

Housing Digital Built Britain Network

What is the potential for greater digital innovation in the housing sector?

CCHPR

- The Cambridge Centre for Housing and Planning Research (CCHPR) is a research centre within the University of Cambridge, with over 25 years' experience of research in policy evaluation and analysis, and expertise in housing, poverty and welfare reforms.
- Department of Land Economy at the University of Cambridge.
- Since its inception, the Centre has attracted over £12m in external research grants, carrying out over 150 research projects for a variety of sponsors.

CDBB

- The Centre for Digital Built Britain is a partnership between the Department of Business, Energy & Industrial Strategy and the University of Cambridge.
- Deliver a smart digital economy for infrastructure and construction for the future and transform the UK construction industry's approach to the way we plan, build, maintain and use our social and economic infrastructure.
- These networks will work towards forming the agenda for future research in support of a digital built Britain.

Housing network

- Housing sits at the heart of many wider social issues, and it will sit at the heart of the development of a Digital Built Britain (DBB).
- Delivering DBB is not simply about technological solutions to make supply and maintenance more efficient, although this is important, it is also about understanding how those solutions and efficiency gains interact with wider social policy issues to address UK housing inequalities.

Aims

1. Facilitate dialogue between key stakeholders in relation to the construction, management, servicing and lived experience of housing in the development of DBB;
2. To determine the key questions that should be the priority for investigation;
3. To scope out the existing literature in relation to these questions;
4. To identify the gaps in knowledge and gaps in capabilities;
5. To use this evidence base to scope out a research programme to meet the needs of UK plc in delivering affordable, sustainable and inclusive housing in a DBB.

Outputs

- A network of stakeholders interested in housing and DBB
- Scoping report from workshop 1
- Four position papers on priority topics
- Interim report
- DBB Housing Framework Paper final report
- Proposals for research:
 1. Planning and digital innovation
 2. Off-site housing
 3. Housing an ageing population

Transforming Construction Alliance

- £72 million government funding to drive innovation and boost UK construction productivity
- A new national Core Innovation Hub
- MTC (Manufacturing Technology Centre), BRE (Building Research Establishment) and the CDBB (University of Cambridge Centre for Digital Built Britain)
- The TCA aims to be a catalyst for transforming the UK construction sector through manufacturing technologies and digital ways of working – boosting productivity, exports and asset performance to benefit society.
- https://www.cdbb.cam.ac.uk/news/2018NovPR_TCA_CIH

Today's seminar

- What is the potential for greater digital innovation in the housing sector?
- Can it support better planning, housing delivery and management?
- What are the opportunities?
- What are the constraints on innovation and change?

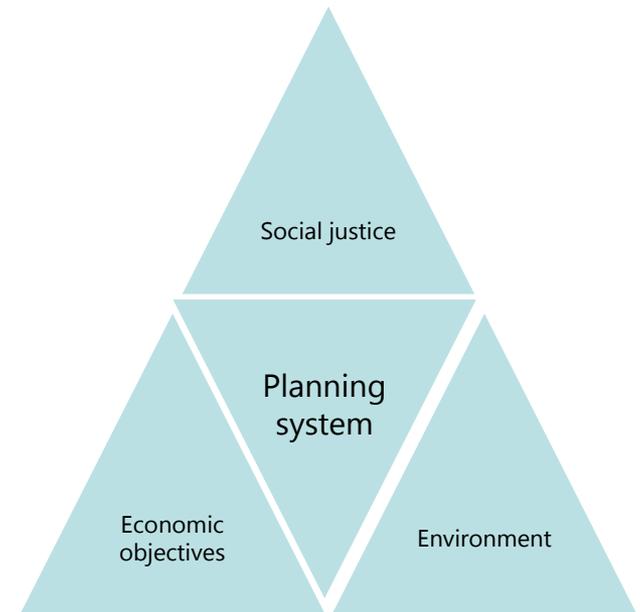
How could better use of data and digital technologies improve housing delivery through the UK planning system?

Overview of the UK planning system

- Planning objectives: Campbell's (1996) triangle
- A "plan-led" system
- Different actors, levels, a multi-scalar regulatory framework



- Local Planning Authorities elaborate Local Plans, compliance with NPPF
- Planning application: developers/landowners apply for planning permission on a specific project

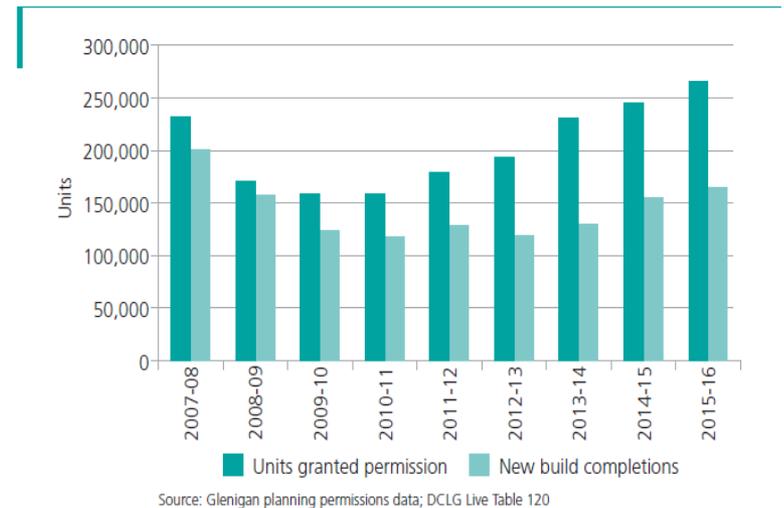


Planning for housing

- Planning plays a key role in housing delivery
- LPAs are in charge of:
 1. Identifying land available
 2. Assessing the number of homes needed using local data and housing need assessment
 3. Deciding upon type, tenure and affordability
 4. Granting permission for residential developments
 5. Monitoring progress in building out sites

Planning for housing

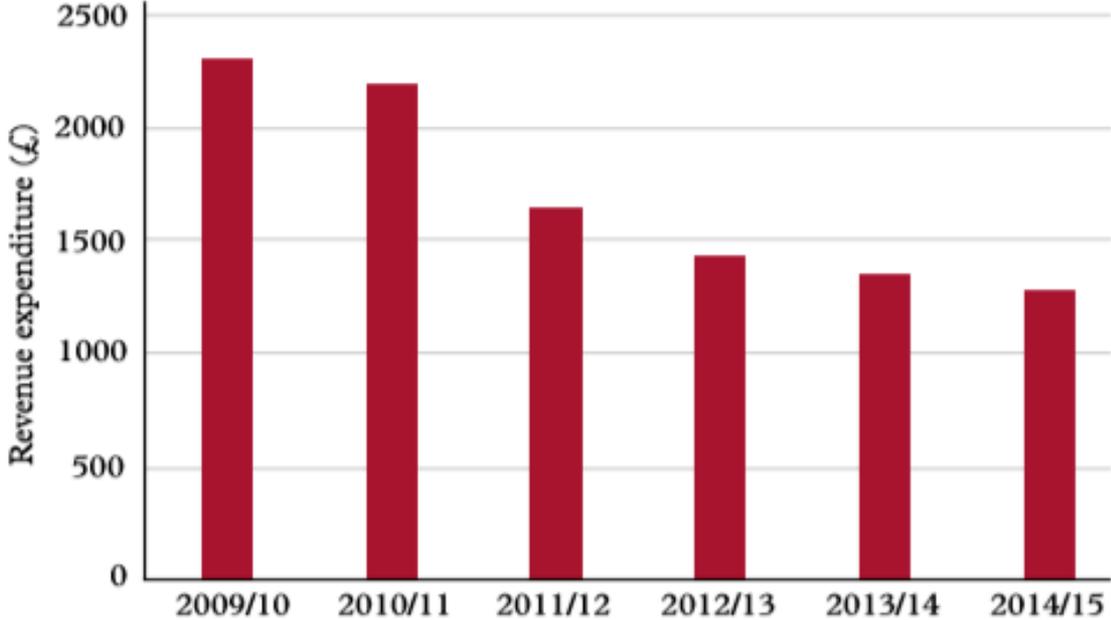
- Housing crisis: complex to identify the responsibility of the planning system
- 40% of LPA do not have a plan capable of meeting their housing needs
- 70% of LPA say they rely substantially on the planning system to deliver affordable housing required in the area (TCPA, 2018)



Planning criticism: slow, complex, costly and un-transparent?

- Lack of up-to-date plans
- Onerous process: £100,000 for an evidence base study, costs of appeals and budget cuts for LPAs
- 9 months to produce an evidence base, 4-7 hours to process a planning application
- Over-production of documents
- Lack of transparency

LPA expenditure on planning and development services 2009-2015



Source: House of Lords Select Committee on Economic Affairs, "Building more homes" report (2016)

Digitisation of the planning system

- To what extent is the current planning system digitised? How could it be improved, and what are the potential benefits?
- Only basic digital tools are in place, such as the Planning Portal (2002) e-submission, now 90% of applications
- But not a fully digitised process:
 1. person-centric process
 2. ill-suited for sharing
 3. no aggregation of data
 4. no coordination between different actors

Expected benefits of the digitisation of the planning system

- The use of digital tools can improve **transparency, efficiency** and allow **cost and time savings**
- Benefits are expected at every stage of the planning process

Site search and appraisal	Plan monitoring	Public consultation
<ul style="list-style-type: none">• Integrate data in single platforms• Coordinate stakeholders	<ul style="list-style-type: none">• Allow more accurate assessment of outcomes• Make data more accessible	<ul style="list-style-type: none">• Digital platforms can encourage community involvement• Make planning information more visual and accessible

Case study- examples of existing innovation

- Evidence making process, site search and appraisal: ***Land Insight***



- Compiles and aggregate data on a variety of topics
- Automatically identifies land available and specific needs
- Allows developers to assess likelihood of planning permission



Reduces asymmetry of **information**, allows **time** and **costs** savings for site search and appraisal



Land Ownership

Measure Save as site

Address(es)

CLOCK HOUSE
1
2
IMPERIAL STREET
LONDON
GREATER LONDON
E3 3EA

[View All Title Addresses](#) >

Freeholder(s)

[Plot Bromley-By-Bow Llp](#) >

Map Legend

Known Freeholders ⓘ

- Company
- Corporate Body
- Local/county authority
- Housing Association

Planning Search Help X

Search Search History Alerts

eg. Residential or B1 or 2016/0126/PA Search

Search Results Create Alert

Showing 25 of 11401 results

Add first 25 results to sites Choose a stage... Add

Installation of a public call box with solar panels
21/02/17 *Application rejected* PA/17/00514/NC

A.) New gates in security fence (but no crossover) to give emergency access to yard at corner of Grey Eagle Street and Co...
07/08/97 *Application granted* PA/97/00605

Residential 1 Dwelling

Proposed works are to renovate the flat : 1- To install a new kitchen (within existing kitchen room). To include a new ...
15/03/11 *Application granted* PA/11/00631/NC

15 Dwellings

Erection of four storey building comprising 15 flats.
30/06/97 *Application rejected* PA/97/00134

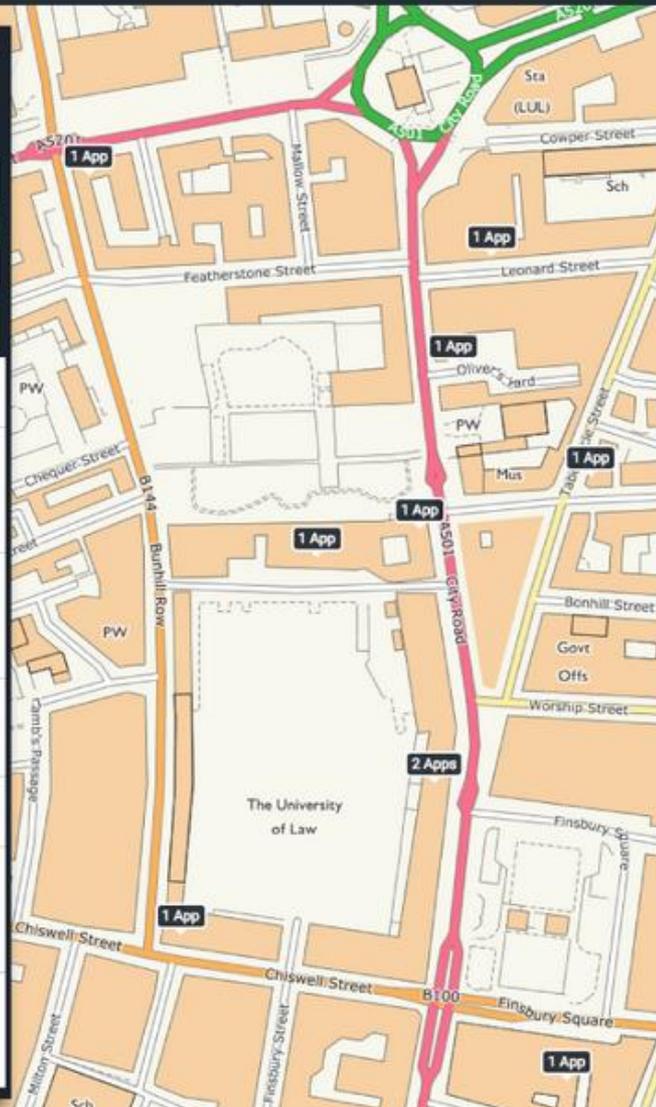
Continued use of third floor as offices on a permanent basis.
20/07/98 *Application granted* PA/98/00912

Demolition

Demolition and redevelopment to provide 45,056 sq.metres of floorspace for use as (i) a financial futures and options ex...
30/04/97 *Application granted* PA/97/00115

9 Dwellings

RETENTION OF INTERNAL AND EXTERNAL ALTERATIONS IN CONNECTION WITH CONVERSION AND CHANGE OF USE OF THE BUILDING TO PROVID...



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Concluding remarks

- There is still room for improvement in the digitisation of the planning system
- However, digitisation might face constraints, challenges and risks



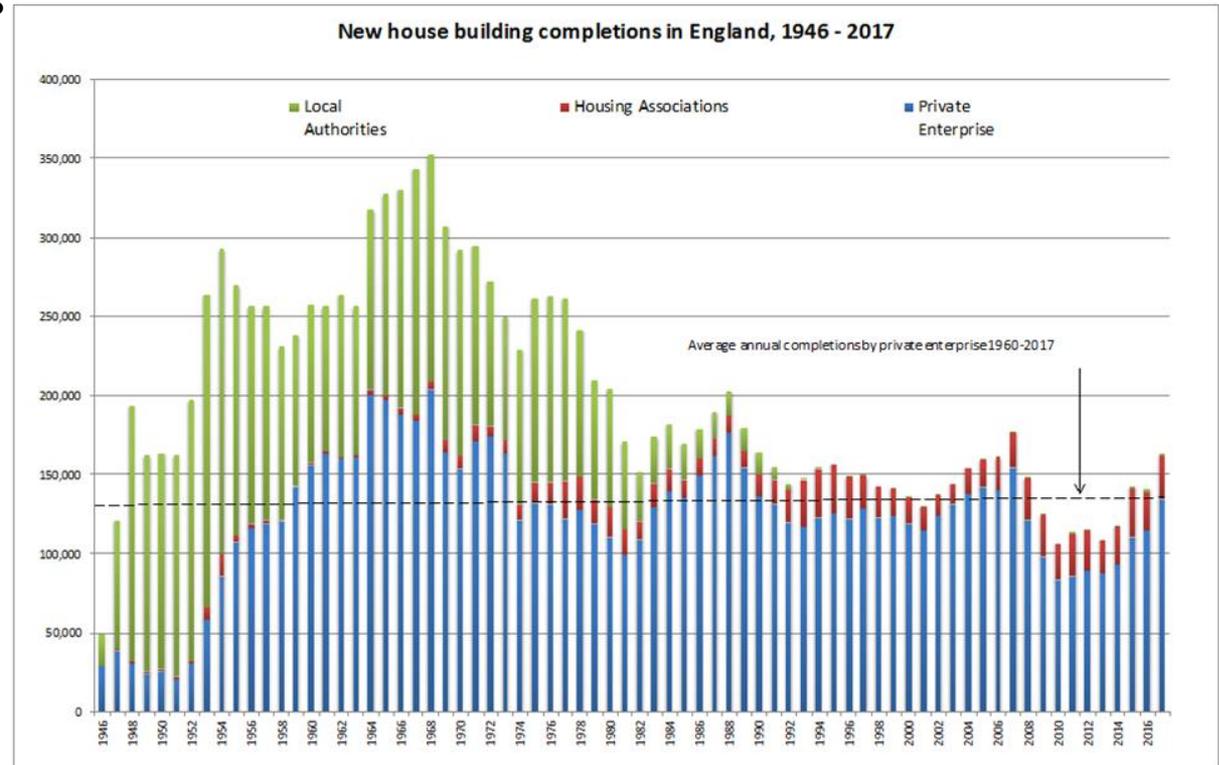
Speakers

- Future Cities Catapult – Nissa Shahid
- Plymouth City Council – Tom Lowry

What is the role of off-site housing manufacture in a digital built Britain?

UK housing crisis

- Lack of supply
- Few house builders
- Lack of innovation



Off-site housing construction

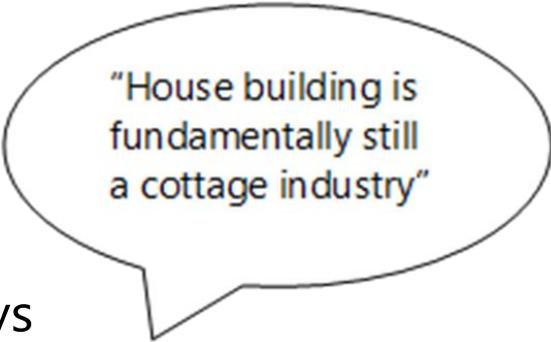
- Digitisation and off-site manufacturing might offer solutions.
- Government presumption in favour of off-site manufacturing.
- Includes:
 - Volumetric construction - three-dimensional units which are fully fitted out off-site;
 - Pods - used in conjunction with another construction method e.g. bathroom or kitchen pods;
 - Panelised systems - panels with timber or light steel framing, structural insulated panels or cross-laminated timber;
 - Sub-assemblies and components - larger components incorporated into new homes, including roof and floor cassettes, prefabricated chimneys, porches and dormers, and I-beams.

Potential benefits?

- Faster build programme
- Fewer defects
- Address the skills shortage
- Cost advantages from economies of scale
- Improved health and safety
- Reduced disruption to the local community

Opportunities and constraints

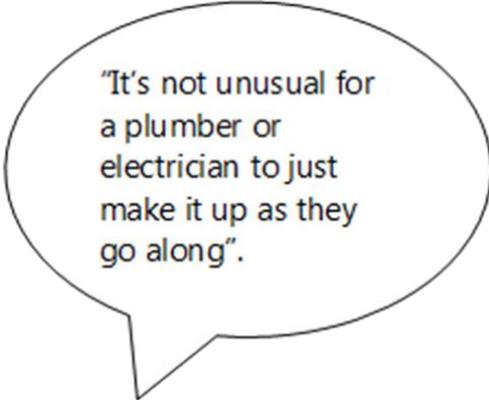
- New entrants into the market – but early days
- Public attitudes
- Cost is a barrier to uptake
- Build cost is only proportion of costs
- Current house builder business models
- Land supply, the planning system, NIMBY-ism
- Reduce incentives to invest in innovation



“House building is fundamentally still a cottage industry”



“The technology is there, but it is the investment of time that is the problem.”



“It’s not unusual for a plumber or electrician to just make it up as they go along”.

Gaps in knowledge

- Lessons from history – the post-war pre-fabs
- What do we mean by off-site housing manufacture?
- What are key issues in the housing market and housing supply chain that off-site housing manufacture and digitisation might be expected to address?
- What is the nature and scale of the current provision of off-site housing manufacture?
- What is the evidence of the outcomes of such housing to date?
- What are the non-digital issues that need to be considered in the development of the off-site housing sector?
- Why has take-up of off-site housing been greater in other countries?
- What are the demand side factors that will shape what housing meets peoples' needs into the future?

Speaker

- Ilke Homes – Craig Liddell

How will the UK govern, maintain and manage housing stock in a Digital Built Britain?

UK housing stock

- Of the 23.5 million homes in England, 62% are owner-occupied, 20% privately rented and 17% socially rented
- The private-rented sector (PRS) has expanded significantly
- Only 24% of the stock was built after 1980
- Age disparities affect housing quality, security and energy efficiency
- This raises management and maintenance issues
- A third of homes in the PRS have been considered non-decent (DCLG, 2017).

Defining the terms

Housing governance

- Allocation policies
- Rules of property ownership and tenancy
- Goals, standards, set of regulations

Housing management

- Technical activities of servicing or repairing the stock
- Ensure equipment and components meet regulatory standards
- Coined as “Facilities Management” (FM)

Why is this important?

- A large scale issue for 28.7 million UK households
- Impact on safety
- Across the UK, 470 buildings are using the aluminium cladding responsible for the Grenfell fire
- Impacts health and well-being: 15 million people in the UK live in poor housing
- Cost : poor housing conditions are the source of 70% of NHS costs (NHBC, 2018)
- Affects energy-efficiency

How is the UK housing stock governed and maintained?

	PRIVATE RENTED SECTOR	SOCIAL RENTED SECTOR	OWNER-OCCUPIED STOCK
Governance	<p>Majority of single landlords (70% of landlords in the UK have only one property to let)</p> <p>No centralised list of landlords in England</p> <p>Stock is managed either directly by the landlord, or by letting agent (2/5 of lettings)</p>	<p>Split between Housing Association (59%) and Local Authorities (41%)</p> <p>All social housing providers are regulated by Economic Regulation Standards and Consumer Regulation Standards</p> <p>Housing Associations set rent and lease types.</p>	<p>Difference between freehold and leasehold</p> <p>No data on owner self-management</p>
Maintenance	<p>Quality and safety are a major issue in the PRS stock, but no enforcement measures for unregistered landlords</p>	<p>Home regulation standards set by RSH</p> <p>Many Housing Associations have their own property-maintenance arms</p>	<p>Leaseholders must pay maintenance fees/ Freeholders are responsible for maintaining the stock</p> <p>No data on self-maintenance costs</p>

Challenges in governance and maintenance

Lack of regulation	Lack of incentives	Lack of means and technology
<p>Grenfell tragedy and Hackitt report (2018)</p> <p>1- No clarity on roles and responsibility for safety issues</p> <p>2- Inadequate regulatory oversight and enforcement tools</p> <p>3- Fragmentation between stakeholders of the contracting chain</p> <p>4- Lack of transparency at all stage of the building life-cycle</p>	<p>1- Environmental sustainability: landlords are not incentivised to improve the energy-efficiency of their dwelling</p> <p>2- Landlords also lack incentives to improve housing quality, health and safety-related issues</p> <p>3- No clear delimitation of their rights, duties and responsibilities</p>	<p>1- Need for a better understanding of the opportunities and barriers for the uptake of digital tools</p>

Data and digital governance in housing

- Data are already collected
 - Energy efficiency measurement such as smart meters
 - Safety issues and the Internet of Things in the connected home: sensors, security cameras, alarm systems, smart locks...
 - In the construction industry with the Building Control Data which ensures legislation and regulation are respected
- Digital governance is already used: Building Information Modelling (BIM)
 - BIM is an « intelligent 3D model-based process that gives architecture, engineering and construction (AEC) professionals the insights and tools to more efficiently plan, design, construct and manage buildings and infrastructure” Autodesk, 2018
 - BIM finds application throughout the building life-cycle, from the construction industry to the facilities management process.
 - Services for tenants are also increasingly digitalised to improve management and maintenance services (customer-led transaction online, platforms for queries, implementation of sensors which would notify repair company directly etc)

Digital Facilities Management (DFM)

- Facilities management are becoming increasingly digitalised (security, cleaning, maintenance, management etc)
- Using data extracted by BIM technology, now easier to:
 - automatically generate inspection plans
 - digital life-cycle scenarios
 - transform management capabilities
 - reduce costs involved in managing the asset
 - share better-informed data with different stakeholders involved in order to reduce costs and risks.

Digital Facilities Management (DFM)

- Expected benefits:
 - Improved space management
 - Streamlined maintenance
 - Efficient use of energy
 - Economical retrofits and renovations
 - Enhanced lifecycle management

Benefits e.g. digital records

- Example of digital records which gathers digital information on every component in a building
- A “golden thread of building information” (Hackitt review, 2018)
- All safety-related information is gathered throughout the building life cycle
- It would address the fragmentation of stakeholder’s activities and responsibilities, as well as the burden of excessive documentation
- Might help to save 5% in the construction cost of new build (Hackitt review)

Gaps in knowledge

- A cost benefit analysis of the use of digital tools
- Research on "human barriers"
- The inequality of access to digital tools
- Research on the challenge of retrofit
- Issues of data ethics, privacy and security of access
- Governance challenges and attribution of responsibility

Speaker

- Chimni – Nigel Walley

Questions and discussion

- Questions for speakers?
- What is the potential for greater digital innovation in the housing sector?
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