., Vasseur, V., Abujidi, N., & Vroon, Z. (2022). Justice in social housing: Towards a people-centred energy renovation process. *Energy Research and Social Science*, *88*. https://doi.org/10.1016/j.erss.2022.102527

European Commission. (2021). *2021/0426 (COD) DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the energy performance of buildings (recast)*. https://eur-lex.europa.eu/legal content/EN/TXT/PDF/?uri=CELEX:52021DC0550&from=EN

Gianfrate, V., Piccardo, C., Longo, D., & Giachetta, A. (2017). Rethinking social housing: Behavioral patterns and technological innovations. *Sustainable Cities and Society*, *33*, 102–112. https://doi.org/10.1016/j.scs.2017.05.015

Groat, L., & Wang, D. (2013). *Architectural Research Methods* (2nd ed.). Wiley.

Lucchi, E., & Delera, A. C. (2020). Enhancing the historic public social housing through a user-centered design-driven approach. *Buildings*, *10*(9). https://doi.org/10.3390/BUILDINGS10090159

Santangelo, A., & Tondelli, S. (2017). Occupant behavior and building renovation of the social housing stock: Current and future challenges. *Energy and Buildings*, *145*, 276–283. https://doi.org/10.1016/j.enbuild.2017.04.019

Traynor, J. (2019). *ENERPHIT: A step by step guide to low energy retrofit*. RIBA Publishing.

Van Hoof, J., & Boerenfijn, P. (2018). Re-inventing existing real estate of social housing for older people: Building a new De Benring in Voorst, The Netherlands. *Buildings*, *8*(7). https://doi.org/10.3390/buildings8070089

Walker, S. L., Lowery, D., & Theobald, K. (2014). Low-carbon retrofits in social housing: Interaction with occupant behavior. *Energy Research and Social Science*, *2*, 102–114. https://doi.org/10.1016/j.erss.2014.04.004

Improving housing affordability through housing allowances: a pilot project in Croatia

Marko Horvat

University of Zagreb, Faculty of Law, Study Centre for Social Policy, Zagreb, Croatia

Keywords: affordable housing, housing allowance, housing policy

1. Introduction

Housing affordability is one of the most pressing social problems in most EU Member States. Cities, especially capital cities, are experiencing a significant influx of inhabitants, leading to an increase in housing costs. This gradual densification process combined with slow housing construction is exacerbating affordability inequality for average earners, with the gap widening for those on below average incomes, leaving more European households unable to afford adequate housing.

The inability of younger generations and the precariously employed to buy their own home is forcing them into the rental market, earning them the label "Generation Rent". The phenomena of financialisation and privatisation, particularly in CEE countries, have contributed to the high proportion of homeowners in societies. This worsens housing affordability since many housing units are converted into short-term rental properties, limiting long-term rental options and driving up rental prices. In urban centres, especially in capital cities, there is often a shortage of affordable housing options such as public or rental housing.

In this paper we will look at housing allowances, a special type of demand-side intervention that has characteristics of both a housing subsidy and an income subsidy. We will evaluate a Croatian pilot project in which housing allowances are distributed as a measure to increase housing affordability. Finally, we will recommend policy measures that should be considered for a greater impact of the housing allowances in Croatia.

2. Research method and aim

This paper aims to explain housing allowances from the Croatian perspective and assess whether this recent nationwide pilot project is a viable large-scale replicable solution to housing inequality and affordability. The research question underlying this paper is whether housing allowances can be used to increase housing affordability in the short term.

To this end, the research will be conducted in three steps. Firstly, a literature review will help us to understand the possible expectations of housing allowances as a demand-side subsidy and the impact on the quality of life of recipients as well as on the housing market in general. Secondly, interviews will be conducted with the relevant Croatian authorities to find out whether the aim of this pilot project has been achieved and whether housing allowance programmes may be introduced on a larger scale in the future. Thirdly, a questionnaire will be distributed to subsidy recipients to assess the real effect of this measure on their housing affordability and quality of life.

The expected outcome of this research is an overview of the housing allowance system in Croatian context and an understanding of the future scaling up potential.

3. Housing in Croatia

3.1 Housing since the independence

Croatia was under socialism until the early 1990s, when the socialist one-party system was replaced by democratic party pluralism. One of the most important measures that characterised the current housing regime was the process of "give-away" privatisation to sitting tenants and the privileged individuals from the socialist era, as well as the withdrawal of the state from the housing market. In the newly adopted constitution, the right to housing was not enshrined as a human right and the state's responsibility to provide housing for those in need was not mentioned. Furthermore, the newly formed government did not set up a national housing fund to oversee privatisation and reinvest the proceeds. Instead, privatisation was left to local authorities who had no knowledge, capacity or responsibility to carry out such an operation. This led to a transfer of publicly owned flats to individuals who had the means to acquire them for a fraction of the real market value. In addition to these "internal" forces that set in motion this path-dependent development of housing policy and institutions, which have not changed significantly to this day, Croatia faced an external pressure, namely the War of Independence, which devastated both human lives and the housing stock. The upshot of policy modernisation is a lack of institutional and political capacity to respond to the inflated housing market and the inability to implement an efficient housing policy.

In recent years, Croatia has faced different housing market challenges ranging from the global financial crisis, failure to produce a national housing strategy, low investment in social and public rental housing, the Swiss Franc crisis, COVID-19 crisis and its entrance into the Eurozone. In practically all these periods, housing was left to the market that mostly incentivised homeownership, thus worsening the housing market situation. Incentivising homeownership, if not followed by an increase in new construction and if the equal programmes are not provided to tenants, leads to widening the social inequalities and dividing households to "outsiders" and "insiders".

Common "issues" with unaffordable housing is evident in young people either leaving Croatia and searching for better employment elsewhere or leaving home later in their lives and starting families, which has a dual effect: first the overcrowding rate increase due to more people living under the same roof, and second, a negative demographic trend. This is especially evident in Croatia with 44,4 percent overcrowding rate in young population between 16 and 29 (Figure 1), and the negative demographic balance between 2011 and 2021 census of nearly 10 percent[1] (Croatian Bureau of Statistics, 2023).

[1] Population in 2021 census was 3.871.833 compared to 4.284.889 in 2011

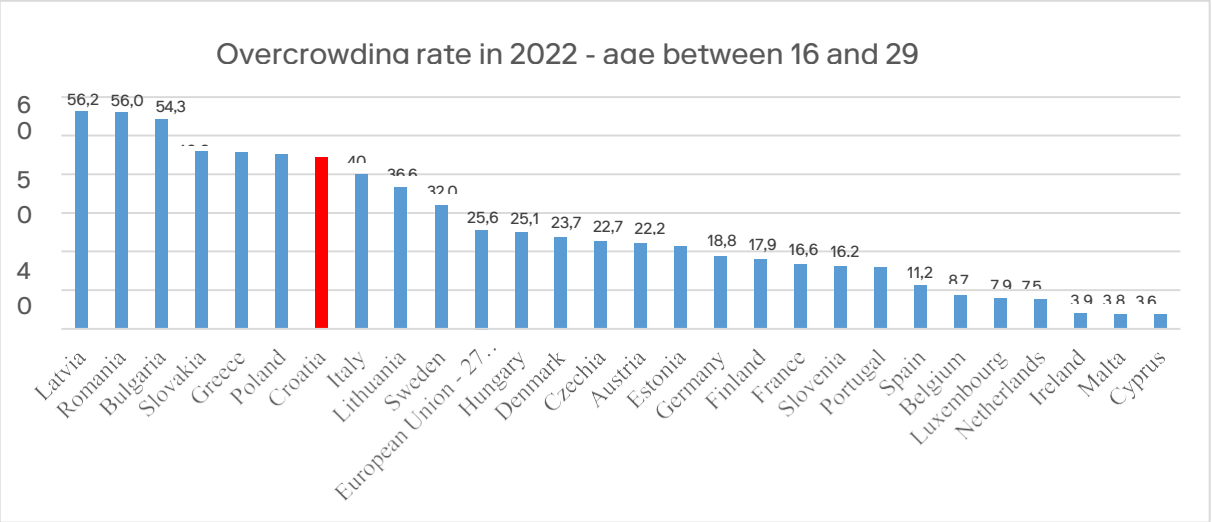


Figure 1. Overcrowding rate across EU Member States for age between 16 and 29, in 2022. Source: author, based on Eurostat (2023)

3.2 Current housing market

Housing affordability in Croatia is not absolute but relevant and it concerns both tenants and homeowners. While housing may be deemed unaffordable in large cities, such as the city of Zagreb, it may be more affordable in the area of 50 kilometres distance from the city centre.

Croatia has a specific housing market fragmentation, in which the housing market is mostly active in the city of Zagreb and on the Adriatic Sea coast, whereas other parts of Croatia have underdeveloped housing markets. Figures 2 and 3 below show the number of real estate transactions and the average (median) prices according to Croatian regions in 2022, respectively (Institute of Economics in Zagreb [EIZ] & Croatian Ministry of Physical Planning, Construction and State Assets [MPGI], 2023). Figure 2 clearly indicates (in dark blue) which parts of Croatia were most sought after, and this is due to mostly investments for touristic purposes, not for living. This statement is also backed by the fact that Croatia among the leading countries in the EU in housing stock indicator with 604 dwellings per 1.000 inhabitants (Deloitte, 2022).

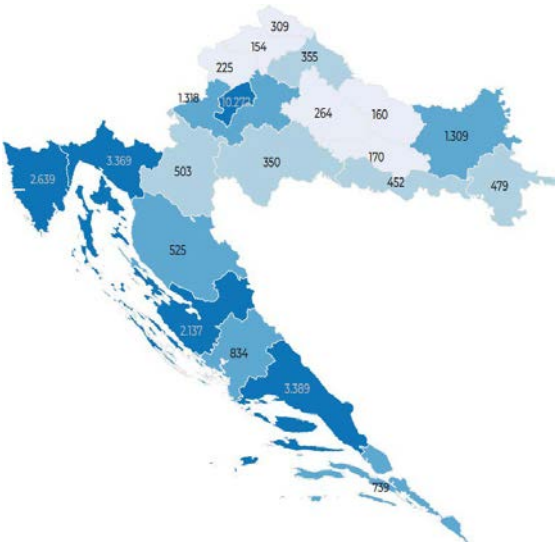


Figure 2. Number of transaction of apartments and houses in Croatian municipalities in 2022, Source: EIZ & MPGI (2023)

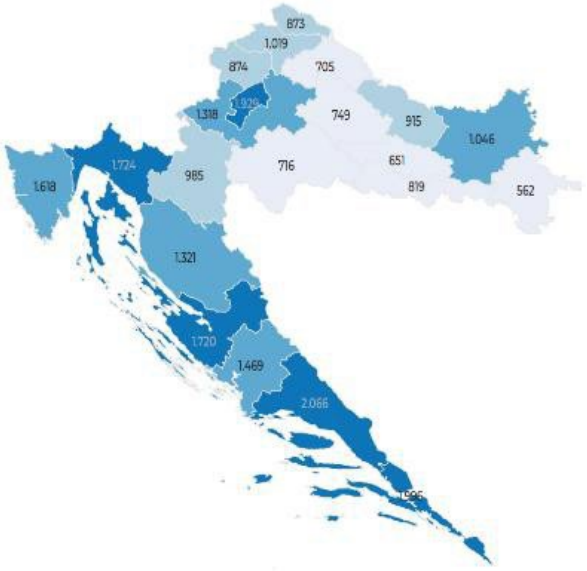


Figure 3. Median realised price of apartments and houses (in €) in Croatian municipalities in 2022, Source: EIZ & MPGI (2023)

Given this information, we conclude that there is a high pressure on housing prices in Zagreb and coastal cities, while the Eastern part of Croatia has much lower demand for housing and thus less pressure on housing affordability. However, we also know that around 90% of households own their homes. For them, paying utility bills and finding paid work are more important issues. Coupled with the fact that Croatia is an increasingly aging society, especially in rural areas where most of population are elderly pensioners homeowners are asset rich but cash poor[2], they are increasingly entering into risk of poverty.

4. Housing allowances

Social policies targeting affordable housing typically comprises three primary components: offering housing allowances to families facing housing-related financial difficulties, enhancing the social rented sector, and aiding low-income households within the owner- occupied sector (Bežovan, 2013; Hegedüs, 2007).

Demand side subsidies, such as housing allowances, allow recipients to procure or rent a residential unit in the housing market, while supply side, such as public or social rental housing do not (Coldburn, 2019). While supply side subsidies mostly subsidise “brick and mortar” such as social rental housing, demand side subsidies target people and households in need. There are cases where supply and demand side subsidies are combined. For instance, in Slovenia, residents in social rental housing are eligible for housing allowance of up to 80 percent of the rent.

[2] Since they own their home but have low monthly incomes to cover housing costs such as maintenance and utility bills

Housing allowance is both an income subsidy and housing subsidy, and in most cases, they are tenure neutral. Since housing allowance both serves to increase disposable income after housing costs are paid, it is part of social policy, but since it also increases housing consumption, it is part of housing policy (Bežovan, 2010). Thus, housing allowances are a hybrid instrument, and in practice the responsible authority is often either the Ministry of Social Security and Welfare or the Ministry of Housing.

Income subsidies can be "tied" or "untied" to a consumption item. Housing allowance is in this case "tied" and must be spent on housing. The formula for calculating housing allowances is called the "housing benefit gap" and is the difference between housing costs and household income spent on housing (Haffner & Boelhouwer, 2006). The impact of housing allowances on households' disposable incomes can be significant and can fulfil an important function in income support. It distinguishes between the affordability of adequate housing and a sufficient budget available for expenses other than housing. The growing need for income support through housing allowances arises from new social risks, including single parenthood, precarious employment, long-term unemployment, mental health problems and working poverty. Housing allowance provides income support in times of temporary and long-term poverty (Griggs & Kemp, 2012).

Housing allowances are integral to welfare and housing policies, aiming to improve housing affordability and provide income support to individuals and households. However, their effect on rent levels is debated, varying across countries and contexts (Eerola & Lyytikäinen, 2021; Eriksen & Ross, 2015; Hyslop & Rea, 2019; Susin, 2002). The impact of housing allowances on rising rents remains uncertain, with studies suggesting conflicting results. Additionally, their influence on house prices differs across countries and time periods, presenting a complex issue (Eerola & Lyytikäinen, 2021; Hyslop & Rea, 2019).

4.1 Housing allowances in Croatia

In Croatia, there are currently several housing allowance support schemes, mostly reserved for low-income households. These include the housing allowance, fuel allowance, allowance for energy-challenged buyers at risk, and personal needs allowance for residential care beneficiaries. To qualify for the housing allowance, recipients must meet the criteria for the minimum guaranteed benefit, which ranges from €92.91 to €172.54 per month for single households, depending on various factors. The housing allowance covers rent, energy and utility bills, and renovation costs for energy efficiency enhancements. Local authorities administer these allowances, with heating allowances also available, providing firewood for those using such heating methods, and are disbursed annually (Government of Croatia, 2023).

Additionally, a national programme subsidises rent for full-time students in specific cities, including Pula, Rijeka, Varaždin, Split, and Zagreb. Under this program, 2,206 students receive €248.86 each (Central Office for Demography and Youth, 2023). However, this programme will not be the focus of this research.

4.2 Housing allowances pilot project

Since the beginning of 2023, there has been a national pilot programme that grants housing benefits to young individuals (under 30) and families (with recipients under 45) who rent in the private market and whose salary is not higher than the average national salary. The maximum monthly allowance is €180 for families (€2,160 annually) and €120 for individuals

and families without children (€1,440 annually) until 2023. These funds are allocated by the national government and distributed through local authorities, with each authority able to support up to 10 beneficiaries per year (Central Office for Demography and Youth, 2023a). The total budget for this pilot project amounts to €785,719.03.

The distribution of the housing allowance was carried out until the end of 2023 and the aim of this paper is to gather insights about this pilot project from two sides: from the government agency and from the beneficiaries.

5. Conclusion

Housing allowances need to reflect local housing needs, especially in Croatia, where property supply and prices vary significantly across regions. Coastal areas and Zagreb properties are highly sought after compared to rural areas and other cities, necessitating tailored approaches to adjust allowances based on living standards. With limited options for homeownership and inadequate social and rental housing, extending housing allowances to a wider population could alleviate short-term affordability issues until more public rental units are available. To combat the trend of young Croatians leaving the country due to housing challenges, modernising housing allowances to enhance affordability is imperative (Bežovan & Jakovčević, 2023).

Acknowledgment

The work presented in this publication has been conducted within the RE-DWELL Innovative Training Network, funded by the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement no. 956082..

References

Bežovan, G. (2010). Analiza sustava subvencioniranja najamnina i troškova stanovanja te prakse gradnje socijalnih stanova u Hrvatskoj [Analysis of the rent subsidy system and housing costs, and the practice of building social housing in Croatia], *Hrvatska i komparativna javna uprava: časopis za teoriju i praksu javne uprave*, *10*(3).

Bežovan, G. (2013). The Social Housing Search Delayed by Postwar Reconstruction. In J. Hegedüs, M. Lux, & N. Teller (Eds.), *Social Housing in Transition Countries* (pp. 128- 146). London: Routledge.

Bežovan, G. & Jakovčević, D. (2023). Učinci stambenog zbrinjavanja mlađe populacije na demografske trendove u Zagrebu. [The effects of providing housing for the younger population on demographic trends in Zagreb.], *Revija za socijalnu politiku*, *30* (1), 1-21 https://doi.org/10.3935/rsp.v30i1.1800

Central office for demography and young. (2023). *Pilot project public call- local self- government units for financial support aimed at co-financing costs housing for young families and young people in 2023.* https://demografijaimladi.gov.hr/UserDocsImages//Dokumenti//PILOTP~1.PDF

Central office for demography and young. (2023a). Notice on subsidizing housing costs for full-time students. https://demografijaimladi.gov.hr/vijesti-4693/obavijest-o-subvenciji-troskova-stanovanja-redovitim-studentima/6698

Croatian Bureau of Statistics. (2022). *The final results of the Census 2021 have been published*. https://dzs.gov.hr/vijesti/objavljeni-konacni-rezultati-popisa-2021/1270

Coldburn, G. (2019). The use of markets in housing policy: a comparative analysis of housing subsidy programs. *Housing Studies 36*(1):1-34 https://doi.org/10.1080/02673037.2019.1686129

Deloitte (2022, August). *Property Index - Overview of European Residential Markets*. 11th edition.

Eerola, E., & Lyytikäinen, T. (2021). Housing Allowance and Rents: Evidence from a Stepwise Subsidy Scheme. *Scandinavian Journal of Economics, 123*(1), 84–109. https://doi.org/10.1111/sjoe.12396

Eurostat. (2023). *Glossary: Housing cost overburden rate.* https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Housing_cost_overburden_rate&lang=en

Government of Croatia (2023). Zajamčena minimalna naknada. https://gov.hr/hr/zajamcena-minimalna-naknada/714

Griggs, J., & Kemp, P. (2012). Housing allowances as income support: Comparing European welfare regimes. *International Journal of Housing Policy, 12*(4), 391–412. https://doi.org/10.1080/14616718.2012.711987

Haffner, M. E. A., & Boelhouwer, J. (2006). Housing allowances and economic efficiency. *International Journal of Urban and Regional Research, 30*(4), 944–959. https://doi.org/10.1111/j.1468-2427.2006.00699.x

Hegedüs, J., (2007). *Social Housing in Transition Countries. Social Housing in Europe*. London: LSE.

Hyslop, D. R., & Rea, D. (2019). Do housing allowances increase rents? Evidence from a discrete policy change. *Journal of Housing Economics, 46.* https://doi.org/10.1016/j.jhe.2019.101657

Institute of Economics in Zagreb & Croatian Ministry of Physical Planning, Construction and State Assets (2023). Pregled tržišta nekretnina Republike Hrvatske [*en. Overview of the real estate market in the Republic of Croatia*], *Institute of Economics in Zagreb.*

Susin, S. (2002). Rent vouchers and the price of low-income housing. *Journal of Public Economics, 83,* 109–152.

Spectrum thinking for an equitable housing landscape

Margaux Lespagnard[1], Waldo Galle[1,2], Niels De Temmerman[1]

[1]Vrije Universiteit Brussel (VUB), Brussels, Belgium

[2] Vlaamse Instelling voor Technologisch Onderzoek (VITO), Mol, Belgium

Keywords: equitable housing, social sustainability, residential financing, housing models, visual research tool

1. Introduction

Gentrification, escalating material prices, large international real-estate development companies, all of which are focused on maximising profit, exacerbate the current housing crisis. This situation has prompted researchers, policy makers and project developers to question the viability of established housing models such as owner-occupied and rental housing (Dreesen & Vastmans, 2021). The market-driven approach to affordable housing has proven insufficient in catering to the increasingly diverse needs of households (Beersmans, 2022; De Rijk, 2024). Desmond and Wilmers (2019) argue that commodifying housing even intensifies inequalities as a result of property speculation which yields higher profits for investors in impoverished neighbourhoods.

Considering the housing crisis, it becomes imperative to explore a broader range of housing models, beyond the traditional owner-occupied and rental tenures, such as cooperative housing or community land trusts. Delz et al. (2020), state that “housing production dominated by macro-economic interest and speculative markets must be countered by models based on co- ownership, co-production, and co-management of shared resources and capacities”. There is no one-size-fits-all solution. Diversity within the housing market is necessary to respond to the various needs and capabilities of different households. Consequently, interest for a diverse housing landscape is on the rise all over Europe. (Jacobs, Denoo, et al., 2020; Lang et al., 2020; Lengkeek & Kuenzli, 2022; Lorente et al., 2023)

To navigate the complex housing landscape, housing models are often categorised. This approach neglects the diversity and overlap between housing models. For example, A housing cooperative, such as *Wooncoop* in Belgium has different characteristics from a Swiss housing cooperative such as *Kalkbreite*. Both are called cooperatives, but they vary, for example, in the process of buying shares as well as their overall financing strategies. (Jacobs, Totté, et al., 2020) Furthermore, In many cases, housing projects and organisations tailor financing and organisation of their housing model to their specific market (Aernouts & Ryckewaert, 2018; Brysch et al., 2023; Delz et al., 2020). As a result, understanding the specificities of certain housing models in relation to others can be overwhelming. The complexity of the issue increases when considering the building design and technological levels of housing projects.

A systemic view is crucial to ensure inclusive, equitable housing projects. (Lespagnard et al., 2023; Mulliner et al., 2013) Literature often focuses on project characteristics, design, technologies, collaboration principles, social cohesion within a project. Even though these characteristics are essential to properly explain the potential of housing models, tenure models and their

impact on households should not be neglected. In many cases tenure is what makes living in a certain housing project feasible for its residents. A significant number of households slip through the cracks of the existing, conventional housing models. (Beersmans, 2022) Internationally, a wide range of housing models exist that answer to a large variety users' housing abilities and needs. But how can we effectively communicate the opportunities of these tenure models and their corresponding projects? Currently practitioners and policy makers lack a comprehensive overview of the diversity in housing models and their implications for their regions and residents. (Lang et al., 2020) This is where the application of spectrum thinking becomes crucial.

The goal of the research is to develop a methodology for an alternative way of thinking, which compares and disseminates the concept of housing landscape. Therefore, this research establishes a prototype for a tool for designers, policymakers, and developers, to create a nuanced view on housing tenure models, meanwhile linking these housing models to design strategies and actor networks. By exploiting the housing spectrum, we aim to provide a framework to create an overview of the opportunities housing projects can bring for diverse households (in terms of design, but also organisation and financing).

2. Methodology

Our objective is to establish a comprehensive framework that encapsulates the variety of opportunities that housing projects can offer to a variety of households. This framework will not only focus on architectural design aspects, but also delve into the intricacies of project organization and financing strategies.

To develop a method that can adapt to existing practices, we started by analysing the existing housing models of 16 case studies. From the data on those case studies and based on previous research, we derived four dimensions by which the tenure of housing models could be characterised. We then developed a framework, which we named the housing spectrum, where case studies can be plotted and compared to each other. Project sheets were developed, to provide more insight into the specific projects on the spectrum. The project sheets show design strategies, but also collaborations between actors.

Data for this paper was collected through case study research. To provide a wide overview of housing models, we applied the diverse case method as described by Gerring (2009). We collected the data through literature, 35 semi-structured interviews with architects, residents, housing developers, and policy makers and site visits in Spain, Belgium, Switzerland, and Finland between November 2020 and December 2023. The aim of the interviews and site visits was to understand the housing models and design decisions made in the project in terms of financing, management and architectural design.

In previous research, we identified 15 dimensions which should be considered to achieve equitable housing projects.(Lespagnard et al., 2022, 2023) Based on these findings and further data analysis, we chose four dimensions which signify the tenure characteristics of housing models and highlight their differences, regardless of the architectural or specific project-related features: responsibility (3.1.1), initial cost (3.1.2), long-term costs (3.1.3), and residential equity (3.1.4). For each dimension, a spectrum can be drawn up. A household's tenure needs and abilities can be related to this spectrum. For instance, a household that is constrained by a limited budget which doesn't allow for substantial initial expenses, would require a housing model that falls on the lower end of the initial cost spectrum. Conversely, a household that is willing and able to take

on significant responsibilities in their housing project would be better suited to a housing model that falls higher on the responsibility spectrum.

The spectrum serves as framework on which projects can be placed. Tables 1-4 indicate characteristics that were used in this research to define the position of a housing project on the spectrum. The characteristics were assembled by comparing the collected data about the case studies. When spectra of the different dimensions are depicted in relationship to each other, they become 2D or 3D spectra. The annexes attached to this paper show the spectrum in one-, two-, and three-dimensions.

3. Housing spectrum

Through the case study analyses, we found that housing projects play with the following four housing dimensions to tailor their tenure model to the needs or interests of their envisioned target users. Definition of the dimensions are based on findings through the data, complemented with additional literature references. The following paragraphs provide more information on the four dimensions.

3.1 Defining spectrum location

Projects can be assigned a location on the spectrum, by considering specific characteristics. Tables 1 to 4 provide an overview of the different characteristics which influence the project position on the spectrum for each dimension. '-' brings the project lower on the corresponding spectrum while '+' will place it in a higher position.

Housing tenure models, e.g. cooperatives or owner-occupied housing, are distinguishable through their financing and management. Therefore, assigning a spectrum-location to a case-study is based on four dimensions: resident responsibility, initial costs, long-term costs, and Residential equity. While a household's residential decision-making encompasses a broader range of considerations, e.g. aesthetics and neighbourhood (Lespagnard et al., 2023; Mulliner et al., 2013), in this study we considered only the characteristics related to the tenure model and not the building characteristics and construction methods specific other housing projects.

3.1.1 Resident responsibility

In this research, resident responsibility encompasses two interconnected concepts that highlight residents' multifaceted role in housing projects, emphasising both their active participation and financial obligations.

First, responsibility refers to the influence and participation of residents in the housing project regarding daily and long-term management (self-governance) and decision-making (self-democratic control) (Table 1). In housing models rooted in the principles of the commons—such as cooperatives or community land trusts—resident participation is a fundamental pillar. Residents engage in democratic decision-making processes, ensuring their voices are heard in matters that impact their lives (Delz et al., 2020). However, the degree of participation can significantly differ even among cooperatives. Participation can also be demanding. It can pose time, cognitive, and skill-related challenges for households. Participatory processes must be thoughtfully designed and integrated to match the diverse needs and capabilities of residents living in the project (Huisman & Czischke, 2023).

Second, we also refer to financial liability as the responsibility of the resident to bear unforeseeable expenses, such as construction damages. Communication about the financial responsibility of tenants is crucial. Specific housing models—like the UK's shared ownership—

involve minimal initial investment but significant long-term financial commitments. Lowincome households residing in shared ownership properties face substantial financial risks. Balancing affordability with responsibility becomes critical (Barton & Cromarty, 2024).

Table 1. Placement on the resident responsibility spectrum

Resident responsibility		
Self-Democratic Control The extent to which residents participate in democratic decision-making.	+++	Individual decision making for housing units, collective decision making for shared spaces
	++	Executive board is only formed by residents (Full self-democratic control)
	+-	Executive board consists of part residents, part non-residents.
	--	No participation of residents in the executive board
Self-Governance The degree to which residents manage and maintain the housing project without external interference.	++	Complete self-management by residents.
	+	Participatory design process
	+-	Influence on regular management such as maintenance tasks, community activities, but no major influence on managing finances or deciding on renovations.
	--	No influence of residents in management
Financial liability Responsibility of the resident in case of unforeseeable problems	++	Individual financial liability
	+-	Collective liability
	--	No liability, liability falls on an external actor, ex. Landlord, social housing company

3.1.2 Initial costs

Initial costs to live in a dwelling depend on the real-estate price, defined by location, building age, and floor space (Ishijima & Maeda, 2015). However, the type of housing model can influence the initial costs residents are required to pay at the beginning of their tenure (Table 2). For example, in rental housing, residents must pay a deposit, which is a significantly lower initial cost than the down payment for owning a home and getting a mortgage. Nevertheless, initial costs can vary significantly within the same housing model. For example, the share price to enter a cooperative can fluctuate depending on the association.

Table 2. Placement on the initial costs spectrum

Initial costs		
Initial costs	++	Deposit, administrative costs, high share costs Price includes soil and house
Costs which must be paid at the beginning of the tenancy agreement.	+	Deposit, administrative costs, high share costs Price includes only dwelling (no plot)
	+- to -	Share price, depending on the size of the share
	--	Only initial cost is the deposit
	---	No initial costs - not even a deposit

3.1.3. Long-term costs

Four elements are considered to define long-term costs (Table 3). The first element to define long-term building costs is the total cost of usership. This includes leasehold payments and rent, referring to a fixed sum paid regularly to an external actor, like a (social) landlord or community land trust. Furthermore, we refer to initiatives that can reduce rental costs, such as subsidies or co- ownership. For example, in social rental housing, in general the state provides subsidies for social housing residents. The amount and form of the subsidies differs, depending on the type of housing project and its location.

Second, total costs of ownership refer to the amount paid for owning or co-owning a dwelling, for example, renovation costs and mortgage interest payments. Strategies such as self-renovation or subsidies can reduce the total costs of ownership. Third, maintenance costs are needed to keep the buildings in good working condition. Maintenance costs can fluctuate depending on how the project is managed. Projects that implement voluntary self-maintenance will have lower maintenance costs than projects that hire an external maintenance firm.

Table 3. Placement on the long-term costs spectrum

Long-term costs		
Total cost of usership Costs associated with using the dwelling.	++	Full rent, housing taxes
	+-	Rent reduced by owning shares, or through subsidies
	-	No rent on the dwelling, only leasehold payments
	--	No rent
Total cost of ownership Costs required for owning the dwelling.	++	High mortgage interest, renovation costs
	+-	No mortgage interest payment, renovation costs
	-	Reduced renovation costs (e.g. through self-building or subsidies)
	--	No total costs of ownership
Maintenance costs	++	High maintenance cost (e.g. due to employing external maintenance firm)
	+-	Partly self-maintenance
	--	Full self-maintenance

3.1.4. Residential equity

Residential equity refers to the capital residents build up before owning their home (Table 4). For example, owner-occupied housing allows residents to sell their homes once they move out, allowing them to recover their investments or even make money when housing prices rise significantly.

Contrarily, renters do not recuperate any of their housing costs – apart from the deposit – when they move, therefore they do not build up residential equity. While residential equity is an essential dimension when choosing a specific housing model, it also continues to be a heavily discussed topic, as an unequal equity division can lead to societal inequalities and a wealth divide between homeowners, renters and landlords. (Arundel, 2017) Furthermore, as discussed in Section 3.1.1. full equity carries high risks, especially for low- income homeowners. (Carroll & Cohen-Kristiansen, 2021).

Table 4. Placement on the residential equity spectrum

Residential equity		
Costs that can be retrieved by the resident on a long-term perspective, for example through selling the dwelling or housing shares.	++	Full equity of the dwelling and plot (full ownership)
	+	Full equity of the dwelling, not of the plot (e.g. leasehold)
	+-	Housing Shares, depending on the number and value of owned shares
	---	No equity

3.1.5. Placement example – La Borda cooperative

Table 5 shows the placement characteristics for the housing cooperative La Borda in Barcelona. The housing cooperative was developed through a collaborative process led by the residents (Brysch et al., 2023). Supported by the city's housing programme, they received a leasehold on their land. Residents paid a relatively low share cost to live in the housing project when they moved in. As a result, the rent of the dwelling is lower than dwellings in the same location. The cooperative took a mortgage to pay for the housing project (collective mortgage). Residents participate in self-maintenance and some self-building. Through share ownership, residents can build up residential equity (Lorente et al., 2023).

Table 5. Placement example – La Borda

Resident responsibility – Ex. La Borda		
Self-Democratic Control	+++	Individual decision making for housing units, collective decision making for shared spaces
	++	Executive board is exclusively made up of residents (Full self-democratic control)
Self-Governance	++	Complete self-management by residents.
	+	Participatory design process
Financial liability	+-	Collective liability
Initial costs – ex. La Borda		
Initial costs	+-	Relatively low share costs (about €18 000) Price includes only dwelling (no plot)
Long-term costs – ex. La Borda		
Total cost of usership	+-	Rent reduced by owning shares
Total cost of ownership	+	**Collective** mortgage interest, future renovation costs
	-	Reduced renovation costs (e.g. through self-building or subsidies)
Maintenance costs	--	Full self-maintenance
Residential equity		
	+-	Housing Shares, depending on the number and value of owned shares

Based on Table 5, we can now place La Borda on the spectrum of each dimension (Figure 1). The table gives an indication of what to consider through '+' and '–'-signs, the project can be located higher or lower on the spectra. The 1D-spectra can be assembled to create 2D and 3D spectra (see figures at the end of the paper).

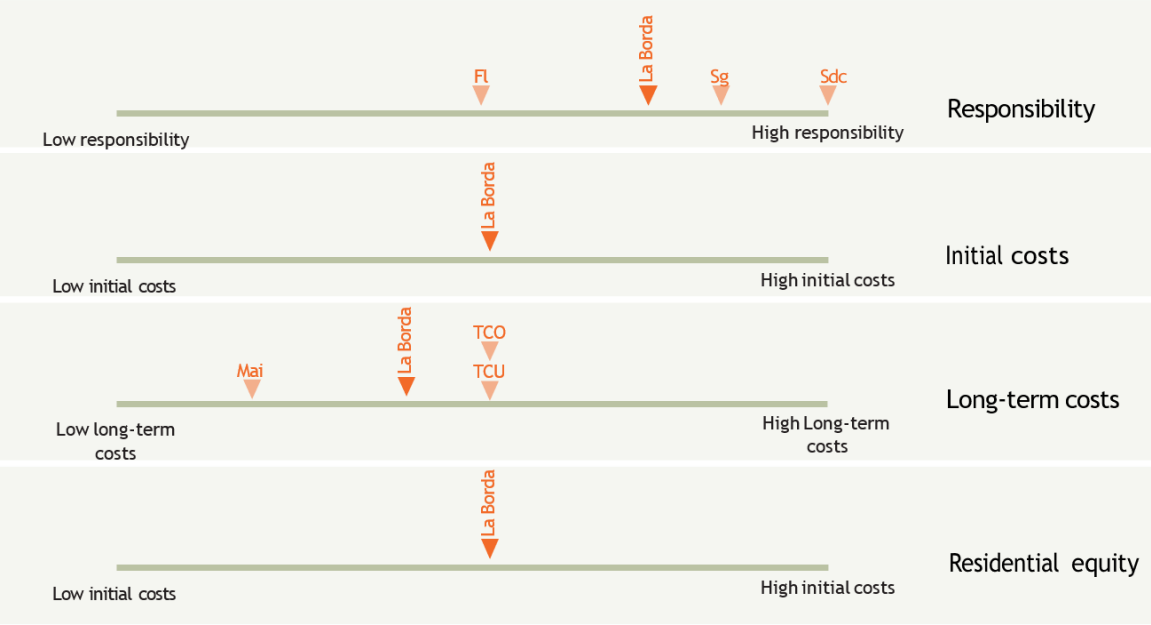


Figure 1. Placement of La Borda on the housing spectra. For the long-term costs and Responsibility, the location is an aggregation of the characteristics defined in Table 5

4. Discussion- Possible outcomes and uses of the spectrum method

The following paragraphs illustrate possible uses and insights for which the housing spectrum method could be used.

4.1 Spectrum trends

Placing the case-study housing projects of this research on the housing spectrum provides an overview of trends and comparisons between housing models. This result is an exploration of housing models. More accurate results and trends require a larger sample of projects. Nevertheless, certain trends can be observed even with a sample of 16 projects (Figure 2).

4.1.1 Identifying trends and zones

Based on our first exploration, we can observe some overarching trends. These trends are indicated in Figure 2. The arrows in the spectrum on the right show how more resident responsibility can lead to lower long-term costs in housing projects. This is because residents themselves take on housing responsibilities, such as decision-making and maintenance. On the other hand, higher initial costs can lead to more responsibility for the residents. This is because residents often own a more significant part of the project, and therefore, they carry more financial liabilities.

From the first mapping of the case studies, there appear to be three zones: rental, commons (co-operative) ownership, and ownership. At the intersection of these zones, some models implement elements of both commons and rental or ownership. For example, a Community Land Trust (green) model combines elements of ownership and commons, by keeping the land in common ownership while residents own their dwelling.

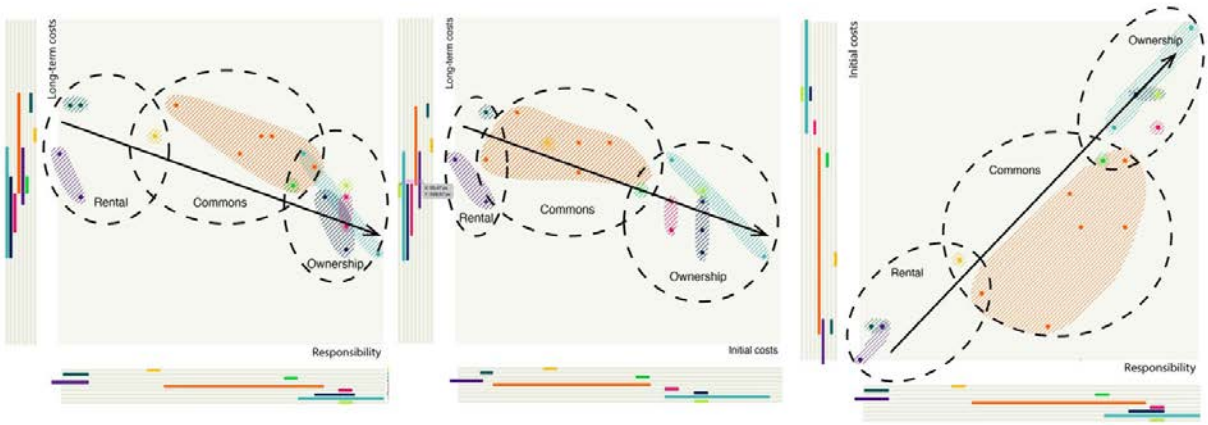


Figure 2. A first plot of the housing spectrum indicating trends and zones

4.1.2 Develop initiatives to push housing models towards another place on the spectrum

Adapting existing models can lead to a wider variety of housing models on the spectrum. By implementing rules, subsidies, and self-management housing models can be more closely adapted to the needs and abilities of residents.

For example, Figure 3 shows the Finnish right-of-occupancy model, which is similar to social housing, but residents pay a deposit of 15% of the dwellings' value. In return, they pay less monthly rent (reduced long-term costs). Furthermore, right-of-occupancy projects often include residents in resident councils and maintenance tasks, resulting in a rise of responsibility in the project. The arrows in Figure 3 indicate how right-of-occupancy is pushed on all 2D spectrums because of these tenure alterations.

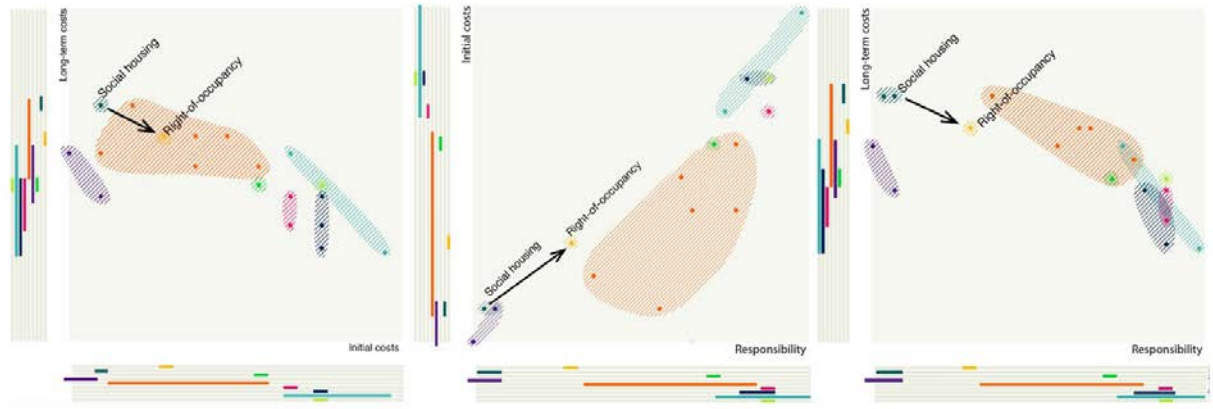


Figure 3. By implementing management and financing strategies, right-of-occupancy housing provides lower monthly rent and increased resident responsibility. In return, residents pay a more considerable initial cost

Another example is the Belgian social housing cooperative shown in Figure 4. This cooperative operates in a similar way to a rental social housing company except for a few key differences. Residents buy the obligatory share of the social housing cooperative when they move in. Given the low share price (25 Euros), the initial costs do not significantly increase. However, as shareholders of the cooperative, residents are allowed to vote in yearly board meetings (increased responsibility). The executive board also contains residents, along with other stakeholders.

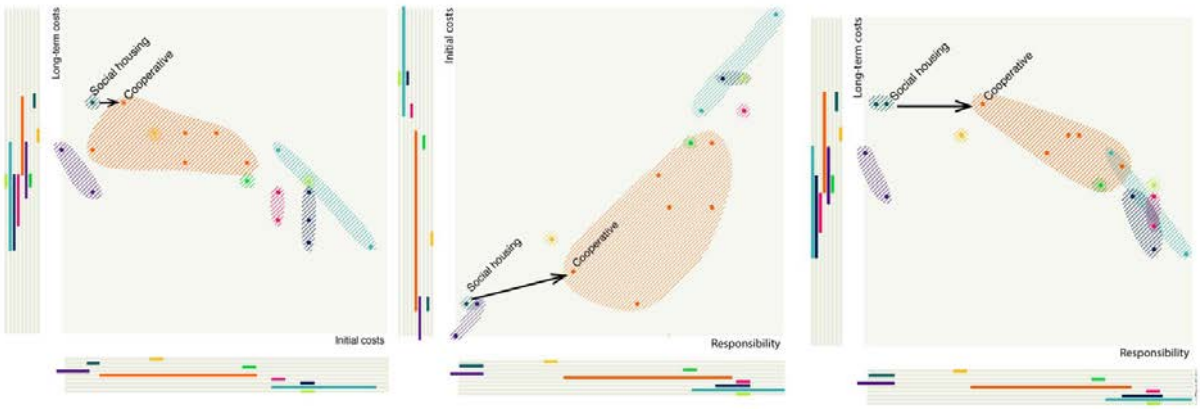


*Figure 4. In social housing cooperatives, residents are shareholders of the cooperative but still obtain government subsidie*4.2 The spectrum as an interactive mapping tool

The spectrum is a tool for visualising nuances between housing models and their projects. It is meant to serve as an inspiration for practitioners and policymakers. To disseminate the knowledge, this research serves as the base for a web tool prototype where practitioners, designers, policymakers, and project initiators can use the spectrum in their practice.

The web tool could be used in two ways. First, it could serve as inspiration. This version of the spectrum would include preselected case studies indicated on the spectrum. Users can access more information about the project by clicking on the project's location.

Second, the spectrum can serve as an interactive tool. Users actively place projects along the spectrum, representing their positions dynamically. To determine location, respondents are asked to complete a survey. The survey questions align with the placement system detailed in section 3.1. On a regional scale, practitioners can indicate their projects or the projects in their region on the housing spectrum. Creating their own survey could help project developers and policymakers identify which type of housing model is missing in their portfolio or region. On a project scale, residents could indicate on the spectrum which location would be within their abilities and develop and design their housing project accordingly.

For researchers, the spectrum can be used as an evaluation tool to spot trends and compare housing tenures and the projects which apply them. For policy makers the spectrum can be an evaluation tool of their region. They could fill in the spectrum and question: is there enough diversity in my region? Am I addressing enough people? How do other regions address this?4.3 Limitations of the methodology

The goal of this review is to develop a methodology to create a visualisation of housing projects in a certain region. The methodology was created while studying case studies, although providing an exact overview of all European housing models would need more extensive data than the data collected in this research.

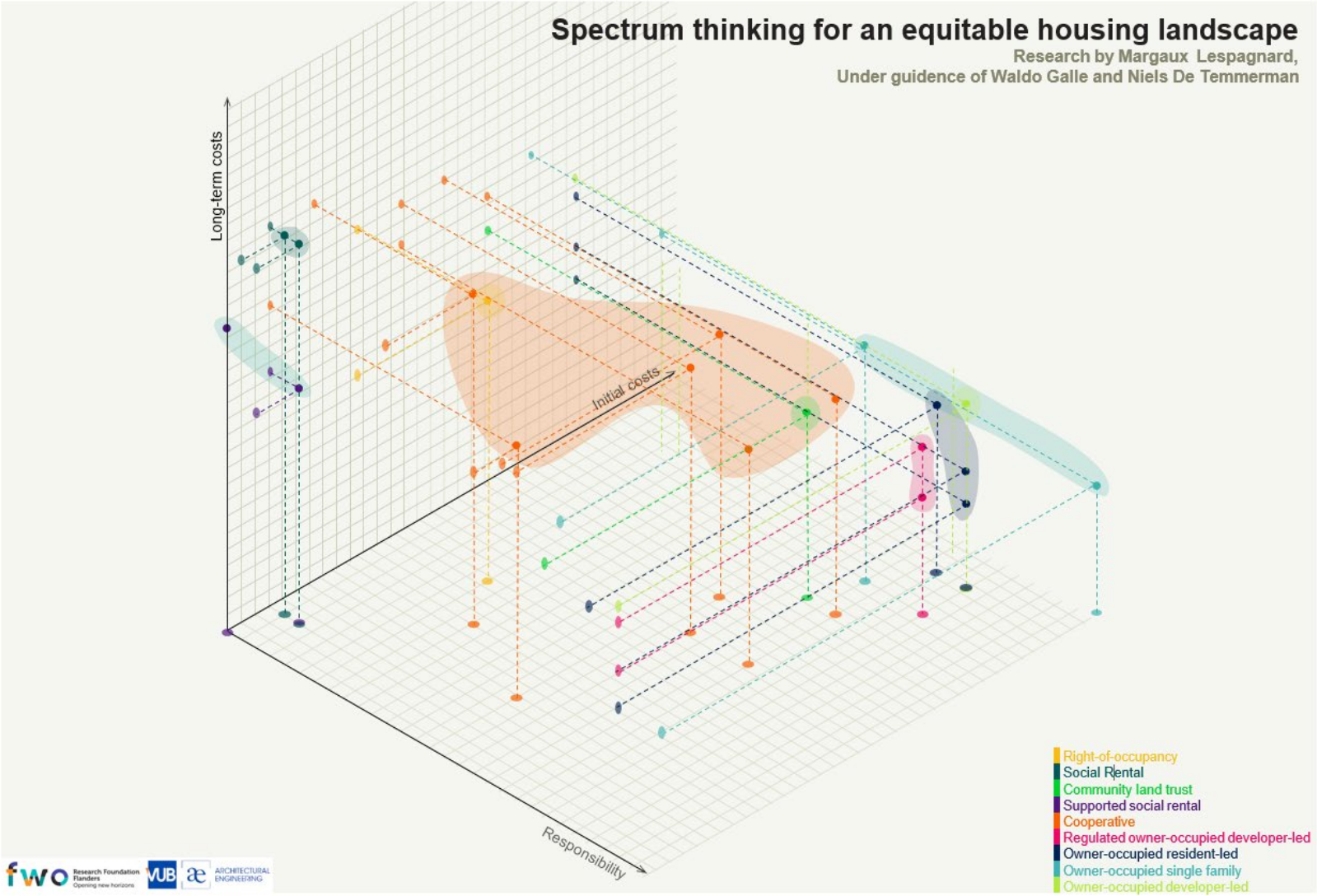
Furthermore, this is a qualitative study, however, by visualising the spectrum as a graph, it can be mistaken for a quantitative study. Yet, the housing spectrum is not an exact measuring tool. The spectrum is a communication tool, a medium to provide an overview, comparison, and knowledge in the variety of existing housing models.

5. Conclusion

In this paper we have presented a housing spectrum methodology for visualising and comparing four dimensions of housing tenure models: resident responsibility, initial costs, long-term costs, and residential equity. Both the development of the methodology and the illustration of placing projects on the spectrum are based on in-depth case study research. A first illustration shows the potential uses of the spectrum methodology as a tool to identify trends and zones in housing landscapes, to find initiatives that can fill in gaps within the housing spectrum, and to develop the housing spectrum as a webtool.

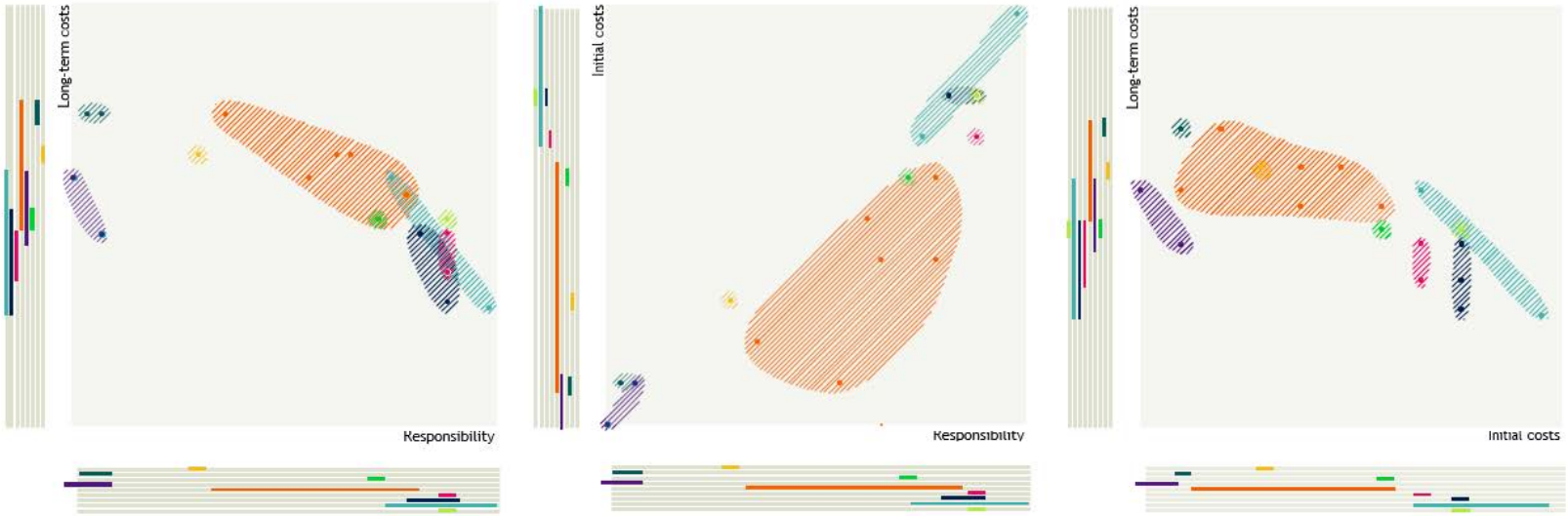
The spectrum invites users to think alternatively about the housing landscape. Instead of thinking about different categories of housing models, it shows the diversity, and the variety of opportunities housing tenure models can adopt to respond to a wide spectrum of housing needs. The spectrum calls upon policymakers, housing providers and designers to broaden their horizons and to be inspired by housing possibilities.

There is no one perfect solution, diversity is key. A tenure model should not be located high or low on the spectrum. To create an inclusive housing landscape, we should strive for wide coverage of the spectrum to answer to the needs of those who fall between the cracks of our currently established tenure models.


Spectrum thinking for an equitable housing landscape
Research by Margaux Lespagnard,
Under guidence of Waldo Galle and Niels De Temmerman
Long-term costs
Initial costs
Responsibility
Right-of-occupancy
Social Rental
Community land trust
Supported social rental
Cooperative
Regulated owner-occupied developer-led
Owner-occupied resident-led
Owner-occupied single family
Owner-occupied developer-led

Spectrum thinking for an equitable housing landscape

Research by Margaux Lespagnard,
Under guidence of Waldo Galle and Niels De Temmerman



- Right-of-occupancy
- Social Rental
- Community land trust
- Supported social rental
- Cooperative
- Regulated owner-occupied developer-led
- Owner-occupied resident-led
- Owner-occupied single family
- Owner-occupied developer-led

fwo Research Foundation Flanders Opening new horizons VUB ae ARCHITECTURAL ENGINEERING

References

Aernouts, N., & Ryckewaert, M. (2018). Beyond housing: On the role of *commoning* in the establishment of a Community Land Trust project. *International Journal of Housing Policy*, *18*(4), 503–521. https://doi.org/10.1080/19491247.2017.1331592

Arundel, R. (2017). Equity Inequity: Housing Wealth Inequality, Inter and Intra-generational Divergences, and the Rise of Private Landlordism. *Housing, Theory and Society*, *34*(2), 176–200. https://doi.org/10.1080/14036096.2017.1284154

Barton, C., & Cromarty, H. (2024). *Shared ownership (England): The fourth tenure?* https://commonslibrary.parliament.uk/research-briefings/cbp-8828/

Beersmans, H. (2022). *Woonzaak*. EPO.

Brysch, S. L., Mateu, A. G. i, & Czischke, D. (2023). The process of value setting through co- design: The case of La Borda, Barcelona. *CoDesign*. https://www.tandfonline.com/doi/abs/10.1080/15710882.2023.2277724

Carroll, D. R., & Cohen-Kristiansen, R. (2021). Evaluating Homeownership as the Solution to Wealth Inequality. *Economic Commentary*, *2021–22*. https://doi.org/10.26509/frbc-ec-202122

De Rijk, M. (2024, October 12). Help, Het Kapitaal neemt ons over volkshuisvesting. Grip op de grond. *De Groene Amsterdammer*, *5*(148).

Delz, S., Hehl, R., & Ventura, P. (2020). *housing the Co-op. A micro-political Manifesto* (2nd edition 2022). Ruby Press.

Desmond, M., & Wilmers, N. (2019). Do the Poor Pay More for Housing? Exploitation, Profit, and Risk in Rental Markets. *American Journal of Sociology*, *124*(4), 1090–1124. https://doi.org/10.1086/701697

Dreesen, S., & Vastmans, F. (2021). *De werking van de Vlaamse woningmarkt.* Steunpunt Wonen.

Gerring, J. (2009). Case Selection for Case-Study Analysis: Qualitative and Quantitative Techniques. In J. M. Box-Steffensmeier, H. E. Brady, & D. Collier (Eds.), *The Oxford Handbook of Political Methodology* (1st ed., pp. 645–684). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199286546.003.0028

Huisman, C., & Czischke, D. (2023). Between Self-organization and Formal Participation: Increasing Tenants' Influence through Self-management? – A Dutch Case-study. *Housing, Theory and Society*, *40*(2), 219–237. https://doi.org/10.1080/14036096.2022.2150681 Ishijima, H., & Maeda, A. (2015). Real Estate Pricing Models: Theory, Evidence, and Implementation. *Asia-Pacific Financial Markets*, *22*(4), 369–396. https://doi.org/10.1007/s10690-013-9170-7

Jacobs, L., Denoo, J., Devos, T., Van Balen, M., & Totté, P. (2020). *Cooperatief Wonen in Vlaanderen*. Cera-https://www.cera.coop/nl/cooperaties/info-en-onderzoek/documentatie-links-onderzoek/2020/20200807_n_cooperatief-wonen-in-vlaanderen

Jacobs, L., Totté, P., Denoo, J., Devos, Ti., & Van Balen, M. (2020). *Coöperatief wonen in Vlaanderen*. CERA CV.

Lang, R., Carriou, C., & Czischke, D. (2020). Collaborative Housing Research (1990–2017): A Systematic Review and Thematic Analysis of the Field. *Housing, Theory and Society*, *37*(1), 10–39. https://doi.org/10.1080/14036096.2018.1536077

Lengkeek, A., & Kuenzli, P. (2022). *Operatie Wooncoöperatie*. trancityxvaliz.

Lespagnard, M., Galle, W., & De Temmerman, N. (2022, November 25). *The equitable housing workshop. Mapping and improving stakeholders' decision-making process for circular equitable housing projects.* Sutainability in the built environment, Helsinki, Finland.

Lespagnard, M., Galle, W., & De Temmerman, N. (2023). Visualizing Equitable Housing: A Prototype for a Framework. *Sustainability*,*15*(5) 4110. https://doi.org/10.3390/su15054110

Lorente, D., Sakamoto, T., Devesa, R., & Bugés, M. (2023). *Cohousing in Barcelona.Architecture from/for the community.* (1st ed.). Actar Publishers & Ajuntament de Barcelona. Mulliner, E., Smallbone, K., & Maliene, V. (2013). An assessment of sustainable housing affordability using a multiple criteria decision making method. *Omega*, *41*(2), 270–279. https://doi.org/10.1016/j.omega.2012.05.002

Mulliner, E., Smallbone, K., & Maliene, V. (2013). An assessment of sustainable housing affordability using a multiple criteria decision-making method. *Omega, 41*(2), 270–279. https://doi.org/10.1016/j.omega.2012.05.002

Socio-spatiality as a methodological lens . Architectural building assessment of contemporary social mass housing in India

Aboli Mangire
HafenCity University Hamburg, Germany

Keywords: social housing, slum-free cities, passive cooling design, sustainable housing, liveability

1. Social housing liveability through spatial design

Social housing provision in India, particularly under the Pradhan Mantri Awas Yojana-Urban (PMAY-U) mission and the "Slum-free Cities" initiative, aim to significantly increase urban density and housing availability, especially over the past decade. However, in addition to addressing increased density and liveability issues, policymakers must also tackle the growing challenge of rising temperatures and heatwaves. Since the beginning of the twenty-first century, growth in space cooling demand has been rising steadily due to factors such as rising population in the tropical climate, growing aspirational needs fuelled by sustained economic growth (Ministry of Environment, 2019) and more importantly, housing demand with a vision to improve quality of life. This has drawn attention to creating affordable and low-energy cooling architecture, specifically through passive cooling design. Theoretically, passive cooling design is a branch of passive solar design, defined as a low-energy and low-cost, which uses techniques to reduce dependency on mechanical ventilation, thereby saving energy and associated costs and hence improving the building energy efficiency.

The practical application of the passive cooling design has been observed in the hot and dry climatic regions. Architects in the Indian subcontinent have relied on diverse building elements or techniques for preventing overheating and cooling through a process of heat transfer. A few examples of passive cooling techniques that can be frequently observed in contemporary buildings in India are: solar shading and cantilevers for preventing harsh sunlight through windows, voids such as the courtyards and light-shafts for circulating adequate air flow and sunlight, semi-open corridors for insulating the living spaces from outdoor spaces and ground level courtyards and trees for shading and cooling through a process of heat transfer (Kamal, 2021). Such techniques in the field of passive cooling design are typically used to prevent, modulate heat gains and improve thermal comfort (Asimakopoulos & Santamouris, 1996). However, the change in the typology from low-rise group-housing to mid-rise apartment blocks, combined with the increase in the price of land have resulted in the decline of such spacious building techniques that were used to create sustainable thermal comfort.

The forms of greenery within the built environment have been researched and recognised to be both a passive cooling technique and a significant indicator to improve social liveability. Trees, small and large vegetation, open green spaces have been seen to improve thermal comfort in urban areas. In addition to the spatial benefits, the social benefits of well-designed green spaces in social housing have been linked to the social cohesion, community interaction, safe neighbourhoods and long-term residential liveability. However, the open green spaces within the social mass housing habitats have been labelled as poor design elements, leading to low-vitality,

neglect, unpleasant environments, crime or illegal usage and essentially damaging the social environments of the developments.

1.1 Research questions

Within the contemporary social mass housing typology in India, the above-mentioned challenges, namely, the increase in building storeys, declining spatial design elements of thermal comfort and the low-quality green open spaces, create a socially and economically challenging living environment. Long-term risks of such housing environments include lack of building adaptability, building decay, abandonment fuelling the culture of demolition.

This research deals with the social housing liveability issues concerning thermal comfort and social cohesion through a lens of socio-spatiality, or a socio-spatial methodology by building on following three interdependent research questions.

The main research question is:

- What are the spatial opportunities and barriers of the contemporary social mass housing in India with regard to passive cooling design (PC") and green spaces in housing buildings and habitat (GSHBH)?

The research sub-questions used in the empirical investigation in order to answer the main research question are:

- Which PCD elements can aid social gathering spaces and can further develop into green spaces in GSHBH in the future?
- What are the spatial opportunities and barriers of the identified spatial elements (PCD + GSHBH) in contributing to thermal comfort and green spaces?

In the following section the research methodology is described that advances to answer above research questions.

2. Research methodology

Passive cooling architecture is the first focus that guides this research, while the second focus is the green spaces within the social housing habitat. The research methodology consists of three steps, as below:

1. Conceptual framework of socio-spatiality
2. Empirical case study
    a. Socio-spatial assessment
    b. Discussion of findings
3. Conclusion and outlook

2.1 Conceptual framework of socio-spatiality

A conceptual framework of socio-spatiality is used, which takes its roots from the broader theoretical field of “conceptualisation of space with social relations” as proposed in Lefebvre’s research and “space as a social product of human body”, by Stewart (1995) Contemporary research advancement in this field can be traced in various studies, such as: the interlinking studies (Zhou et al., 2014) of the built environment and their social effects by the liveability researchers (Schröpfer & Menz, 2018). The study by Sarkar and Bardhan (2020) is central to this research due to the closeness of the research concept, building typology and the geographical context. Their study about the social housing in India focuses on the slum rehabilitation projects

in Mumbai city. They argue that the socio-spatiality is an appropriate conceptual framework to systematically assess the dysfunctional social housing projects as opposed to the previous models based only on the socio-economic assessments. Even though the housing models used in the Indian cities of Chennai and Mumbai delivered to the urban poor, an upgrade in the infrastructure and the living space, the lack of consideration to the behavioural elements such as the psychology, living culture and spatial requirements, among others, caused the rejection of the building habitats by inhabitants.

The behavioural association to the social housing built-environment, in which the concept of socio-spatiality is anchored, have also been supported by the Environment-Behaviour researchers in several other studies. Post-occupancy Evaluation (POE) of the built environment settings, is an example of the alternative approach that can include inhabitants' surveys, in order to compliment the quantitative assessments that were proved to be insufficient (Cooper, Ahrentzen & Hasselkus, 1991; Preiser., Rabinowitz, & White, 1988). In this research, the methodology of building assessment is developed with a socio-spatial lens. The spatial elements are analysed not only for their spatial qualities but also for their social liveability interlinkages. The empirical case study and the socio-spatial assessment are described in the following subsections.

2.2 Empirical case study: social housing habitat design

The social housing habitat that is studied as a case in this research is one of the case studies listed in the book 'Best Practices for Habitat Planning and Design for the Urban Poor' created and published by India's Ministry of Housing and Urban Poverty Alleviation. This book is created as 'a compendium of model layout and housing designs for different regions of the country', as described by the minister in his opening message of the book. The social mass housing habitat is described as a model with a sustainable vision for its – efficient apartment design, cluster layout, adequate social infrastructure and innovative, speedy construction technology (MoHUPA, 2024).

The largest land use of this habitat site, the residential part, contains one hundred and sixty buildings in total, that are further arranged in the forty clusters of four buildings and a central courtyard each. Each apartment building, colloquially called as a 'society', is a standardised eight storey structure with a hollow ground floor reserved for parking of cars and scooters. Forty-two families live in every apartment building, or a society, making it a total of 6720 families as the total capacity of the social housing habitat. Construction of all the planned apartment buildings was completed by 2023, with more than 90 per cent of the apartments being handed over to the inhabitants since the year 2015. The project timeline – from sanctioning of funds, constructing infrastructure and buildings to finally handing over apartments to the inhabitants – spanned over fifteen years between the year 2007 (MoHUPA, 2024) to 2022.

The housing buildings in the selected buildings are designed with appropriate voids in the building volume for maintaining adequate quality of sunlight and air ventilation, such as, the light shafts, open-to-sky central courtyard and a hollow ground floor. This is an important reason for selecting this case study because such spacious passive cooling building techniques have been observed to be declining in social housing projects in the city, as the allowed construction area per unit of building site area is increased in the updated building regulations. In this context, this case study provides an assessment which can be compared in future with the assessment of the newer social housing buildings.

Lived experience – The housing project timeline allows for recording six to eight years of the lived experiences of the inhabitants. This is recognised as a rich and reliable data resource.

2.1.1 Socio-spatial assessment

The socio-spatial assessment (Table 1) is developed to address the research sub question 2 – Which passive cooling design elements can aid social gathering spaces and can further develop into the green spaces in housing buildings and habitat in the future? It comprises of three assessment steps: 1) Identified spatial elements 2) PCD techniques used + expected benefits as per PCD studies, and 3) Social liveability indicators based on the Socio-spatiality study by Sarkar and Bardhan (2020).

Table 1. Socio-spatial assessment: Building assessment methodology of this research. Source: Author

	SOCIO-SPATIAL ASSESSMENT			ASSESSMENT FINDINGS		
RESEARCH QUESTIONS	Which passive cooling building ("PCD") elements can aid social gathering spaces and can further develop into green spaces ("GSHBH") in the future?			What are the spatial opportunities and barriers of the identified spatial elements (PCD + GSHBH) in contributing to thermal comfort and green spaces ("GSHBH")?		
STEPS OF ASSESSMENT	Identified spatial elements	Passive Cooling Design ("PCD") techniques used + Expected benefits as per PCD studies	Social liveability interlinkages	Existing benefits in PCD in the empirical case study	Existing benefits in Green Spaces in Housing Buildings and Habitat ("GSHBH") in the empirical case study	Innovative use by inhabitants/ Bottom up greening by inhabitants
RESEARCH METHODS	Theory = Passive Cooling Design (PCD)	Theory = Passive Cooling Design (PCD)	Theory = Socio-spatiality (Sarkar and Bardhan, 2020)	Inhabitants' surveys + Professionals' interviews (Structural Engineer, City Officer, Site Engineer) + Architectural drawings analysis + Field observation (photographs, notes)		
1						
2						
3						

The assessment findings (Table 1) are developed to address the research sub question 3: What are the spatial opportunities and barriers of the identified spatial elements (PCD + GSHBH) in contributing to thermal comfort and green spaces?

The findings are structured in three assessment steps: 1) Existing benefits in PCD in the empirical case study 2) Existing benefits in green spaces in housing buildings and habitat in the empirical case study, and lastly, and 3) Innovative use by inhabitants/ Bottom up greening by inhabitants. A set of methods used for this part of socio-spatial assessment consist of Inhabitants' surveys, professionals' interviews (structural engineer, city officer, site engineer), architectural drawings analysis and field observation (photographs, notes). The discussion of findings and conclusion are detailed in the next section.

3. Discussion of findings

Identification of building elements and their contribution to thermal comfort and green spaces in housing structures and habitats

3.1 Cantilever balcony

This space, open on two or three sides and attached to the room on one side, offers solar exposure, view on outdoors and space for household activities. Due to its cantilever construction properties (space supported by one side and hanging in air on other sides), it receives adequate sunlight and air flow required for indoor activities as well as plantation.

Inhabitants use this private space by modulating the sunlight based on varying solar exposure and diverse needs of family size and occupation. The spatial use includes storage, sewing, kitchen-related, drying activities, or a space for planting herbs and medicinal plants. Current design of balconies offers 'inadequate privacy' that is needed for leisure activities such as having a conversation. If used for planting the potted plants, it provides a 'private green space' (Figure 1), a shelter from harsh weather and visual interruptions. There is a positive potential for introducing more of such cantilevered spaces in the future designs due to the multiple benefits. Some of the most beneficial functions assessed are saving the ground space for other needed activities such as social gatherings, vehicle parking and planting of larger trees; providing private, cool refuge in the scenario of less inter-building space; and finally, the appropriation flexibility by using a variety of inexpensive lightweight metal and tin structures. The survey responses are seen as offering important insights in understanding the interlinkages between designed space, lived experience, wellbeing and preferences in green spaces, which do not always follow the designer's spatial language and vision. The future research in the field of the *Dense and Green* typologies of elevated sky-gardens found in the public housing in Singapore [8] may become relevant in the study context.

Figure 1. Culture of (elevated) greening. Balcony in the case study project. Source: Author

3.2 Courtyard and void decks

A combination of courtyards continued in a semi-open ground floor parking areas (in literature known as void deck), possesses the spatial quality of a courtyard and transitional spaces in traditional low-rise architecture. In this case, building's geometry plays a role in regulating the exposure to incident solar radiation and wind, thus maintaining an ambient quality of natural daylight and air. Viewed from the lens of socio-spatial interlinkages of social cohesion, it is the most multifunctional community space (Figure 2). Different age groups, genders, social subgroups individually or in groups use parts of the spaces for formal and informal community gathering, playing, resting and exchanging short conversations.

The large number of activities undertaken by the inhabitants at different times of the day support the expected benefits of PCD theory mentioned above. However, the current design problems hinder the access and usage of these spaces, which are observed to have an adverse impact on the socio-spatial interlinkages of the long-term residential liveability, community interaction and sense of belongingness. The design problem is the limited barrier-free access which hinders the less-physically abled inhabitants, elderly people, pregnant women to use the space as frequently as they would like. Secondly, the major restrictions are imposed by the management authorities for planting new large trees due to the serious damaging risks caused to the underground concrete structures by means of the roots of trees.

Figure 2. Multifunctional community space. Void deck is being used for a group survey of this research. Source: Author

3.3 Designed open and green spaces

The expected PCD benefits of vegetation around the buildings suggest the protection from the solar radiation through shading and evapotranspiration which results in the reduction of the overall ambient temperature. Additionally, it offers protected spaces for outdoor activities.

The field study revealed the largely unsatisfactory condition and usage of the open spaces in the habitat. They are left without any treatment such as paving, street furniture and vegetation. The small parks are the only designed green open spaces in the entire housing project which are inadequate in size, proportion and quality, when compared with the number of households; close to 6,000 households amounting to close to 10,000 inhabitants. The small parks are used by sellers for selling purposes. Pedestrian walkways and other open spaces are also generally occupied for selling activities, making them unable to be used freely by pedestrians with different spatial needs such as wheelchair users, baby-pram users. The market spaces are needed to be organised and formalised by giving the sellers a clean, adequate space. This is also a necessity along with the green open spaces such as parks. The other necessary design related challenges are the absence of playgrounds for children, and safe exercising environments for women. Due to criminal tendencies of younger men on some of the streets after dark, this poses a serious threat to the long-term liveability and health of inhabitants.

4. Conclusion

> *"An ambitious agenda for architecture at the time of Anthropocene can be set: to rethink design through a theory of human and material coexistence. Designers are the first to test different ways of assembling, harmonising and re-composing the world; they can also rethink techniques, sites, scales, and aesthetic devices to acknowledge the agency of entities and the relationships among them."* Albena Yaneva (2022)

As Yaneva points out, designers have the potential to significantly contribute to addressing the challenges posed by climate change by exploring various approaches to reconfiguring the environment while also re-evaluating current design and construction techniques and methods. Findings of the empirical investigation highlight the spatial opportunities and barriers within the current design of contemporary social mass housing, particularly regarding passive cooling strategies and green spaces. Construction innovations have enabled structural engineers to maintain a high level of quality control across all apartments. This construction typology offers spatial opportunities for creating cantilevered elements such as balconies and semi-open corridors, which have significant potential for fostering elevated community interaction and providing private refuge spaces that enhance thermal comfort and ensure appropriate privacy.

The spatial barriers that the time and cost-efficient concrete shear-wall construction method has produced can be termed as a serious limiting barrier to the future of greening. On the one hand, the inhabitants are inclined to use the available ground space for planting large shading trees of their choice and knowledge. Vegetable farming or kitchen gardens are also desired for a better quality of life. But on the other hand, the roots of such trees if spread underground, can seriously damage the concrete building foundation and/or the underground water storage tanks, and therefore are strictly prohibited by the building management.

Well-designed, pleasant and calm green public spaces are absent in the housing habitat. The open spaces and a large number of road-side trees are provided, which perform well in providing the thermal comfort. They help in cooling down the temperature of asphalt concrete roads and building facades by means of shading, evapotranspiration, night cooling and heat transfer. But the design of open spaces must go beyond a mere provision of trees. The vacant pieces of land must be seen as a spatial opportunity to provide community parks for a variety of activities responding to the various needs of the inhabitants.

The study of the lived experience was insightful in revealing the link between lack of open green spaces and the public transport. Inhabitants are in dire need of a well performing public transport, in this case the public bus service, due to its affordability. However, the faraway location of the bus-stations and very low frequency of the buses make it impossible for inhabitants to rely on the affordable public transport. Therefore, to reach the necessary locations in the city including parks, places of employment, marketplace, the inhabitants need to use the private or semi-private transport options such as a motorbike or a shared autorickshaw, which proves to be financially and environmentally unsustainable. This insight helped in understanding that the future housing provision must be informed with the post-occupancy consequences of the earlier model and design. It is necessary that the housing, climate and transport policy instruments work together according to the post-occupancy needs and necessities of the inhabitants of social housing habitats for the long-term sustainability.

This research demonstrates how a socio-spatial methodological lens can be used to link theories and concepts, determine the opportunities and barriers of existing buildings and discover the interconnected challenges. The socio-spatial links must be explored further in order to fully understand the challenges. For this, a systematic process can be followed for various case studies in order to compare the similarities and differences of challenges. This can help further in detecting the flaws in the current policies that do not serve the desired purpose and need to be reviewed.

Acknowledgment

This paper is an intermediate output of the author's doctoral research within the Research Training Group (RTG)- "Urban future-making". The doctoral research is funded by the German Research Foundation (DFG) and jointly hosted by the HafenCity University Hamburg (HCU), University of Hamburg (UHH), and Hamburg University of Technology (TUHH).

References

Asimakopoulos, D. & Santamouris, M. (1996). *Passive cooling of buildings*. CRC Press LLC, E-Book ISBN: 9781134254828.

Cooper B., Ahrentzen S., & Hasselkus B. (1991). Post-occupancy evaluation: An environment-behaviour technique for assessing the built environment. *Canadian Journal of Occupational Therapy*. 58, (4), 181-188.

Kamal M.A. (2012). An overview of passive cooling techniques in buildings: Design concepts and architectural interventions. *Acta Technica Napocensis: Civil Engineering & Architecture* 55(1), 84 – 97.

Ministry of Environment, Forest & Climate Change, Government of India (2019). *India Cooling Action Plan*. New Delhi. http://ozonecell.nic.in/wp-content/uploads/2019/03/INDIA-COOLING-ACTION-PLAN-e-circulation-version080319.pdf

MoHUPA (Ministry of Housing and Urban Poverty Alleviation) (n.d.). *Best Practices: Habitat Planning and Design for the Urban Poor*. URL https://smartnet.niua.org/sites/default/files/resources/04_Best_Practices_Habitat_Planning.pdf

Preiser, W., Rabinowitz, H., & White, E. (1988). *Post-occupancy evaluation*. New York: Van Nostrand Reinhold.

Sarkar, A. & Bardhan, R. (2020). Socio-physical liveability through socio-spatiality in low-income resettlement archetypes - A case of slum rehabilitation housing in Mumbai, India. *Cities* (digital publication) Volume 105, 102840. https://doi.org/10.1016/j.cities.2020.102840

Schröpfer, T., & Menz, S. (2018). *Dense and Green Building Typologies: Research, Policy and Practice Perspectives*. Springer. https://doi.org/10.1007/978-981-13-0713-3

Stewart, L. (1995). Bodies, Visions, and Spatial Politics: A Review Essay on Henri Lefebvre's The Production of Space. *Environment and Planning D: Society and Space*, 13(5), 609-618. https://doi.org/10.1068/d130609

Yaneva, A. (2022). A Gaia who cares in *Latour for architects*. Taylor & Francis. 115 – 124.

Zhou, C., Wang, Z., Chen, Q., Jiang, Y., & Pei, J. (2014). Design optimization and field demonstration of natural ventilation for high-rise residential buildings. *Energy and Buildings*, 82, 457–465. https://doi.org/10.1016/j.enbuild.2014.06.036

Clientelism and infrastructural gaps in Southern Europe: The implications on housing and urban governance

Andreas Panagidis, Effrosyni Roussou

Department of Architecture, University of Cyprus, Cyprus

Keywords: clientelism, southern Europe, infrastructure, participation

1. Introduction

Unaffordable and unsustainable housing is widely regarded as a harsh side-effect of the failure of pro-market policies. The issue is often used to articulate the flaws of dominant responses through political-economic ties that tend to reconstruct new cases of dispossession (Dikeç, 2007). When exploring the ongoing housing crisis, the dominant narratives of urgent fixes to the problem enabled governments face when enacting policy without questioning the insecure foundations of uneven spatial development (Heslop & Ormerod, 2020).

The inability of the state to protect disenfranchised groups, and the deficiencies of public-private neoliberal models of urban governance have contributed to rising levels of distrust in governance institutions. Adding to the widely regarded problem of the global affordable housing gap (Reid, 2023), the infrastructural gap in the Mediterranean region is identified by the deficits (gaps) in the infrastructures required to mitigate overlapping challenges of sustainable development in general (Dalakoglou, 2016). Moreover, the growing role of the private sector in urban governance and public-private alliances, promoting urban entrepreneurialism (Phelps & Miao, 2020), provide private actors with speculative interests greater degrees of influence in the development of urban infrastructure than society as a whole. A continuation of neoliberal urban planning places real barriers to meaningful citizen participation in the development of sustainable cities.

Clientelism and infrastructural gaps

According to Ferrera (1996), Southern European (SE) states have historically shared common traits in terms of governance, including high levels of corporatism in local, regional and national finance management, an elevated degree of collusive relations between public and private actors, and persisting clientelism. Such state-market interactions are observed across SE countries, such as Italy and Greece, to an extent that some scholars describe this phenomenon as the privatisation of politics, whereby developers, hotel owners, ship owners, contractors etc, gain access to political authority (Hadjimichalis, 1998). The tangible failures of the 2008 financial crisis and the more recent refugee crisis, have been strongly felt in conjunction with an ongoing housing crisis (Maloutas et al., 2020) Hence, as the influx of refugees has coincided with a growing housing problem in Europe, the two intersecting crises have made access to housing that is both decent and affordable especially difficult, if not almost impossible, for the most vulnerable groups – namely, refugees and asylum seekers (Paidakaki, 2021).

Recent research is shifting the debate on affordable housing towards a more equitable distribution of resources and a better allocation of funds together with a change in the approach

to housing as another type of social infrastructure, such as schools and hospitals (Lawson et al., 2019). In other words, the proposition to conceptualise affordable housing as essential and guaranteed urban infrastructure is arguably a ground-breaking path to follow, which can contribute to the development of social sustainability (Ponce, 2010; Power & Mee, 2020). Importantly, this research is revealing a number of initiatives ranging from bottom-up and co-produced alternatives to formal processes of urban development, indicating the potential of new state-society relations which are produced through infrastructure (Guarneros-Meza, 2022; Lawhon et al., 2018). Citizen participation in the production of local soft and hard infrastructures is a burgeoning practice of socially-minded urban planning.

In light of the post-crisis outcomes, some governments have begun to shift their approach to incorporate more active citizen participation by encouraging socio-technical innovations, the co-production of resources and new methods of state-society-market collaboration (Fung, 2015; Loeffler & Bovaird, 2017). Dalakoglou (2016) claims that "both state monopoly and public–private partnership paradigms in the governance and development of infrastructures—in the case of Europe at least—are coming to an end as we knew them" (p. 828). However, we argue that in light of a long history of clientelist modes of urban politics and selective pathways of development, the realities on the ground are in fact fraught by society-state contestations and constant struggles by disenfranchised groups to be heard. Moreover, housing as a vital infrastructure for urban life is often missing in these analyses.

What are the implications of such complex relationships on the provision of affordable and sustainable housing as one of the essential infrastructures of cities? Even more, what are the limitations of citizen participation in the design and planning of urban infrastructures, if power imbalances in urban governance coalitions remain? A wider notion of infrastructure, defined as the conditions that provide access to rights and equal urban opportunities and undeniably involves affordable housing, can be considered as realm of state-society interaction which may unlock the potentialities of solutions to a housing crisis.

2. Methods

In this paper we aim to investigate the role of clientelism in urban spatial planning and land development relations, and its impact on citizen participation in local planning. With a broader scope of essential urban infrastructure, from public transportation to affordable housing, we will investigate examples of state-market alliances in Italy, Greece, and Cyprus, which continue to place barriers to citizen participation in the development of sustainable cities. However, as a reaction to these barriers, we also identify community-organised initiatives as opposed to clientelist practices, which are direct actions against the neoliberal, so-called "fixes" to housing and other crises. These actions address different topics including environmental conservation, anti-eviction campaigns, pro-migrant solidarity and anti-corruption demonstrations.

We firstly look specifically into recent examples of clientelist public-private partnerships concerning urban infrastructure and housing in Southern Europe, which are based on unequal power distribution. A cross-comparative reflection of examples of exploitation of power on the one hand and examples of community-based opposition on the other, reveals the antagonistic nature of SE urban governance and planning. Cases of corruption appearing as public scandals in the media are used as opportunities to examine the effects of clientelism and neoliberal policies in South European countries regarding urban development and the lack of credibility of governments in providing infrastructure of care and well-being. Cases of self-organised acts of protest and solidarity, indicate the potential of greater citizen participation in urban development

process in general. However, one must remain critical of the impact of these acts in terms of urban governance and housing policy.

2.1 Case studies

2.1.1 Italy - Organised crime involvement in urban infrastructure

The Mafia Capitale scandal

This scandal involved a network of corruption in Rome, where politicians, bureaucrats, and organised crime figures, such as Massimo Carminati and Salvatore Buzzi, were accused of syphoning off public funds designated for social services such as housing for incoming migrants and refugees, and other welfare-oriented services (DW News, 2017). Commencing in late 2014, when Italian authorities uncovered evidence of corruption and organised crime involvement in the allocation of public contracts and services in Rome, the investigation revealed a web of kickbacks, rigged contracts, public fund embezzlement, and illicit agreements between criminal elements and public officials (Swenson, 2017). The main figures of the scandal, Carminati and Buzzi, were eventually sentenced to 20 and 19 years in jail respectively (Tondo, 2023). The Mafia Capitale scandal highlighted the extensive involvement and influence of organised crime in Italy's local, regional and national political scene.

2.1.2 Greece - Lamda Development land grabs

The Mall of Athens

One of the largest post-2000 real estate scandals in Greece is the case of the Mall of Athens. Lamda Development, one of the most prominent land development corporations in the country, entered into an agreement with the state which revolved around the construction of the "Press Village". The Press Village was designed as a complex of dwellings, an 80-acre park, and a commercial, cultural and entertainment centre that would accommodate approximately 5000 foreign journalists covering the 2004 Olympic Games. Lamda Development was eventually granted access to an additional 43 acres of land adjacent to the "Press Village" site, which belonged to the Worker's Housing Trust[1], and by overriding the initial agreement, aimed at creating a massive commercial and entertainment building (TVXS, 2009, Aretaki, 2013). Since the overall area was zoned as strictly housing, politicians both in the local and national government were involved in passing constitutional and planning regulation amendments to facilitate and fast-track the construction, while Lamda Development failed to meet any of the clauses of the initial agreement. On 27/01/2020 regulations were amended once more to render what used to be South-Eastern Europe's largest illegal structure legal (The Press Project, 2020).

[1] Worker's Housing Trust (Οργανισμός Εργατικής Κατοικίας - OEK) was a public agency active between 1954-2012 and tasked with providing affordable housing to lower income households. OEK was eventually shut down in 2012, as dictated by the EU Economic Adjustment Programme for Greece.

The Ellinikon project

Another massive Lamda Development endeavour is the Ellinikon urban regeneration project. Currently branded as the largest urban regeneration project in Europe, Ellinikon is a 6800 acre area in southern Attica, and the site where “a cutting-edge urban haven” is set to be created, consisting of “a world-class Metropolitan Park” (The Ellinikon, n.d.), “the upgrade of the Coastal Front” and the creation of “residential developments, hotels, shopping centres, family entertainment venues, museums, cultural venues, health and wellness centers” among others (Lamda Development, n.d.). Lamda Development has secured land use and development rights of the area at a price 5 times lower than its actual value (according to estimations provided by the Technical Chamber of Greece), while no precise prerequisites and obligations were pinpointed to frame the exact nature of this development (The Press Project, 2021). Much of the criticism frames this project as one of the largest public land grab cases, and focuses on the exclusionary nature of the development, which, by outrightly targeting the most affluent members of the international society, may create a ghettoed community in one of Attica’s most prestigious locations (Efimerida ton Sidakton, 2021).

2.1.3 Cyprus – unhinged urbanisation

Residential development in Nicosia’s periphery

Since the 2008 financial crisis and the accompanying demise of Nicosia’s urban centre, around the same time, the Mall of Cyprus was constructed and speculative outward residential development in Nicosia has grown. Details were collected from a personal interview with Ms Agni Petridou, City Engineer of Nicosia Municipality (A. Petridou, personal communication, May, 2015). Overall, from Ms Petridou’s point of view, there has been a lack of enforcement of planning regulations and over-investment in areas such as Latsia, away from the centre. The most important factors have been the prioritisation of building roads in the suburbs and the expansion of residential zones which increase the profitability of land developers but increase public infrastructure costs and make public transportation even more inefficient. Petridou also shared information regarding the connection of private interests such as the actors involved in the development of the Mall and the granting of special favours by the planning department as the planning permission which was granted to the Mall of Cyprus was by derogation (κατα παρέκκλιση).

Cyfield’s monopoly business in state infrastructure projects

The most significant infrastructure in Cyprus has been constructed by Cyfield Group. Between 2015 and 2022, Cyfield was awarded 12% of the total value of all nationally procured tenders (personal analysis of statistical data provided by the Treasury Department). This includes roadworks, sewage infrastructure (including the scandal of bribing the Paphos mayor), luxury residence-high rise buildings, schools, mall, new museum, hospital, football stadium, a new power station. A recent scandal regarding failure to adhere to environmental protection measures during the construction of new roads, has led to a halt of works in Akamas, the island’s most protected natural habitat, due to public outrage regarding the violations.

Perhaps the most publicised scandal has been the case of Cyfield bribing the mayor of Paphos, the island’s westernmost city, with millions of euros in the Paphos Sewerage Board new infrastructure works. Eight years after the case, the company continues to operate with impunity. The president of the Parliamentary Committee on Institutions and Values stated: “This is what the citizens see, this is what society sees, and this is what discredits us and entrenches a feeling of deepest complicity and corruption” (Savva, 2024). These remarks indicate that corruption in the eyes of society leads to diminishing respect and trust in public institutions.

3. Results and discussion

The commonalities of these cases are the institutional environments and regimes which define the ways in which networks of urban development and political actors collaborate. According to Savini and Bertolini (2019), institutions are defined "both as concrete spatial conditions and as immaterial rules and norms, [which] provide the principles by which selections are made in cities [...] for example, institutions are deeply influencing the workings of the housing market, through established regulations and economic rules" (p. 834). These processes are shaped by actors who are either conforming to, or attempting to transform, their institutional environments, policies and planning approaches and are therefore intrinsically political. The actors who are most powerful in urban planning institutions, are those whose judgement and ability is prioritised and even uncontested when the trajectories of new urban developments are being decided.

These obvious instances of corruption arguably intensify an already precarious bond of (mis)trust in, and a diminished level of respect for public institutions. This conflictual relation between governing bodies and the various facets of society may lead to an apolitical approach to urban development - meaning, a less-than-democratic system of governance and planning with direct implications in the sustainability and affordability of cities. Hence, the attempts by Southern states to incorporate EU sustainable development goals in their housing agendas at the city/local level, or, more specifically, implement participatory approaches e.g. in neighbourhood planning, are sometimes received with scepticism by the groups that have been side-lined in the past.

While new instances of corruption and clientelism are arguably continuing to emerge, SE states present a long history of bottom-up tactics, opposing dominant spatial/planning strategies. Tactics, rather than formal strategies, are niches of improvisation and experimentation that rely on a day-to-day responsiveness to shifting conditions, and a steady support of organising teams and communities with a sense of social capital. These tactics pose as reactions to the exclusionary urbanism in line with neoliberal development regimes. Anti-eviction movements, housing squats, neighbourhood social spaces are but a few examples of side-lined groups attempting to create prefigurative socio-spatial instances and housing configurations in the city that resist the various hegemonic planning and development agendas (Franks, 2003).

However, meaningful as these tactics may be in reproducing social capital, their impact on housing policy is often limited. Occasionally, national/local governments may attempt to suppress such tactics by associating the exhibited disruptiveness with a projected negative impact on the urban landscape. This negative impact may, therefore, be spotlighted in public discussions to draw the general public's focus away from other important topics and toward the groups using these tactics. The inherent precarity that characterises the latter, paired with the unwillingness of local and national governments to examine, negotiate and discuss the diverse visions co-existing in SE cities, contribute to the conflictual relation between institutions and citizens, thus perpetuating the cycle of mistrust. Finally, the obstinance of state planning and housing departments which cannot deviate from their established ways and hierarchical organisation pose serious questions regarding the accessibility provided to local actors and especially minority groups.

4. Conclusion

Clientelist and corrupt relations in local economic development decision-making are beginning to reveal a regional commonality between SE countries with regard to the barriers to citizen participation in urban development. More specifically, what these case studies have in common is the disenfranchisement of less-powerful groups, even more so minorities, who lack the political influence and financial capacity to claim the right to the neoliberal city. The bottom-up tactics that are occasionally employed by these groups, and their subsequent suppression by governing institutions, present a missed opportunity for dialogue and (some level of) reconciliation.

The expected outcome of this research is a set of reflections on the antagonistic relation between the clientelist state-speculative private actor transactions and the bottom up attempts to claim a seat at the decision-making table of urban infrastructure development. Finally, through the exploration of these opposing practices we aim to critically contextualise citizen participation approaches within the specific limitations of the Southern European socio-political landscape.

Acknowledgment

This paper is an output of A. Panagidis and E. Roussou's doctoral research, conducted under the auspices of RE-DWELL, an Innovative Training Network (ITN) funded by the H2020 Marie Skłodowska-Curie programme of the European Union (2020-24), with project number 956082.

References

Aretaki, M. (2013, April 5). The Mall Athens: Σκάνδαλο όπως και αν το δεις [The Mall Athens: No matter how you look at it, it's a scandal]. The Press Project. https://thepressproject.gr/the-mall-athens-skandalo-opos-kai-an-to-deis/

Dalakoglou, D. (2016). Infrastructural gap: Commons, state and anthropology. *City*, *20*(6), 822–831. https://doi.org/10.1080/13604813.2016.1241524

Dikeç, M. (2007). *Badlands of the Republic: Space, Politics and Urban Policy*. Blackwell Publishing. https://doi.org/10.1016/10.1002/9780470712788

DW News. (2017, July 20). Mafia Capitale: Rome racket convicted. https://www.dw.com/en/mafia-capitale-rome-court-convicts-racket-leaders-who-extorted-city-officials/a-39774910

Efimerida ton Sidakton. (2021, March 24). Τρία σκάνδαλα σε συσκευασία ενός [Three scandals packaged as one]. https://www.efsyn.gr/politiki/i-apopsi-tis-efsyn/286895_tria-skandala-se-syskeyasia-enos

Ferrera, M. (1996). The "Southern Model" of Welfare in Social Europe. *Journal of European Social Policy, 6*(1), 17-37. https://doi.org/10.1177/095892879600600102

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

Heslop, J., & Ormerod, E. (2020). The Politics of Crisis: Deconstructing the Dominant Narratives of the Housing Crisis. *Antipode*, *52*(1), 145–163. https://doi.org/10.1111/anti.12585

Lamda Development. (n.d.). The Hellinikon. https://www.lamdadev.com/en/investment-portfolio/the-hellinikon.html

Lawhon, M., Nilsson, D., Silver, J., Ernstson, H., & Lwasa, S. (2018). Thinking through heterogeneous infrastructure configurations. *Urban Studies*, *55*(4), 720–732. https://doi.org/10.1177/0042098017720149

Lawson, J., Denham, T., Dodson, J., Flanagan, K., Jacobs, K., Martin, C., Van Den Nouwelant, R., Pawson, H., & Troy, L. (2019). Social housing as infrastructure: Rationale, prioritisation and investment pathway. In *AHURI Final Report* (Issue 315). https://doi.org/10.18408/ahuri-5314001

Lemanski, C. (2020). Viewpoint infrastructural citizenship: (de)constructing state-society relations. *International Development Planning Review*, *42*(2), 115–125. https://doi.org/10.3828/idpr.2019.39

Loeffler, E., & Bovaird, T. (2017). From Participation to Co-production: Widening and Deepening the Contributions of Citizens to Public Services and Outcomes. In E. Ongaro, S. Van Thiel (Eds.), *The Palgrave Handbook of Public Administration and Management in Europe,* 403–423. https://doi.org/10.1057/978-1-137-55269-3_21

Maloutas, T., Siatitsa, D., Balampanidis, D. (2020). Access to Housing and Social Inclusion in a Post-Crisis Era: Contextualizing Recent Trends in the City of Athens. *Social Inclusion, 8(3),* 5–15. https://doi.org/10.17645/si.v8i3.2778

Paidakaki, A. (2021). Social Innovation in the Times of a European Twofold Refugee-Housing Crisis. Evidence from the Homelessness Sector. *European Journal of Homelessness*, *15*(1), 24.

Phelps, N. A., & Miao, J. T. (2020). Varieties of urban entrepreneurialism. *Dialogues in Human Geography*, *10*(3), 304–321. https://doi.org/10.1177/2043820619890438

Ponce, J. (2010). Affordable housing as urban infrastructure: A comparative study from a European perspective. *The Urban Lawyer*, *42*(4), 223-245.

Power, E. R., & Mee, K. J. (2020). Housing: an infrastructure of care. *Housing Studies*, *35*(3), 484–505. https://doi.org/10.1080/02673037.2019.1612038

Reid, A. (2023). Closing the Affordable Housing Gap: Identifying the Barriers Hindering the Sustainable Design and Construction of Affordable Homes. *Sustainability (Switzerland)*, *15*(11). https://doi.org/10.3390/su15118754

Savini, F., & Bertolini, L. (2019). Urban experimentation as a politics of niches. Environment and Planning A, 51(4), 831–848. https://doi.org/10.1177/0308518X19826085

Savva, G. (2014, February 14). Ατιμώρητες εταιρείες που βάσει απόφασης Δικαστηρίου είχαν εμπλοκή στην υπόθεση ΣΑΠΑ, λέχθηκε στην Επ. Θεσμών. CNA. https://www.cna.org.cy/article/6231885/atimorites-etaireies-poy-vasei-apofasis-dikastirioy-eichan-ebloki-stin-ypothesi-sapa-lechthike-stin-ep-thesmon

Swenson, K. (2017, July 21). The last king of Rome: How a one-eyed gangster conned the Italian capital into a debt crisis. *The Washington Post.* https://www.washingtonpost.com/news/morning-mix/wp/2017/07/21/the-last-king-of-rome-how-a-one-eyed-gangster-conned-the-italian-capital-into-a-debt-crisis/

The Ellinikon. (n.d.). https://theellinikon.com.gr/en/about-us/the-ellinikon/

The Press Project. (2020, February 2). Με τη σφραγίδα του ΣτΕ νομιμο το μέχρι πρότινος αυθαίρετο “The Mall Athens” [By order from the national assembly The Mall Athens gains legal status]. https://thepressproject.gr/me-ti-sfragida-tou-ste-nomimo-to-mechri-protinos-afthereto-the-mall-athens/

The Press Project. (2021, June 29). “Υφαρπαγή δημόσιας περιουσίας” και “παράδοση του Ελληνικού χωρίς προϋποθέσεις στη Lamda” [“Embezzlement of public property” and “Unconditional delivery of Ellinikon to Lamda”]. https://thepressproject.gr/yfarpagi-dimosias-periousias-kai-paradosi-tou-ellinikou-choris-proypotheseis-sti-lamda/

Tondo, L. (2023, November 20). More than 200 mobsters convicted in Italian mafia maxi-trial. The Guardian. https://www.theguardian.com/world/2023/nov/20/more-than-200-mobsters-convicted-in-italian-mafia-maxi-trial

TVXS. (2009, May 7). Mall: "Το μεγαλύτερο αυθαίρετο της Ευρώπης" [Mall: "The largest illegal structure in Europe"]. https://tvxs.gr/news/ellada/mall-to-megalytero-aythaireto-tis-eyropis/

Unfulfilled promises and unintended permanence: The evaluation of the Temporary Relocation Areas (TRA) in Stjwetla, Johannesburg, South Africa

Newsha Salari

School of Architecture La Salle
Ramon Llull University, Barcelona, Spain

Keywords: slum upgrading, Temporary Relocation Area (TRA), SDGs , participation

Introduction

Unequal distribution of resources, infrastructure, and economic opportunities within an urban area often leads to disparities in living standards, access to basic services, and employment opportunities. This uneven urban development is a significant factor in the emergence of impoverished neighbourhoods and slums, particularly in areas lacking in investment and infrastructure. (UN Habitat, 2003). Rapid city expansion and acute housing shortages exacerbate these issues, resulting in interconnected problems such as increased illicit activities, sanitation challenges, and a lack of necessities like clean water, electricity, and employment opportunities (Cities Alliance, 2021).

Researchers studying urban inequality have conducted numerous studies on uneven urban development in South Africa. One such project is the City Studio initiative by the CUBES research group, focusing on the Kelvin-Alexandra-Franken Wald area. This project employs an inter- and transdisciplinary approach, engaging with local communities and stakeholders to understand their needs and perspectives. The ultimate goal of this research is to contribute to the transformation of urban spaces in ways that are socially just and inclusive (CUBES research team, 2024).

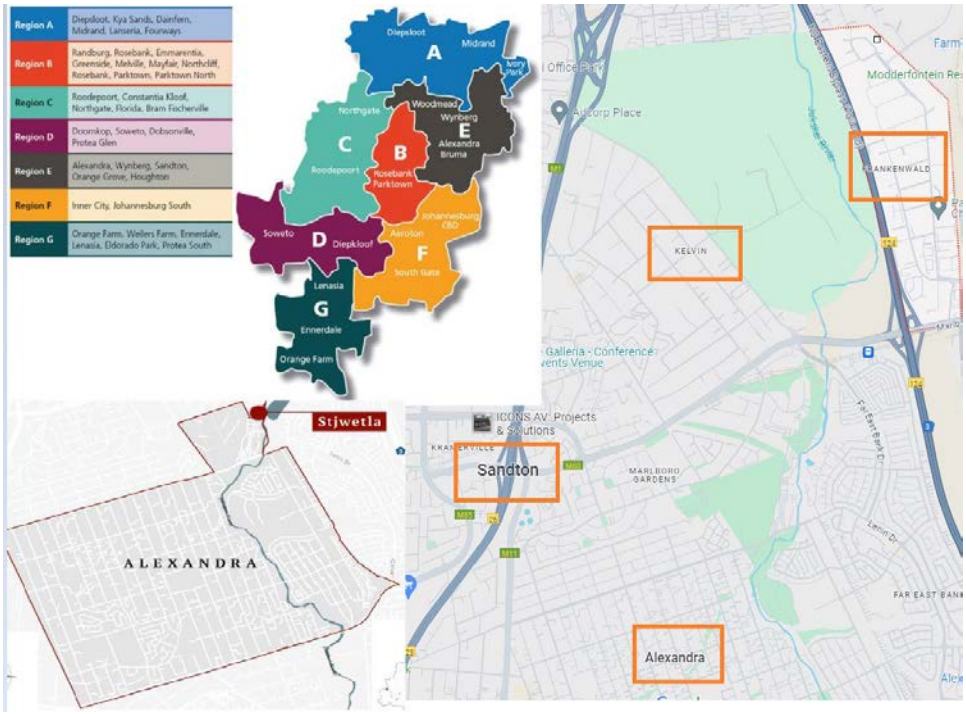


Figure 1. Location of Kelvin-Alexandra-Frankenwald and Stjwetla in Johannesburg. Source: Author

Stjwetla, located in the Alexandra neighbourhood of the historic centre of Johannesburg (Figure 1), exemplifies extreme poverty and overcrowding. This informal settlement stands in stark contrast to the adjacent affluent area of Kelvin, highlighting the vast disparities in living standards between neighbourhoods just a few kilometres apart. Stjwetla's vulnerability is exacerbated by its proximity to the Jukskei River, making it highly susceptible to flooding. In 2016, the area experienced some of its worst floods in history, displacing many residents and underscoring the critical issue of inadequate housing and infrastructure. This disaster served as a wake-up call for the South African government, prompting swift action to address the urgent needs of those affected by these recurring natural calamities (Huchzermeyer, 2003). As a result, the government, in collaboration with the Gift of the Givers Charity, designated the neighbourhood as a Temporary Relocation Area (TRA) and installed 70 basic metal units as Temporary Relocation Units (TRUs) for the displaced residents, aiming to improve living conditions in such impoverished neighbourhoods (Smit et al., 2007; Sonono, 2020).

The satellite map (Figure 2) depicts a section of the Alexandra township, with the Stjwetla area outlined by a red dotted line. A yellow line indicates the township's only main road accessible by car. Right by the red line is the Jukskei River. The buildings with green roofs represent temporary housing units provided for residents who lost their homes during the severe 2016 flood.

Figure 2. Stjwetla's Main Road and Temporary Relocation Area units

Despite government reports claiming improvements in Stjwetla, such as the provision of mobile toilets, bathrooms, and water pumps, the current situation tells a different story (Figure 3). The living conditions in both Stjwetla and the Temporary Relocation Area (TRA) units remain challenging, underscoring a significant gap between the planned interventions and the residents' lived experiences.

Figure 3. Discrepancies between reported efforts and actual living conditions in Stjwetla. Source: Author

In fact, efforts to improve living conditions in Stjwetla have not been effectively executed. For instance, bathrooms and toilets have been installed but lack access to water, making them useless. Educational facilities are also inadequate, with no desks or chairs available for students. Moreover, poor monitoring of these initiatives has exacerbated the challenges faced by residents, highlighting serious gaps in implementation and oversight.

In the book *Rethinking Precarious Neighbourhoods*, Huchzermeyer (2016) critiques the tendency of planning policies to neglect marginalised settlements, often prioritising their replacement with more formal urban developments. In addition, inadequate monitoring and the absence of clear strategies to enhance these areas, hampers efforts by both residents and the government to improve essential services, housing, and local facilities.

Many residents in Stjwetla have been living in temporary housing for an extended period because the government's 2016 plan to provide permanent housing for the community's residents was never fulfilled. Stjwetla is currently home to 5,300 households of a variety of demographic groups, including young families, the elderly, and many households headed by a single mother. Most slum dwellers are migrants who came to Johannesburg in seek of greater opportunities and better living conditions from rural areas of various African countries.

Previous attempts to address the settlement's needs proved ineffective due to a lack of awareness of the community's most pressing issues and challenges in implementing solutions on the ground. Despite multiple endeavours over time to improve living conditions, the fundamental problems persist. Therefore, innovative solutions and increased effort are necessary to address these persistent challenges and enhance the living standards for all residents.

Historical slum upgrading projects worldwide have often failed despite significant investment and effort. A primary reason for this failure is the lack of recognition of residents as valuable sources of knowledge. Many projects overlook the importance of involving the community in the planning and decision-making processes. Without input from the people who live in these areas, critical details about the most pressing issues and urgent needs are missed, leading to ineffective or unsustainable solutions. Engaging residents can provide essential insights into local challenges, such as inadequate infrastructure, access to services, and housing needs, ultimately leading to more successful and impactful projects

Stjwetla exemplifies the challenges faced by many slum upgrading projects that fail due to inadequate community involvement and poor post-implementation monitoring. Despite efforts to improve conditions, such as installing portable toilets and Temporary Relocation Units (TRUs), these initiatives have struggled to meet the actual needs and preferences of residents. This disconnect has resulted in the deterioration of facilities, worsened living conditions, and increased health risks. The insufficient recognition of residents as critical sources of knowledge creates a significant gap between the community's needs and the understanding of these needs by experts. To bridge this gap, it is crucial to actively engage residents in the planning and evaluation of projects. Their input can provide valuable insights into local challenges, ensuring that interventions are more effective and sustainable. Active community participation in studying and addressing issues in Stjwetla is essential for achieving meaningful and long-lasting improvements.

2. Scope of the research

Stjwetla is one of the case studies in this doctoral research, which aims to bridge the gap between experts and community knowledge. The primary focus of the research is on understanding and addressing the specific needs and demands of residents in slum upgrading projects. It emphasises the importance of integrating community perspectives and participation into urban development projects to enhance their success and sustainability.

2.1 Objectives

The research objectives can be summarized as follows:

1. To identify the most urgent needs of slum residents in Stjwetla for development projects.
2. To prioritise these needs according to the Sustainable Development Goals (SDGs) framework.
3. To bridge the gap between expert knowledge and community perspectives using the Analytic Network Process (ANP) decision-making tool.
4. To propose strategies for urban development initiatives in Stjwetla based on the prioritised needs and SDGs.

2.2 Research questions

1. What are the primary needs and challenges faced by residents in slum areas such as Stjwetla?
2. How can these needs be prioritised effectively to ensure the implementation for upgrading the case study aligns with the SDGs?
3. What methods can be employed to integrate community perspectives into decision-making processes for urban development projects?
4. How can the Analytic Network Process (ANP) facilitate the integration of expert knowledge and community perspectives in prioritising upgrading interventions?

2.3 Key components

These key components are integral to a comprehensive approach to community development initiatives, particularly in the context of Stjwetla. Together, they form a holistic method emphasising participation, sustainability, informed decision-making, empowerment, and data-driven interventions:

1. *Participation*: Emphasising the active involvement of residents in identifying their needs and aspirations through interviews and surveys.
2. *Sustainable Development Goals (SDGs):* Utilising the SDGs framework as a roadmap for prioritising development interventions and ensuring alignment with global sustainability objectives.
3. *Analytic Network Process (ANP):* Employing ANP as a decision-making tool to analyse both quantitative and qualitative data simultaneously, integrating expert knowledge and community perspectives.
4. *Community Empowerment:* Fostering community empowerment and engagement throughout the research process and upgrading initiatives.
5. *Data Collection:* Conduct comprehensive surveys and interviews to gather insights into the living conditions, challenges, and aspirations of Stjwetla residents.

3. Research methodology

To ensure a comprehensive approach, the methodology phase encompasses various steps aimed at integrating community perspectives and expert knowledge into upgrading development initiatives. The following steps outline the systematic process employed in this research:

1. *Survey Design*: Designing a comprehensive survey consisting of nineteen questions covering various aspects of living conditions, challenges, and aspirations according to SDGs.

2. *Interviews and survey*: Conducting in-person interviews to gain deeper insights into the needs and perspectives of residents, particularly those lacking internet connectivity.
3. *Data Analysis*: Utilising ANP to analyse survey responses and interview data, prioritising community needs based on their relevance to the SDGs.
4. *Community Engagement*: Involving residents in the prioritization of urgent needs and decision-making process, ensuring their voices are heard and incorporated into development plans.

3.1 Overview of the case study research

In recent years, the CUBES group has been dedicated to enhancing awareness among the residents of Alexandra-Stjwetla about their rights regarding urban living conditions (“their right to the city”), including housing, sanitation, and land tenure. These initiatives have been carried out in collaboration with African governance, NGOs, and slum dwellers, aimed at merging academic insights with practical government action while fostering public participation.

The first step of this research carried out in the case of Stjwetla is to identify the most important needs of the residents. By leveraging the groundwork laid out by the CUBES group’s initiatives, the field study aimed to capture an in-depth understanding of the community's specific conditions and requirements.

Utilising participatory research techniques, the goal was to understand the issues facing the community of slum dwellers, their urgent needs, and their future expectations. We conducted these surveys from September to November 2023, utilising an online tool as well as in-person interviews with residents. This face-to-face contact streamlined the data collection process for individuals without internet access and helped to better understand their needs.

A comprehensive survey comprising nineteen questions was elaborated, covering various domains including social demographics, housing and living conditions, community and safety, access to basic needs, and participation and empowerment. The survey aimed to gather residents' perspectives on their living conditions, evaluating their situations across different types of residences—from informal settlements to typical apartment houses—on a scale from 'very bad' to 'very good.' This approach provided a direct metric for assessing conditions and gathering subjective assessments of their overall living situation. Additionally, the survey delved into critical daily challenges faced by residents, such as access to clean water, toilets, electricity, healthcare, educational opportunities, waste management, and concerns over housing quality, crime, and safety. This comprehensive data collection aimed to illuminate the multifaceted issues within the community and inform future interventions.

Following the identification of the most pressing community needs, the next step involved prioritising these needs based on their relevance to the Sustainable Development Goals (SDGs). It is essential to focus on needs that directly contribute to achieving the global objectives outlined by the SDGs, thereby fostering coordinated efforts toward a more sustainable and equitable world.

To prioritise these needs and mitigate bias, we employed the Analytic Network Process (ANP) decision-making tool. ANP is effective in handling both quantitative and qualitative data simultaneously. Experts involved in upgrading projects typically work with numerical data that represent measurable knowledge, while residents’ viewpoints provide vital qualitative insights. This methodology is particularly advantageous for examining both types of data concurrently, offering a robust framework for urban development and improvement initiatives in the area.

The ANP process consists of the steps below:

1. *Structuring the Decision Hierarchy*: The first step in ANP involves defining the decision hierarchy, which includes identifying the main objectives or criteria for evaluation and the alternatives being considered. This hierarchical structure helps organise the decision-making process and ensures that all the relevant factors are considered.
2. *Pairwise Comparisons:* Decision-makers then conduct pairwise comparisons between the criteria and the alternatives in order to assess their relative importance or performance. These comparisons are typically made using a scale that ranges from 1 to 9, where 1 indicates equal importance or performance, and 9 indicates extreme importance or performance.
3. *Weight Calculation*: Based on pairwise comparisons, the ANP calculates the weights or priorities of the criteria and alternatives. These weights represent the relative importance of each criterion or alternative in achieving the overall objectives of the decision-making process.
4. *Network Analysis*: ANP analyses the interrelationships between criteria and alternatives using a network approach. This analysis considers both the direct and indirect influences of each criterion or alternative on the overall decision.
5. *Sensitivity Analysis*: Finally, ANP performs sensitivity analysis to assess the robustness of the decision and identify potential sources of uncertainty or variability. This analysis helps decision-makers understand the potential impact of changes in input parameters on the outcomes.

The step-by-step process for identifying the most urgent needs of the Stjwetla dwellers by applying an ANP to prioritise the needs based on the SDGs in the steps below:

1. *Developing the ANP Model*: A model is constructed to integrate the identified criteria, objectives, and prioritised requirements. The network structure is designed to show the complex interconnections among various requirements and objectives, thereby guaranteeing harmony with the framework of the SDGs.
2. *Pairwise Comparisons*: In the ANP model, pairwise comparisons are performed between the identified requirements and criteria. The assessment of the significance of each requirement about the main goals of slum upgrading initiatives takes into account their practicality, congruence with the SDGs, and overall influence.
3. *Weight calculation*: The calculation of weighted ratings for each need is performed using pairwise comparison matrices. The ANP algorithm is utilised to calculate global priority weights, which indicate the criticality and significance of attending to particular requirements within the framework of slum upgrading initiatives.
4. *Prioritization and Decision Making*: The ANP model generates a prioritised list of requirements that is used to guide resource allocation and project prioritization decisions. Every effort is made to ensure that interventions are specifically designed to tackle the most critical issues that have been identified via the prioritization process. This approach seeks to maximise the effects on slum communities.
5. *Constant Evaluation and Monitoring*: Continuous monitoring and evaluation mechanisms are implemented to assess the efficacy of upgrading projects to meet the identified demands and to attain the desired results. Stakeholders and slum residents are allowed to provide feedback to ensure that interventions continue to be adaptable to changing priorities and needs.
6. *Iterative Methodology*: The recognition of the ongoing nature of the prioritization process is evident, and modifications may be implemented in response to evolving conditions,

developing obstacles, or fresh perspectives gained through continuous community involvement. In accordance with the SDGs, the relevance and efficacy of upgrading projects in addressing the urgent requirements of slum dwellers are ensured by looping the steps as required.

Starting with a thorough assessment of needs followed by strategic prioritization based on the SDGs lays the groundwork for targeted and effective urban development initiatives. Ultimately, by integrating academic research with practical applications and ensuring active public participation, we can significantly contribute to improving living conditions in Alexandra.

4. Results

The survey achieved diverse participation across all age groups and employment statuses, including students, employed individuals, unemployed individuals, and those preferring not to disclose their job status. A total of fifty respondents participated, comprising 28.1% students, 25% employed individuals, and 46.9% unemployed individuals.

The results of the study show that the residents are deeply conscious of their poor living conditions, with nearly all acknowledging that they live in a slum. Out of fifty surveys completed, forty-nine respondents identified their homes as part of a slum, indicating a strong self-awareness of their circumstances as inhabitants of such areas.

Due to the absence of basic infrastructures such as water, electricity, and sanitation facilities, residents have turned to obtaining them through informal means, frequently finding ways to bypass legal regulations. Additionally, the disproportionately high ratio of residents to available facilities further exacerbates the inadequacy and insufficiency of these amenities to meet the community's needs. Figure 4 shows that all survey respondents are aware of their severe living conditions.

In the immediate aftermath of the 2016 disaster, the community reported receiving support from the government and the Gift of Givers Charity (Sithole, 2016). However, as time went on, this assistance and support gradually faded away due to the reduction of aid over time (Webster, 2020). This lack of support from the government only served to aggravate problems such as poverty and unemployment, which became increasingly serious and soon reached levels worse than the initial post-disaster state.

The most commonly shared challenges faced by the respondents are related to electricity and unemployment, both cited by 90.6% of them. It is evident that infrastructure-related issues like access to clean water, toilets, and electricity, as well as socio-economic issues like unemployment and crime, are significant concerns for the inhabitants.

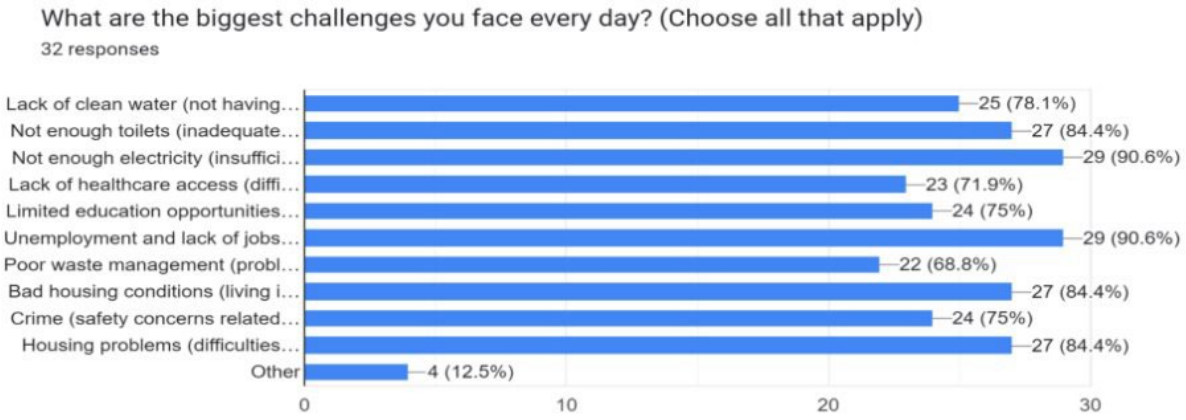


Figure 4. Key challenges according to respondents

The result of the prioritised SDGs based on urgent needs, as perceived by residents, is presented in the Table 1 below after the application of the ANP.

Table 1. Results of the prioritization applying ANP methods

Factors	Priority of factors	Subfactors	Priority of subfactors	Total priority of factors
Employment	0.283706	SDG5	0.226964	0.064439
		SDG8	0.056741	0.016609
Health	0.217292	SDG3	0.072431	0.015738
		SDG17	0.144862	0.031477
Education	0.161772	SDG4	0.161772	0.06170
Poverty	0.114323	SDG1	0.114323	0.043069
Housing	0.073177	SDG6	0.013713	0.001003
		SDG7	0.024533	0.001795
		SDG9	0.007068	0.000517
		SDG11	0.027863	0.02001
Citizen security	0.028956	SDG16	0.028956	0.000838
Public services	0.036552	SDG15	0.036552	0.04362

The results indicate that, based on residents' responses and the application of the ANP, the most pressing urgent need is poverty and lack of job opportunities. Addressing these urgent needs can be facilitated by assessing the indicators SDGs 1, 5, and 8 as a framework for sustainable outcomes. However, it is important to note that these findings are not conclusive. To obtain the most relevant insights, the prioritization process should be repeated. This involves sharing the results with residents to gather their thoughts and ideas once more, followed by a reapplication of the ANP process.

5. Discussion

The study confirmed the harsh reality of the conditions in Stjwetla's temporary shelters which have become permanent, revealing the extent to which initial relief efforts have failed to transition into long-term improvement. The survey data demonstrates that residents, while initially hopeful due to the support received from the government and from charities, now face a daily struggles because of insufficient and deteriorating basic infrastructure. The lack of clean water, electricity, and proper sanitation facilities, alongside the need for adequate employment, remains a critical concern.

The reduction in external assistance over time has heightened these challenges, indicating the need for more enduring disaster management approaches. In Stjwetla, various community leaders have taken initiatives to address shared concerns, such as road maintenance and construction, and creating facilities for washing clothes and dishes. These efforts are funded by contributions from residents themselves, as external aid from higher authorities has become scarce.

The residents' lived experiences call for a comprehensive reassessment of the current policies and the implementation of solutions that go beyond temporary fixes to address the root causes of their ongoing challenges. There is a significant gap between the intention of TRAs as short-term solutions and the reality of their becoming permanent settlements without the necessary conditions for a decent quality of life.

6. Conclusions and further work

The promised transition from temporary emergency housing to stable, sustainable living conditions in Stjwetla has yet to be realised due to funding shortages, planning and policy issues, and infrastructural limitations, all of which hinder progress.. To effectively transform temporary emergency housing into stable, sustainable living conditions, the government and aid organizations must intensify their efforts and concentrate on comprehensive, long-term development strategies. These strategies should include the construction of robust infrastructure and the creation of job opportunities, both of which are crucial for genuinely improving the community's well-being.

Recognising the needs of the residents and involving them in the planning process is vital to ensure that the solutions are effectively tailored to their circumstances. These initiatives underscore the significance of understanding the community's needs to achieve the most sustainable outcomes. Alongside this, it is crucial to monitor the impact of the adopted measures to ensure that the needs of the residents are not neglected over the years and facilitate prompt responses to emerging issues.

Acknowledgement

This research received funding from the Agency for Management of University and Research (AGAUR, Government of Catalonia, Spain) through a pre-doctoral grant, with reference number 2021FI_B 00520. I would like to express my gratitude to Prof. Marie Huchzermeyer, for hosting me in the CUBES research group at the University of the Witwatersrand, Johannesburg, and to the group researchers for their support during my stay. I also want to thank Dr Leandro Madrazo, the director of my PhD research, for his comments and review of this publication.

References

Cities Alliance. (2021). *Cities Alliance: Cities without slums*. UNOPS, 1–4.

CUBES - City Studio. (2024). *Field visit feedback*.

CUBES Research Team. (2024). *CUBES*. https://www.wits.ac.za/cubes/projects/

Huchzermeyer, M. (2003). Housing rights in South Africa: Invasions, evictions, the media, and the courts in the cases of Grootboom, Alexandra, and Bredell. *Urban Forum, 14,* 80–107. https://doi.org/10.1007/s12132-003-0004-y

Sithole, M. (2016). *From the Jukskei to higher ground: Community participation in Project Higher Ground in the Stjwetla informal settlement, Alexandra, Gauteng*. University of Johannesburg.

Smit, W., MacGregor, H., & Mgwatyu, Z. (2007). *Living on the edge: A study of the Delft temporary relocation area*. Cape Town: Development Action Group.

Sonono, M. T. (2021). *South African informal settlements in the age of the COVID-19 pandemic: An investigation of Stjwetla informal settlement resilience challenges against the COVID-19 pandemic*.

Sonono, M. T. (Ed.). (2020). *South African informal settlements in the age of the COVID-19 pandemic: An investigation of Stjwetla informal settlement resilience challenges against the COVID-19 pandemic*.

UN Habitat. (2003). *The challenge of slums: Global report on human settlements*. United Nations Human Settlements Program.

Webster, D. (2020). PressReader.com - Digital newspaper & magazine subscriptions. https://www.pressreader.com/south-africa/mail-guardian/20200703/281646782419037

Key topics and challenges for creating community-led, inclusive, and sustainable housing: Grant-of-use cooperative housing in Catalonia

Zoe Tzika[1], Carla Sentieri[1], Anna Martínez[2]

[1]Universitat Politècnica de València, Spain

[2]School of Architecture La Salle, Ramon Llull University, Spain

Keywords: collaborative housing, participation, capability approach, inclusion

1. Introduction

Over the last two decades, Barcelona has witnessed the emergence of a cooperative housing movement, known as the grant-of-use model, spurred by the socio-political context following the global financial crisis. This movement is part of a broader trend seen across Europe (Czischke et al., 2020; Tummers, 2016). Originating from grassroots efforts, it primarily seeks to address the pressing demand for affordable and adequate housing, while also responding to demographic shifts and the evolving housing needs within the population (Cabré & Andrés, 2018). The model has spread from the city of Barcelona to the rest of the territory, reaching smaller cities and rural areas (Tzika et al., 2023). The main characteristic of the grant-of-use cooperatives is the long-term right to use a home rather than own it, promoting non-speculative housing and positioning it as a collective endeavour. Residents actively participate in decision-making processes, reinforcing this model's collaborative nature (Avilla-Royo et al., 2021; Sostre Civic, 2017). By reconsidering the architectural typologies of housing through the incorporation of communal spaces and facilities, while parallelly creating more communal ways of living, these communities reshape the concept of dwelling and transform the social dynamics among residents (Lacol et al., 2018). Given the diverse project values and aims of the groups (affordability, neighbourhood revitalisation, ecological considerations, gender perspective), their demographic composition (age, gender, number of units), land access and tenure type (collective property, social housing), building characteristics (construction system, typology, rehabilitation), and community living (private and communal areas, activities), the approaches of each group and their collaboration with external entities can vary significantly (Lang et al., 2020). This article aims to identify the key challenges shaping the cooperative housing landscape in Catalonia and explore how different groups navigate these challenges.

2. Methodology

A mixed-method approach was selected as the most appropriate for this research, integrating both quantitative and qualitative methodologies. Initially, a comprehensive table was created, compiling information from 66 projects of cooperative housing in Catalonia, which are the ones in a more advanced phase, or at least having access to land. Information was gathered for each project on the following categories: location, collaboration, year, relation with the public, building characteristics, social characteristics of the groups, community, and neighbourhood. Five

projects were selected for the case study analysis, based on the diversity of their collaboration, building characteristics, and relation to the public sector.

A qualitative case study analysis was conducted, following the methodological guidelines of Groat & Wang (2013) and Yin (2018). The methodology follows a grounded theory approach (Corbin & Strauss, 1998), and more specifically what is known as abductive analysis (Tavory & Timmermans, 2014). Data collection spanned two distinct fieldwork periods: from September 2022 to April 2023 and later from September 2023 to April 2024, providing a comprehensive understanding across different project phases. Diverse methods were employed for data compilation, such as in-depth and semi-structured interviews with various stakeholders, comprising residents, architects, facilitators and professionals. These interviews offered multifaceted insights into individual perspectives and experiences. Additionally, the research gathered information through document analysis, encompassing materials from the participatory processes, documents generated by the residents' groups, and by the professionals and the intermediate organisations. This included architectural briefs, drawings, reports etc. Furthermore, data from public presentations and interviews with the projects´ members were incorporated. Utilising these various sources provided the foundation for a comprehensive analysis, allowing for the triangulation of information and the exploration of diverse perspectives. The gathered data was analysed iteratively and classified into common themes.

3. Results

The data analysis has yielded significant themes that underscore key topics and challenges pertinent to the cooperative housing model operating under the grant-of-use. These results provide insights to identify focal points and propose mechanisms and practices aimed at achieving sustainable and inclusive housing outcomes.

3.1 Living in Community

One of the most important premises of the model is its aspiration to create a different way of living. The main motivation is the need to live in a community, countering the prevailing individualisation of contemporary living, which has exacerbated feelings of loneliness across wide segments of the population, contributing to what is commonly acknowledged as a 'crisis of care' (Fraser, 2016). Notably, a considerable proportion of residents within cooperative housing projects either live alone or belong to single-parent families. Acknowledgement of this communal ethos necessitates the active and intentional cultivation of interpersonal relationships within the group. Additionally, it entails the design of novel spatial configurations that reimagine the interplay between the private and the common spaces within new or adapted buildings (Jarvis, 2011). Finally, the concept of care also assumes significance within these initiatives, addressing a crucial contemporary issue with distinct gender dimensions (Jupp et al., 2019).

3.2 Collaborative process

Among the initiatives in Catalonia, three approaches have emerged concerning how groups realise their projects. Some opt for a self-managed model, retaining control over the entire process and coordinating all tasks internally. Others seek guidance from external entities while maintaining autonomy. A third category involves individuals becoming members of umbrella cooperatives, which initiate the projects and lead the process. Each of the three options offers distinct advantages and can cater to the diverse needs of different individuals or communities. While self-management affords greater autonomy for the group, it may prolong the timeline due to extensive involvement. Conversely, relying on external support can streamline the process but

might involve sacrificing some degree of control (Huisman & Czischke, 2023). Additionally, groups may form with the explicit goal of living together, commonly referred to as intentional communities, or they may assemble through waiting lists facilitated by external entities. Regardless of the formation method, groups inevitably encounter the need to integrate new members at some stage, an action which requires thoughtful management of member inclusion dynamics.

3.3 Diversity/ Inclusion

As the model continues to evolve, it has begun to embrace greater diversity, as groups with varying needs and identities initiate their projects. However, alongside this growth, concerns on inclusivity have emerged from the discussions within the collective spaces of the cooperative housing movement (Bresson & Labit, 2020). A recurring criticism is the relative homogeneity of the groups, often comprising residents with similar profiles and economic, cultural or social resources (Sørvoll & Bengtsson, 2018). The need for inclusive housing encompasses various dimensions, including affordability, and the integration of socially diverse groups, immigrant populations, vulnerable demographics, or those with mental disabilities. A notable development towards addressing these concerns is the integration of "social flats" within projects. These flats are specifically designated for specific collectives and are typically established through collaboration with third-sector associations, such as those supporting women, single young people, or individuals with disabilities. Additionally, fostering typological diversity within buildings represents another avenue towards creating more inclusive environments. This approach allows for different housing units to coexist within the same structure, accommodating diverse needs and preferences while promoting social cohesion and community integration.

3.4 Relationship with the public sector

An integral aspect of the model involves its relationship with the public sector, encompassing both support mechanisms and the qualification of many flats as social housing. Under the grant-of-use model, residents have the long-term right to use housing rather than owing it. What varies for the cases is the ownership - which can be public or cooperative. In cases of public ownership, projects access public land for a specific duration, between 75 and 99 years, provided residents meet social housing requirements. Alternatively, in cases when public land is unavailable or when the conditions imposed by the public sector are not favourable to the group's objectives, groups are purchasing collectively the land, with ownership retained by the cooperative. A common feature across both categories is the decision of the groups to designate all or a portion of the apartments as social housing, aligning with public right-to-housing agendas and fostering public-communitarian collaborations (Ferreri & Vidal, 2021). Qualifying the flats as social housing means that there is economic support from the public sector. The residents should meet specific income criteria and the projects must adhere to regulations regarding apartment sizes, the number of units, and monthly rents. In certain cases, the public character is further demonstrated through the utilization of ground floor spaces for public purposes, enhancing community engagement and contributing to the broader social fabric of the cooperative housing model.

3.5 Neighbourhood impact

A key challenge of cooperative housing projects is their interaction with the surrounding context. As highlighted by Fromm (2012), cooperative housing initiatives have the potential to contribute to neighbourhood repair, and to the social cohesion. One approach involves the repurposing of empty buildings in urban centres, particularly in smaller municipalities, where the community transforms an abandoned building into a new model of cooperative living. This creates the

opportunity to revitalise a degrading neighbourhood and rebuild the social bonds and a sense of community among residents (Jarvis, 2015). Additionally, many groups express a desire to open up spaces within their buildings to the broader neighbourhood, aiming to foster social cohesion and strengthen community ties. This approach not only enriches the cooperative housing experience but also contributes positively to the social fabric of the surrounding area (Williams, 2005).

3.6 Sustainability

From the first initiatives, there was a clear commitment to the creation of more sustainable housing. This is evident in the choice of materials and construction systems used by the cooperative housing projects. Wood structures, compressed earth blocks and passive housing strategies are among the main characteristics of many new buildings, while others focus on rehabilitating existing structures, thereby emphasising sustainability through resource repurposing. Sustainability extends beyond mere construction techniques, encapsulating broader initiatives aimed at reducing consumption. For example, most buildings incorporate common laundry spaces equipped with shared washing machines, thereby promoting resource efficiency. Furthermore, deliberate design choices often include the reduction of private space, fostering a sense of community while concurrently minimising the environmental footprint of construction (Brysch & Czischke, 2021). Finally, the typological flexibility incorporated in many projects permits long-term sustainability. Housing units are designed to be adjustable, enabling residents to continue living in the same building without using more space than needed. Furthermore, the groups understand and design the whole building as their housing, rather than just the apartment that they are using, which allows them to swap apartments within the same building.

4. Conclusion

The emergence and evolution of the grant-of-use cooperative housing model in Catalonia over the last two decades represent a significant development in community-led housing provision and a new paradigm of dwelling. However, to fully grasp its potential, further investigation is needed. This study has identified the primary themes and challenges that are currently confronted by the cooperative housing projects in Catalonia, alongside the diverse mechanisms and practices employed to address them. By delving into these challenges, we glean insights into the transformative capacity of cooperative housing, paving the way for alternative modes of habitation. Our analysis has highlighted key areas such as community living, collaboration, diversity and inclusion, public sector engagement, neighbourhood impact, and sustainability, each bearing significance for the model's success. Comparing experiences, processes and lessons learnt can enrich our understanding of the housing model and contribute to its continual improvement.

Acknowledgement

The work presented in this publication has been conducted within the RE-DWELL Innovative Training Network, funded by the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement no. 956082.

References

Avilla-Royo, R., Jacoby, S., & Bilbao, I. (2021). The building as a home: Housing cooperatives in Barcelona. *Buildings*, *11*(4). https://doi.org/10.3390/BUILDINGS11040137

Bresson, S., & Labit, A. (2020). How Does Collaborative Housing Address the Issue of Social Inclusion? A French Perspective. *Housing, Theory and Society*, *37*(1), 118–138. https://doi.org/10.1080/14036096.2019.1671488

Brysch, S. L., & Czischke, D. (2021). Affordability through design: the role of building costs in collaborative housing. *Housing Studies*. https://doi.org/10.1080/02673037.2021.2009778

Cabré, E., & Andrés, A. (2018). La Borda: a case study on the implementation of cooperative housing in Catalonia. *International Journal of Housing Policy*, *18*(3), 412–432. https://doi.org/10.1080/19491247.2017.1331591

Czischke, D., Carriou, C., & Lang, R. (2020). Collaborative Housing in Europe: Conceptualizing the Field. *Housing, Theory and Society*, *37*(1), 1–9. https://doi.org/10.1080/14036096.2020.1703611

Ferreri, M., & Vidal, L. (2021). Public-cooperative policy mechanisms for housing commons. *International Journal of Housing Policy*. https://doi.org/10.1080/19491247.2021.1877888

Fraser, N. (2016). Contradictions of Capital and Care. *New Left Review*, *100*.

Fromm, D. (2012). Seeding Community: Collaborative housing as a strategy for social and neighbourhood repair. *Built Environment*, *38*(3), 364–394. https://doi.org/10.2148/BENV.38.3.364

Groat, L., & Wang, D. (2013). *Architectural research methods*. Wiley.

Huisman, C., & Czischke, D. (2023). Between Self-organization and Formal Participation: Increasing Tenants' Influence through Self-management?–A Dutch Case-study. *Housing, Theory and Society*, *40*(2), 219–237. https://doi.org/10.1080/14036096.2022.2150681

Jarvis, H. (2011). Saving space, sharing time: Integrated infrastructures of daily life in cohousing. *Environment and Planning A*, *43*(3), 560–577. https://doi.org/10.1068/a43296

Jarvis, H. (2015). Community-led housing and "Slow" opposition to corporate development: Citizen participation as common ground? *Geography Compass*, *9*(4), 202–213. https://doi.org/10.1111/gec3.12206

Jupp, E., Bowlby, S., Franklin, J., & Hall, S. M. (2019). *The new politics of home: Housing, Gender and Care in Times of Crisis* (1st ed.). Bristol University Press. https://doi.org/10.2307/j.ctvjghvp4

Lacol, La Ciutat Invisible, & La Dinamo Fundación. (2018). *Habitar en comunidad : la vivienda cooperativa en cesión de uso*. Catarata.

Lang, R., Chatterton, P., & Mullins, D. (2020). Grassroots innovations in community-led housing in England: the role and evolution of intermediaries. *International Journal of Urban Sustainable Development*, *12*(1), 52–72. https://doi.org/10.1080/19463138.2019.1663525

Sørvoll, J., & Bengtsson, B. (2018). The Pyrrhic victory of civil society housing? Co-operative housing in Sweden and Norway. *International Journal of Housing Policy*, *18*(1), 124–142. https://doi.org/10.1080/14616718.2016.1162078

Sostre Civic. (2017). *Les claus de l'habitatge cooperatiu en cessió d'ús*. https://sostrecivic.coop/biblio/biblio_5.pdf

Tavory, I., & Timmermans, S. (2014). *Abductive Analysis: Theorizing Qualitative Research*. University of Chicago Press.

Tummers, L. (2016). The re-emergence of self-managed co-housing in Europe: A critical review of co-housing research. *Urban Studies*, *53*(10), 2023–2040. https://doi.org/10.1177/0042098015586696

Tzika, Z., Sentieri, C., & Martínez, A. (2023). Towards collective forms of dwelling: the grant-of-use housing cooperatives in Catalonia. *Revista de Arquitectura*, *28*(45), 54–75. https://doi.org/10.5354/0719- 5427.2023.70003

Williams, J. (2005). Designing neighbourhoods for social interaction: The case of cohousing. *Journal of Urban Design*, *10*(2), 195–227. https://doi.org/10.1080/13574800500086998

Yin, R. K. (2018). *Case Study Research and Applications. Design and methods (6th edition)*. SAGE.

Visual essays and posters

A simulation model of the negotiations on affordable housing in England

Aya Badawy
Alexandria University, Egypt

Affordable housing is sometimes supplied by private developers as part of planning regulations, which can be subject to negotiation. Developers can negotiate various aspects such as the number of housing units, as well as the location and schedule of provision with local authorities. In England, Registered Social Landlords (RSLs), also known as housing associations, can take part in these negotiations. The skills of negotiators can significantly impact the provision of affordable housing.

The purpose of the Reasoning of Urban Negotiators (RUNE) model is to highlight how negotiators' emotions, shaped by their prior expectations of outcomes, can influence both the negotiation process and the results achieved. The model demonstrates how the provision of affordable units can be influenced by subjective factors such as stakeholders' emotions. Several scenarios were tested using the RUNE model. In one instance, there was a difference of up to 40 affordable units between scenarios, despite stakeholders negotiating the same development in the same housing market. This difference was due to stakeholders conceding their demands at different rates and values, based on their differing expectations of the outcome in each scenario.

Therefore, the impact of negotiation skills on affordable housing provision should be addressed to ensure sufficient and equitable housing is provided. The model was presented to a sample of 13 experts representing local authorities, developers, and housing associations in England. They largely agreed that it has the potential to be used in training officials for negotiations. They also suggested some improvements to the model's design to better reflect the complexity of real-world negotiations.

RE-DWELL MSCA-ITN

Sustainable living, affordable homes: Meeting the challenge together

Final conference
Barcelona, 16-17 May 2024

A Simulation Model of the Negotiations on Affordable Housing in England

Aya Badawy
Alexandria University
ayabadawy@alexu.edu.eg

IN ENGLAND

Developers cannot build and sell many housing units with market prices without making some of those units affordable. It is a planning obligation enforced since 1990 to get approval for development.

A local authority determines the percent of affordable units it wants in a project and might agree to negotiate such a percent with developers.

I'm Brett, a land developer. I'm heading to the local authority to negotiate the 25% affordable units they ask for. I expect I can negotiate down to 15%.

MEANWHILE AT THE LOCAL PLANNING AUTHORITY

I'm Lisa, the local planning officer. We request 25% affordable units, but with Brett I don't expect to get more than 12% (the half). I know him a skilled negotiator.

LATER ON THE NEGOTIATION TABLE

I will provide 10% of the project as affordable units, not 25%. Otherwise, my project won't be financially viable!

That's close to what I expected. I'm hopeful. I will cooperate and make a big concession to encourage him to give more!

What about 15% rather than 10%?

Superb! I got it

DEAR DECISION-MAKER, WHAT YOU EXPECT BEFORE NEGOTIATING AFFORDABLE HOUSING CAN AFFECT THE NUMBER AND LOCATION OF THE HOUSING WE GET !!

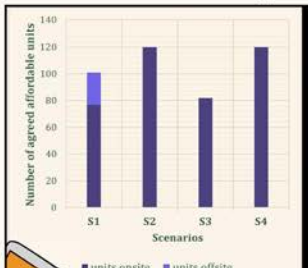
THE RUNE SIMULATOR

Aya Badawy designed the model of Reasoning of Urban Negotiators (RUNE) to simulate the negotiations on affordable housing in England. RUNE helps you understand how your expecations before negotiating affordable housing might affect the outcome you achieve.

Hi, negotiators! I'm RUNE... Tell me your demands from the negotiation and how far you expect to achieve from those demands.

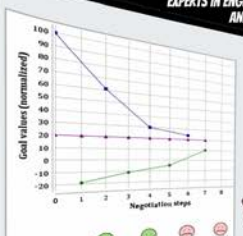
I can show how you might feel as you compare the offers from your opponent to the amount you expected to achieve.

And I'll show how your feelings would affect the way you negotiate and the demand you'll actually achieve!



I can also compare how your outcome might change if you changed your expectation and present the comparison graphically like that!

AYA PRESENTED AN EARLY VERSION OF RUNE TO 13 PLANNING EXPERTS IN ENGLAND FOR FEEDBACK AND RECOMMENDATION



Oh, I should take care of my expectations and emotions when negotiating!

We like the simulator. It can be used in training officers on negotiating affordable housing obligations

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 956082

If you also like RUNE or want more info, you can connect with Aya Badawy by scanning this QR code

Source: The cartoon characters and icons used in this poster (before editing) are either from Freepik.com or generated with AI based on a prompt written by Aya Badawy.

Opportunities and limits. Spatial sustainability of apartment buildings in Buda, built in the 1970s

Noémi Gyárfás
Budapest University of Technology and Economics
Department of Residential Building Design
Budapest, Hungary

At the end of the 1960s, small-scale apartment buildings were constructed alongside the large-scale panel-built housing estates, particularly in wealthier areas to address the housing shortage in Hungary. These 6- to 10-apartment buildings in Buda, a historic district of Budapest, were designed by architectural offices and constructed through private investments, emerged under unique circumstances that are intriguing from several perspectives. After the post-World War II period of centrally managed rental housing, private property ownership reappeared, enabling individuals to address their specific housing needs.

Some middle-class families could now afford to build their own apartments, albeit on a very low budget. They were limited to using locally available materials, as imported building products were not accessible. However, local artisanry, including locksmithing, carpentry, and masonry, provided the means for creating custom design details. At the same time, the first private architectural practices emerged, with entrepreneurial architects overseeing the entire design and construction process from start to finish. In this comprehensive role, architects made the necessary compromises, balancing client demands during the planning phase with cost-effective alternative solutions during execution.

Despite the constraints of limited budgets and the scarcity of materials, the relative freedom afforded to designers resulted in innovative designs, spatial configurations, and handcrafted details that became hallmarks of the era's architecture. These distinctive features stand out not only against the standard designs of the time but also in contrast to contemporary apartment buildings.

The buildings examined are valuable for their flexibility in internal layouts, their use of high-quality materials, and their sensitive integration in their surroundings. From a contemporary perspective, these buildings provide a spatial advantage that enables them to adapt to needs that have developed over time—needs that may not have been anticipated during the planning phase. This adaptability makes them sustainable in terms of spatial use. However, while their spatial and material qualities offer potential for long-term adaptability, it seems that the time has arrived when these buildings, despite their valuable features, can no longer fully meet today's expectations. For example, one of the era's most notable works, Varga Levente's four-apartment house on Lévay Street, is scheduled for demolition in early 2024.

RE-DWELL MSCA-ITN

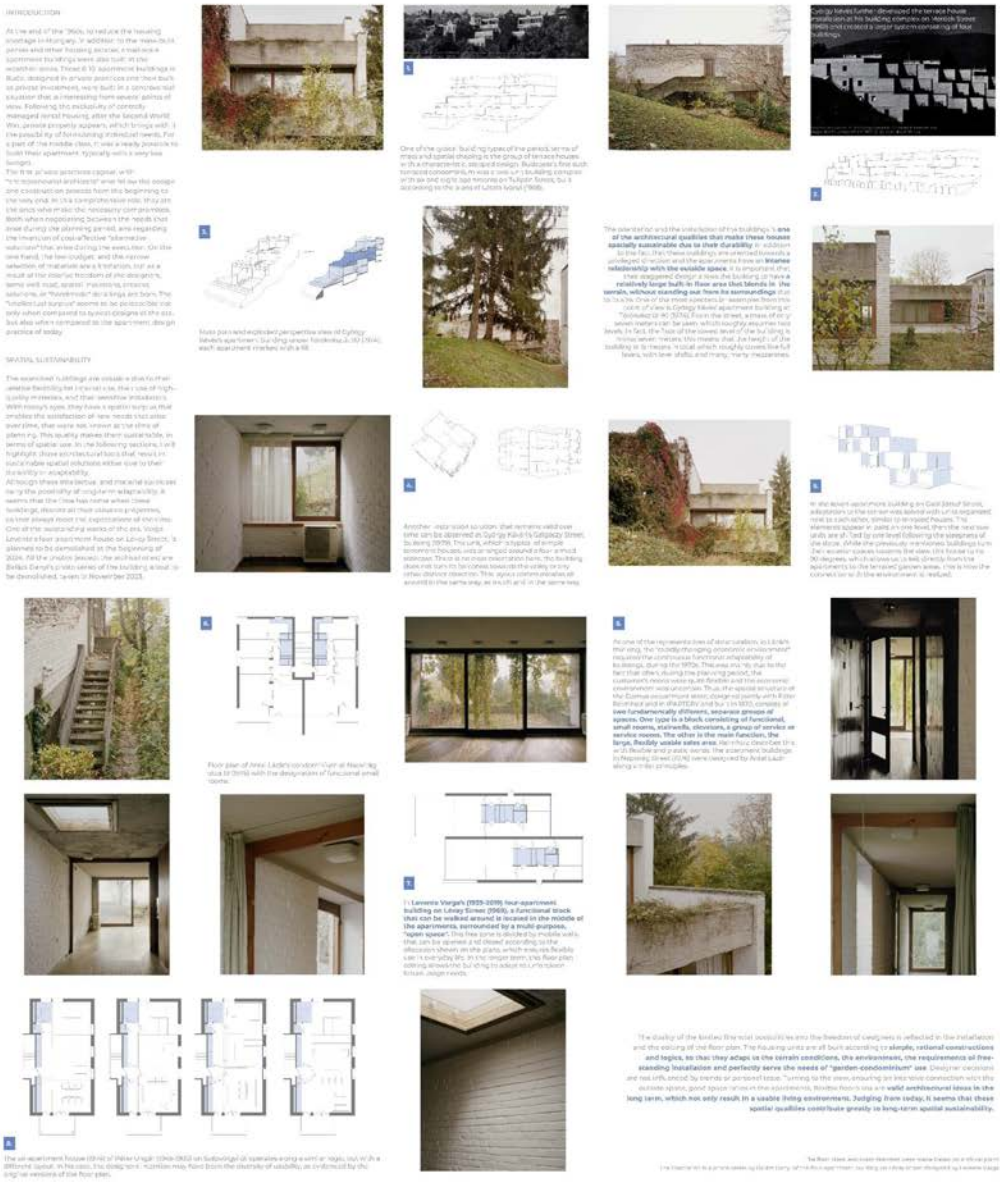
Sustainable living, affordable homes: Meeting the challenge together

Final conference
Barcelona, 16-17 May 2024

Opportunities and limits

Spatial sustainability of apartment buildings in Buda, built in the 1970s

Author: Noémi Gyárfás
Supervisor: Márton Nagy DLA
Budapest University of Technology and Economics
Department of Residential Building Design
noemi.gyarfas@edu.bme.hu



This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 956082

Is there life between buildings? Observing the potential of Terrain Vague for fostering sustainable living

Lorenzo Stefano Iannizzotto, Alexandra Paio
ISCTE-UL
Portugal

In a world where urbanization processes are rapidly evolving, the cycle of urban sprawl followed by periods of contraction has given rise to a new category of intriguing urban spaces. These areas, often referred to as Terrain Vague (Solà-Morales, 1995), Urban Voids, or Vacant Lots, are abandoned and undeveloped spaces where urban, rural, and natural elements blend with unclear boundaries. Although these areas are frequently seen as degraded and problematic due to a lack of human oversight and structured use, they have the potential to contribute to sustainable living. They can offer new urban green spaces, enhance community cohesion, and reveal new opportunities for development.

These areas often become sites for spontaneous daily activities by various communities, showcasing rich biodiversity and hosting practices not allowed in other settings, such as artistic experimentation and creative urban design. They represent a unique intersection of ecological and social interests. Reflecting on Jan Gehl's influential work *Life Between Buildings* (Gehl, 2011), which draws attention to the importance of neighbourhood social interactions, particularly casual and informal ones, we consider whether these spaces could serve as ideal locations for such interactions.

Dwelling encompasses more than just providing housing; it also involves aspects such as quality of life, sustainability, and the relationships formed within living environments. In this regard, abandoned and unused spaces can serve as valuable, inexpensive, and temporarily available resources. Since these spaces lack formal functions and are not part of the legal urban development framework, they offer practical value rather than market value. Moreover, their true potential is underscored by the ways in which communities are already engaging with them. This utilization not only exposes existing needs and deficiencies but also demonstrates the potential for these areas to be improved and repurposed.

Exploring and showcasing everyday life, spontaneous uses, events, alternative practices, and communities that engage with, inhabit, and transform these enigmatic spaces is essential for understanding their value. Although often little-known due to their informal nature, these spaces are of significant interest because their ability to be repurposed lies in enhancing what already exists and occurs within them. Photography serves as a valuable tool for urban investigation, effectively capturing the life of these spaces—often invisible or overlooked in city maps—by highlighting the dimension of everyday life between buildings, an often unexplored and hidden richness.

References

Gehl, J. (2011). *Life between buildings: Using public space* (6th ed.). Island Press.

Solà-Morales, I. de. (1995). Terrain vague. In C. Davidson (Ed.), *Anyplace* (pp. 118–123). MIT Press.


RE-DWELL
MSCA-ITN
Sustainable living, affordable homes:
Meeting the challenge together
Final conference
Barcelona, 16-17 May 2024
Is there Life Between Buildings?
Observing the potential of Terrain Vague
for Fostering Sustainable Living
Lorenzo Stefano Iannizzotto and Alexandra Paio
DINÂMIA'CET, ISCTE-IUL Lisbon
lorenzo_stefano_iannizzotto@iscte-iul.pt
From Theory...
...to field study and observation.
In a world of cities rapid and invasive processes of urbanization, together with the cyclical alternation of urban sprawl and shrinking have generated a new kind of enigmatic urban spaces. Terrain Vague (Solà-Morales, 2013), Urban Voids, Vacant Lot: there are several attempts to define and describe these urban, abandoned and undeveloped spaces, where urban, rural and wild dimensions overlap and mingle, with blurred boundaries. Although considered degraded and problematic, due to the absence of human control and the resulting freedom, these spaces can have a potential contribution to fostering sustainable living, offering new urban green spaces, strengthening communities, revealing new opportunities. In fact, these spaces are the site of spontaneous daily appropriations by different communities, present a very rich biodiversity, are used for practices not allowed elsewhere, or for artistic experimentation or creative urban design, offering an unprecedented union of ecological and social interests.
Five Points of Terrain Vague:
1) Void as Opportunity
2) The need for a New Approach
3) Diversity or Continuity
4) Openness or Temporary
5) Unproductiveness and Commoning
The aim of this visual essay is to explore and show the everyday life, spontaneous uses, events, alternative practices, communities and people who use, live in and transform these mysterious spaces on a daily basis, very often little known because they are places of informal use, but precisely for this reason of great interest to us because we think that their potential or reuse must start from the enhancement of what already exists, happens and lives in the place. To do this, we use the medium of photography as a tool for urban investigation, believing it to be the privileged means of representing the life of these spaces, invisible or white spaces in the cartography or city plans, to which we want to add this dimension of everyday life between the buildings, an often unexplored and invisible richness.
1) Defining Terrain Vague
3)Observing informal practices around Europe
Freely revisiting the issues raised in Jan Gehl's famous text Life Between Buildings (Gehl, 2011), in which he emphasized the importance of neighborhood social relations, especially casual and informal ones, we wonder whether these spaces could not be a privileged place for these encounters, for strengthening the sense of community, for increasing urban biodiversity. In fact, considering the housing issue that does not just end with the built building, but concerns quality of life, sustainability and intangible relations, these spaces can be an important low-cost and temporarily available resource, because they are abandoned, with no official function, and outside the city's production process, privileging use value over market value. Moreover, the richness is that these spaces are already being used by communities spontaneously, revealing needs or lacks and at the same time enhancing the potential of the place.
LIFE BETWEEN BUILDINGS
EVERYDAY Urbanism
An approach that begins by observing the context, in order to preserve, enhance and transform the informal activities and spontaneous appropriations that already happen every day in these spaces, that reveal a great richness and diversity
2) Everyday Life Between Building
4)Observing informal practices in Lisbon
This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 956082

Regenerating San Valentino public housing estate in Terni, Italy. Experimenting with urban and architectural regeneration

Fabio Lepratto, Giuliana Miglierina, Stefano Guidarini
Politecnico di Milano
Italy

The project involves the urban, architectural, and environmental regeneration of the San Valentino neighbourhood in Terni. This public housing complex, built in the 1960s, is currently in a state of decline and neglect due to its isolated location, outdated buildings, and poor-quality public spaces. Financed through public funds, the project is being implemented by ATER Umbria—the regional public entity responsible for public housing—in collaboration with the Department of Architectural and Urban Studies (DAStU) at Politecnico di Milano, which provides scientific support for the architectural and urban design. The project is in the executive design phase and is scheduled for completion by March 2026.

The settlement consists of twelve parallel buildings, ranging from three to four stories high. Some of these buildings are minimum houses with external corridors for access, while others feature internal staircases without elevators. The urban plan includes replacing three of the currently uninhabited buildings with two new structures—one linear and one compact—that deviate from local alignments. This new layout will give rise to a sequence of public spaces designed to establish new connections with the surrounding elements. The aim is to move beyond the existing monofunctional settlement to create a new neighbourhood with diverse activities and improved public spaces that enhance spatial quality. To achieve this, the ground floors will be designated for public use, including duplex flats and spaces for social and commercial activities. The upper-floor apartments, primarily three- and four-room units, are designed to meet current household needs while allowing flexibility for future adjustments.

A primary emphasis of the research has been on achieving flexibility through innovative construction techniques. The steel structure enables long spans, dry perimeter walls, excellent insulation, and includes an internal air gap that serves as a widespread channel for allocating building equipment systems. This design provides maximum flexibility in housing design and allows for potential modifications over time. Additionally, the design research has explored various themes, including the fundamental role of public space in urban settings, the project's civic responsibility in addressing specific contextual vulnerabilities, the architectural and symbolic aspects of public residential buildings, the evolving needs of contemporary living, and the technical choices that define the building's character.


RE-DWELL
MSCA-ITN
Sustainable living, affordable homes:
Meeting the challenge together
Final conference
Barcelona, 16-17 May 2024
San Valentino public housing estate in Terni - Italy
Experimenting with urban and architectural regeneration
Lepratto, Guidarini, Miglierina
Politecnico di Milano
fabio.lepratto@polimi.it
View A - The New Access to the Neighbourhood
View B - The Public Space for the City
The Urban Context
Photos of the current situation
Axonometric View - The neighbourhood as it looks today
Axonometric View - The neighbourhood after the completion of the project (expected 2026)
The Design Approach - Rethinking the Existing City
Urban Design Strategy - A New Morphology
Cross Section
Open spaces - Climate Responsive Design Actions
Flexible, Accessible and Adequate Housing
Flor Plan Flexibility
Dwelling Typologies - Linear Building
Dwelling Typologies - Compact Building
View C - The Community Playground
View D - The Shared Distribution Gallery
Second Floor Plan
PROJECT TEAM
This project has received funding from the European Union's Horizon 2020 research
and innovation programme under the Marie Skłodowska-Curie grant agreement No 956082

An experiment for affordable design

Farishtay Zaidi, Zohaib Zuby

Indu Valley School of Art and Architecture – IVSAA
India

The rapid urbanization of today's world has exacerbated socio-economic disparities, particularly in the Global South. In Karachi, a single wealthy individual occupies the same amount of space as forty-nine poor people. Affordable housing is a critical urban challenge in Pakistan, where the country faces an annual deficit of at least 700,000 houses. The state's complacency, combined with urban planning skewed in favour of the affluent, has led to a severe crisis, with informal settlements often seen as a substitute for affordable housing.

Designing a decent house is just one aspect of addressing the affordable housing crisis in megacities. The shortage is due to a lack of government-leased land, inadequate urban planning policies, and insufficient funding, loan, and mortgage services tailored to the needs of the urban poor. To confront this pressing issue, an integrated approach is essential. The first step is to implement demand-driven finance strategies, while the second involves designing housing units that address deficiencies in infrastructure and community spaces. If a housing unit design can address these two issues simultaneously, it may help mitigate the severe shortage of low-cost housing.

Our research focuses on affordable housing as a social system and is centred around two projects we have worked on over the past few years: Fozia's House and Wallah's House. These projects experiment with affordable housing solutions for Karachi's lower-income communities, who live in slums and lack access to basic amenities. Given the contextual challenges, unique financing mechanisms were developed for each project. In a Muslim-majority society where Zakat, the religious obligation to provide charitable donations to lower-income households, plays a significant role, Fozia's House was funded entirely through this form of charitable giving. However, this approach created a notable issue: since the house was provided "for free," the occupants felt unable to express their concerns or contribute their vision for the project, which undermined the participatory design process that was initially intended. For the construction of Wallah's House, co-financing was employed, leveraging the fact that the inhabitants already owned the land. This approach proved more effective, as it empowered the dwellers and ensured their participation throughout the process.

Observing how different financial strategies influenced the design evolution of both projects offered valuable insights, particularly in terms of prioritising the needs and preferences of the dwellers. Vernacular design principles were also incorporated to ensure that the architectural solutions were appropriately adapted to the socio-cultural and climatic context. As a result, both projects can serve as precedents, providing important lessons for developing affordable housing for the urban poor in Pakistan and other regions facing similar challenges.

personal communication, August 8, 2019

RE-DWELL MSCA-ITN

Sustainable living, affordable homes: Meeting the challenge together

Final conference Barcelona, 16-17 May 2024

An Experiment for Affordable Design

Farishtay Zaidi - Zohaib Zuby
Indus Valley School of Art and Architecture - IVSAA
farishtay.zaidi121@gmail.com

The rapid urbanization of today's world has led to immense socio-economic disparity, especially in the Global South. In Karachi one rich person occupies the same amount of space as 49 poor people. Lack of affordable housing is one of the most prevalent urban challenges in Pakistan as the country faces a deficit of at least 700,000 houses annually. The complacency of the state coupled with urban planning skewed in the favor of the affluent has led to a severe crisis where informal settlements are seen as a substitute for affordable housing.

The truth is that a design of a decent house is only one component in the battle for affordable housing in megacities. Lack of leased land by the government and urban planning policies coupled with inadequate funding/loan/mortgage services commensurate with the specific needs of the urban poor; all contribute to the crisis. Thus, in order to take on this challenge an integrated approach is mandatory. The first effort has to be at using demand-driven finance strategies and the second step is to set quests for the design of the housing unit to offer solutions for lack in infrastructure and community spaces which the context is thoroughly deprived of. If a housing unit design can tackle these two separate issues simultaneously, there is a possibility that some solutions can be found to the severe lack of low-cost housing.

Our research focuses on affordable housing as a social system and is centered around two projects that we have worked on over the last few years. Fozia's House and Wallah's House are an experiment in affordable housing for the lower-income strata of Karachi. These marginalized communities reside in slums that are embedded in the urban fabric of the city and lack access to basic amenities like efficiently designed structures. Considering the contextual challenges, unique financing mechanisms were created for both projects. In the context of a Muslim majority society, the religious obligation to make donations in the form of Zakat to lower-income households has untapped potential. For Fozia's house this became the sole funding method. However, one problem associated with that was the incapacity of Fozia to voice her concerns and vision of the project. Since she was getting "something for free" she felt unable to confidently question the design decisions. This became a serious barrier to build the participatory design process model which was the original intention of the project. For Wallah's House we explored co-financing as a strategy as Wallah already owned the land where her house was built. This proved to be a lot more effective as we realised that it empowers the user and ensures participation in the whole process. Since adopting a user centric approach was at the center of both the projects, it was interesting to see how adopting different financial strategies affected how the design evolved with time Consequently, both projects can be seen as precedents rendering critical lessons for building for the urban poor in Pakistan and other regions facing similar problems.

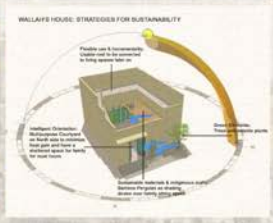
A "diori" (threshold) was made between the street and the house to accommodate communal activities such as meeting with guests or a play area for children

The outlook is purposefully kept simple, respecting the surroundings. During summer, the roof can be easily utilized as an open sleeping space.

FOZIA'S HOUSE

The final design took the shape of a vernacular organization with a "sehen" (courtayrd) in the center to ease the flow of light and air in the structure which is otherwise lacking in houses in the context. The house was finished in lime plaster and bamboo screens. Therefore, from the passive ventilation strategies to the materials, everything was aptly influenced by the socio-cultural and climatic context.

WALLAH'S HOUSE



The design features a courtyard that serves as a threshold between public and private spaces while fulfilling the need for a communal space. Part of the courtyard is shaded with bamboo posts that are easily available in the city. The huge fenestration keeps the indoor spaces well-lit and ventilated. The structure allows the family to build incrementally in the future if they want to.

FOR AFFORDABLE DESIGN

AN EXPERIMENT

RE-DWELL
MSCA-ITN

www.re-dwell.eu