NATIONAL ENGINEERING POLICY CENTRE

Royal Academy of Engineering

Overview: Sustainable living places – a systems perspective on planning, housing and infrastructure

Introduction – Why a systems perspective?

The current housing crisis indicates an opportunity for change in both the quality of places and the scale of housing delivery. The complexity of the housing problem demands a systemic approach, because solutions targeting one aspect of the system may influence other parts. Approaches that focus on one part of the system in isolation may deliver some objectives yet may also result in unintended consequences.

It is important to understand how different parts of the system are interconnected and how they might interact together to achieve the goal of sustainable living places, for which a systemic perspective of the system is required. A systems approach can be valuable in identifying where certain activities could influence the system as a whole.

Little has been done to join up the diverse perspectives of the actors involved in the system to develop a systemic understanding. Working with different stakeholders requires an approach that can draw out pluralistic perspectives and use these to develop a shared understanding. This is a first step towards delivering sustainable living places that are happy, healthy, low-carbon and fit for the future.

Background

This project was delivered in partnership with the Infrastructure Projects Authority (IPA), recognising the need for a systemic perspective on the current system of housing, planning and infrastructure delivery in the UK. The full report is available here.

Definition

The 43 partners to the National Engineering Policy Centre (NEPC) convened and prioritised 'sustainable living places' (SLP) as an issue of importance, requiring a systems approach. SLP is defined as follows:

- '**Sustainable**' includes a low-carbon agenda across all infrastructure (water, electricity, transport), goods and services, and the built environment. This acknowledges that there is a legal and political commitment in the UK to be 'net-zero' by 2050.
- '**Living**' is inclusive of different aspects of life (such as domestic, professional, leisure). This must reflect needs at each stage of life, and take into account trends in ageing populations, political economy, productivity, employment and technology.
- '**Places**' expands the focus from simply building homes to cultivating places. This includes the physical, cultural and social identities that define an area and support its ongoing evolution.

Stakeholders who contributed to the mapping

- National Infrastructure Commission
- Cabinet Office
- Department for Transport
- Bartlett School of Planning and Architecture
- Institution of Civil Engineers
- Institution of Mechanical Engineers
- Ministry of Housing, Communities and Local Government
- Homes England
- WSP
- UK Collaboratorium for Research on Infrastructure in Cities (UKCRIC)
- Royal Institution of Chartered Surveyors
- Royal Town Planning Institute
- The Academy of Urbanism
- BRE
- University of Bristol
- Institution of Engineering and Technology
- Berkeley Group
- m-labs
- Centre for Ageing Better
- Fusion21
- L& Q Group
- Laing O'Rourke
- Gascoyne Estates

Target audience includes:

- Practitioners with an interest in testing applications of systems approaches in the delivery of sustainable living places.
- Policymakers in government working on housing or systems connected to housing
- Professional engineering institutions and infrastructure stakeholders interested in exploring an application of a systems approach.

Objectives

The project objectives were developed by a wide range of experts involved in consultation and guided by a working group comprising 10 experts from the fields of systems thinking, infrastructure and the built environment, in dialogue with the IPA. This was an iterative consultation process that convened monthly to review progress, findings and share feedback.

Project objectives included the following:

1. **To derive a system map** drawing upon perspectives and expertise shared by a diverse group of stakeholders.
2. **To capture the process** and method of mapping the system dynamics.
3. **To identify leverage points*** in the system for creating SLP in the UK.
4. **To identify lessons learned** from applying the approach to this policy challenge.

*Leverage points draw attention to areas in the system where interventions would strongly influence different aspects of the system. These are starting points for exploring where interventions might have greatest impact, and also where unintended benefits and consequences could result.

Outputs from the study and description of leverage points

The study developed a map and captured the process of applying a systems approach informed by perspectives of multiple stakeholders from planning, placemaking, design, infrastructure, housing associations, developers, landowners, community organisations and resident groups.

1. The system map has five key regions and illustrates leverage points, which are high-level intervention points such as goals and values, vicious cycles or aspects that are highly connected to different areas within the system.

2. The map of system dynamics highlights tensions, or paradoxes, within the system such as centralised decision-making about the planning system at a national level versus the mandate to deliver housing and public services at local authority level.

3. The map illustrates multi-level relationships in which the local perspective is a sub-system of the national perspective. The role of central government is to generate coherent national policy and the role of local government is to act on that policy in a manner that reflects and respects the local needs. The map also shows causal relationships between different behaviours and leverage points in the system. The map helped to identify several potential opportunities for improvement.

Findings

The study identified the following leverage points:

i. **Encouraging the development of a sustainability agenda around the target for net-zero greenhouse gas (GHG) emissions** to catalyse a coherent cross-government plan for housing, infrastructure and placemaking. This agenda would call for better integration between national and local planning policies for delivering places. At a local level, this would mean development frameworks and local plans are aligned with this national sustainability agenda.

ii. **Facilitating support for local planning and better masterplanning** that promotes:
1. The creation of mechanisms that enable planning across local authority boundaries; and
2. Efforts to level up by addressing regional disparities in productivity and access to social infrastructure.

iii. **Providing a flexible funding model to enable holistic business cases for place** that can be administered nationally or locally. Holistic business cases for place would account for factors that enable high-quality developments, meet demands for public services and actively engage residents in delivering places.

iv. **Providing technical and financial support to planners in local authorities to address internal barriers to delivery.** This includes resources for increasing numbers of, and providing technical and administrative capacity for, existing staff.

v. **Harnessing the power of data sharing to promote access to information about the planning process.** This would include platforms for digital collaboration that can:
1. Enable meaningful collaboration and communicate the value of high-quality development to existing communities; and
2. Empower those who are unable to access the planning process. As a leverage point, data-sharing could have a positive effect on collaboration and trust but could also have a negative effect.

Strengths of a systems approach

There are many ways (techniques, models, tools) of applying systems approaches. The choice of approach should start with a consideration of the needs or purpose being addressed and the nature of the problem (what is known, what is not, the diversity of perspectives and therefore the potential need for participatory approaches to map the system). However, lessons from this work may have broader application to other complex policy problems. This section presents some strengths and challenges that emerged in relation to the approach adopted for this project.

A guided process for identifying enablers and inhibitors: A core strength of the approach is the guided process for thinking through the system's enablers and inhibitors with stakeholders. Stakeholders who would not usually interact shared how they perceive and interact with the system (as integral elements of the system) through this process. This diversity in the group provides a deep and well rounded analysis of enablers and how factors such as attitudes, relationships and institutions relate to them.

Develop an understanding of the system: The strength of a participatory systems approach is the engagement and interaction with stakeholders across the system that takes place during the process. This interaction generates a common language for working across different sectors, disciplines, and industries.

Stakeholders play a critical role in contributing to a shared understanding of a complex system in which they play a part. This shared perspective can help to inform an approach to the design and evaluation of solutions and potentially contribute to building stakeholder buy-in.

Complements sector-specific expertise: The creation of a system-level view complements and contextualises input from subject experts tackling this issue from a sectoral perspective. For example, stakeholders involved in planning who interact with those from transport infrastructure can contribute to collaborative cross-sectoral work. This can be a useful starting point for creating shared visions and ensuring better coordination of infrastructure delivery.

Informs a discussion about unintended consequences: A systems approach can inform a discussion around how interventions in the system can cause unintended consequences. The identification of system dynamics shows where changes will influence other parts of the system. For example, improving access to information on the planning process can influence how residents navigate it. There may be unintended consequences if information is misused or misinterpreted or if there are disparities between those residents who have access to information and those who do not. The process of identifying system dynamics can inform creative thinking and a wider discussion about potential unintended consequences.

Illustrates complex and engrained behaviours: A systems approach illustrates system complexity and where certain behaviours may be endemic. For example, the ways in which residents resist new development are influenced by their own experience of participating in the system and, potentially, a preconception that these plans will not address their needs. The plans may be inadequate, fail to address the developers' participation in the system and/or maximise sustainability within the plan. Improving access to information about the process for participation in local planning through data-sharing can influence the level of trust between community organisations, residents and local authorities, and help develop a better understanding of these embedded behaviours. An approach that maximises sustainability might meet less resistance.

Enables identification of potential leverage points: Each of the leverage points in this study come from identifying causal loops in the map and connections between regions in the map. These emerged from a synthesis of perspectives from stakeholders who engage with the system for housing and infrastructure at different stages of the process. A systems approach reveals understanding of where an action can influence different parts of the system. The systems approach opens opportunities for continued engagement with stakeholders as the findings emerge, which are then refined through iterative review and validation. As leverage points are identified, this potentially means a clearer understanding of the areas where intervening in the system is likely to have strong influence.

The document draws extensively from the final report *Sustainable Living Places – a systems perspective on planning, housing and infrastructure* that was released July 2020.

The full report is available **here**.

If you have questions, comments and/or want to get involved, please direct enquiries to **nepc@raeng.org.uk**

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NATIONAL
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