



A neighbourhood approach to digital inclusion of older people: trialling Behavioural Systems Mapping in five communities.

Annex

About the research

A neighbourhood approach to digital inclusion of older people: trialling Behavioural Systems Mapping in five communities was a project undertaken to explore how Behavioural Systems Mapping (BSM) can help councils and community partners design more effective, place-based strategies to improve digital inclusion for older people (aged 60+).

Older adults remain one of the UK's most digitally excluded groups, facing barriers such as low confidence, limited skills, accessibility challenges and lack of trust in technology. The project aimed to understand how BSM can be used to help teams create strategies and interventions that are better designed to overcome the systemic barriers to digital inclusion that older people in the UK currently face.

The funding and partnership

This project was funded by the Department for Science, Innovation and Technology Digital Inclusion Innovation Fund.

The partnership consisted of DG Cities, the Royal Borough of Greenwich, Haringey Council, Ealing Council, Leicester City Council, and North East Lincolnshire Council, with expert support from Dr Elise Crayton, Dr Lucy Porter, Dr Vivi Antonopoulou, Dr Ayse Allison on behalf of the Centre for Behaviour Change University College London.



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Annex A1: BSM Methodology

Workshop Structure

Four workshops were conducted across five neighbourhoods: Horn Park (Royal Borough of Greenwich), Havelock Estate (London Borough of Ealing), Noel Park and West Green (London Borough of Haringey), Eyres Monsell and Gilmorton Estates (Leicester), and Waltham (North East Lincolnshire). The structure of the workshop series is outlined below:

Table A1: Workshop structure

	Workshop 1: Objectives, Boundaries and Actors	Workshop 2: Behaviours and Connections	Workshop 3: Drivers	Workshop 4: From Leverage Points to Interventions
Date	November 2025	January 2026	January - February 2026	February 2026
Format	Online / Miro-based	In-person at/near to the neighbourhood	In-person at/near to the neighbourhood	Online / Miro-based
Attendance	Core group	Core group and wider network	Core group and wider network	Core group
Length	2.5 hours	2.5 hours	2.5 hours	2 hours

The workshop series was bracketed by pre-workshop and post-workshop activities and data gathering, as explained below. After each workshop there was also a reflection phase, which involved data synthesis on our end and, in some cases, review and refinement exercises for project partners.

Lessons Learned

Several overarching insights emerged from delivering the workshop series:

- **Mixed preparedness levels and opportunities for contribution limited time in activities:** the distinction between a core team and a wider participant group meant considerable time was required to bring new participants up to speed on the method and work to date. This also limited integration of differing perspectives later in the process. Instead, it may work best to establish a fixed workshop group that represents a range of locally relevant perspectives and that is able to commit to participating in the full workshop series.
- **Optimal workshop size was 4-6 participants:** four to six participants associated with different actors or assets enabled effective mapping. Groups smaller than this risk missing out on the benefits of diverse perspectives while larger groups require an adapted method - otherwise participants may not be able to participate fully.
- **Online and face-to-face formats shape participation:** the workshop format had a noticeable impact on group dynamics. Participants differed in their preferences for which best suited their engagement. These differences were often related to participants' familiarity with digital collaboration tools. We advise assessing in advance whether an online or in-person format is likely

to work best for each group; and to make necessary adjustments to ensure that all participants are equally able to contribute.

- **Stakeholders were under-resourced to input into mid-session reflection activity:** participants often had limited time to complete reflection exercises between workshops. Rather than relying solely on asynchronous reflection tasks, it may be beneficial to schedule short facilitated reflection sessions between workshops to help participants remain engaged with the evolving mapping process.
- **BSM elicited discussion “in the round”, surfacing intervention ideas early, or reviewing earlier map elements later in the process:** A recurring facilitation challenge was ensuring that participants remained focused on the specific mapping step at hand. Discussion often naturally moved ahead to potential solutions before earlier stages of the mapping process were completed. Early solution ideas should not be dismissed as they often become relevant in later stages; however, preparing prompts and facilitation nudges can help steer conversations back to the immediate task while still capturing useful insights.
- **Validation with target groups is key:** where possible, insights generated during the mapping process should be validated with members of the public throughout. While this can be challenging to implement, doing so can significantly strengthen external validity, shaping the mapping process in real time. At a minimum, obtaining early feedback from residents can provide valuable grounding prior to mapping.
- **Stakeholder expectations for the ‘final map’ should be set early:** ensuring participants understand that the Behavioural Systems Map is the product of multiple, differing perspectives and cannot fully represent the complexity of a real-world system supports utilisation. This includes highlighting that the map’s aim should not be unbiasedness or completeness but to meaningfully represent local systems in a way that is interpretable and actionable.

Pre-Workshop Activities

Prior to the first workshop, participating partners completed a Neighbourhood Selection Form and Pre-workshop Survey to establish a shared understanding of the local context and prepare the initial inputs for the BSM process. In combination, these methods established an initial picture of the local digital inclusion system, and informed Workshop 1.

Neighbourhood Selection Form (NSF)

The NSF asked partners to identify the neighbourhood they wished to focus on and provide a suitability rationale for exploring digital inclusion among older people. The NSF ensured that each neighbourhood included a local digital inclusion challenge and an active stakeholder network able to participate in the BSM workshops.

The NSF also collected practical information including the specific digital inclusion challenge, its alignment with priorities outlined in the DSIT Digital Inclusion Action Plan, potential community partners and organisations that could contribute to the workshops, and details of the core project team.

Pre-workshop survey

A pre-workshop survey was distributed to core project team members. The survey captured individual perspectives on the neighbourhood digital inclusion system prior to the start of the workshops.

The survey first explored participants’ perspectives on the neighbourhood, including their personal impressions of the area, features that make it unique, and any local dynamics that might shape how residents connect, engage, or access digital support. This surfaced neighbourhood-specific characteristics

and idiosyncrasies – e.g. the presence of strong community networks, language diversity, shared spaces, or local traditions – that may influence digital inclusion and community engagement.

The survey also asked partners to identify individuals, groups, organisations, or institutions that play a role in shaping digital inclusion outcomes for older residents. To structure this exercise, Actors were collected across several categories:

- Council teams
- Community spaces
- Health or social care providers
- Voluntary or community organisations
- Residents' associations or informal groups
- Local businesses or service providers
- Faith or cultural institutions
- Other relevant actors

Participants were also asked to describe:

- Relationships between actors, including existing collaborations, dependencies, or potential tensions.
- Existing relevant digital inclusion initiatives.
- Existing evaluation of digital inclusion programmes
- Views on how to improve digital inclusion in the target neighbourhood.
- Current understanding of digital inclusion, actors and knowledge of system mapping – as a baseline for evaluation.

Lessons Learned

One lesson from the pre-workshop stage concerned the potential duplication of information requests across the NSF and the pre-workshop survey. This issue largely arose because the NSF was completed prior to the formal start of the project, when partners were at different stages of certainty regarding their chosen neighbourhood and digital inclusion challenge.

Given that participation in the project already required a significant time commitment from partners, future iterations would benefit from ensuring that all information and data requests are clearly aligned and complementary.

Workshop 1: Objectives, Boundaries & Actors

Workshop 1 introduced participants to BSM and established the foundations for the system map. The session consisted of five main components.

Part 1: Workshop Series Overview

The workshop began with introductions and a brief overview of the overall workshop series. Participants shared their roles, areas of expertise, and motivations for taking part. A short overview of the selected neighbourhood was provided which detailed the digital inclusion challenge and key local characteristics, drawing on information gathered through the NSF and the pre-workshop survey.

Part 2: Introduction to Behavioural Systems Mapping

Part 2 introduced the BSM methodology. This included an overview of the three methodological foundations of the approach – behavioural science, systems thinking, and participatory approaches – and how these can support the design of more system-aware interventions.

The key components of a Behavioural Systems Map (Actors, Behaviours, Connections, and Drivers) as well as the Behaviour Change Wheel and the COM-B model were outlined to familiarise participants with key concepts for later activities.

Part 3: Language Adaptation and Accessibility

Before beginning the mapping process, participants were provided with a glossary of key terms. This created space for clarification and ensured that terminology would be accessible for participants and for the wider stakeholder group that would join later workshops.

Two short activities explored how the language and process could be adapted for broader accessibility.

Activity 1a: Making Our Language Accessible

Participants reflected on the terminology used in the workshops and how it might be perceived by community partners and residents.

Guiding questions included:

- “Are there any terms we’re using today that might feel unclear, academic, or confusing to people outside this room?”
- “Are there terms that could be misunderstood or interpreted differently in a community context?”
- “Are there any words or concepts that might trigger worry, distrust, or a negative reaction?”
- “If you were explaining these ideas to a resident or community partner, what phrases or examples would you use?”

Activity 1b: Addressing Accessibility Barriers

Participants also reflected on potential barriers that might affect participation in the mapping process.

Guiding questions included:

- “Are there any accessibility barriers we should consider – things that might make it harder for people to take part fully in this method?”
- “Who might struggle most with this kind of mapping approach, and what makes it challenging for them?”

- “What aspects of the process (e.g. tools, visual layout, pace, group dynamics...) could feel difficult or overwhelming?”
- “What changes would make the method feel more intuitive, inclusive, and comfortable for everyone involved?”

These reflections informed how the following workshops were structured and facilitated.

Part 4: System Exploration

The next stage of the workshop focused on exploring the system objective and defining the boundaries of the system to be mapped.

The system objective establishes the overarching goal that the system map and its resulting interventions seeks to achieve; clarifying this objective helps determine which Actors and Behaviours are relevant to the system. The system boundary delineates what is in and out of scope of the systems map.

Activity 2: Identifying the System Objective

Participants jointly brainstormed ideas for the system objective using the following guiding question and sub questions:

- “What is the overarching goal we’re working toward for digital inclusion of older people in [neighbourhood]?”
 - “What is unique about the digital inclusion challenge in this specific place?”
 - “How does this goal relate to: the needs and experiences of older people, the characteristics of the neighbourhood, the ambitions of the DSIT Digital Inclusion Action Plan?”

Activity 3: Exploring System Boundaries

Participants then reflected on which elements should be included within the system being mapped using the following guiding question and sub-questions:

- “What parts of the system are involved in achieving our objective in [neighbourhood]?”
 - “What must be included in the system for us to understand digital inclusion in [neighbourhood]?”
 - “What elements are connected to the issue, but we’re unsure whether they belong in the system?”
 - “What should we intentionally leave outside the system because it is too broad, too distant, or not actionable?”

Participants explored these questions by sorting potential system elements into three categories using a green-amber-red approach, representing elements clearly inside the system, uncertain elements, and elements outside the system.

Part 5: Mapping Actors

The final and most substantial component of Workshop 1 focused on identifying and mapping the Actors involved in the neighbourhood digital inclusion system.

Actors identified via the pre-workshop survey had already been pre-positioned on the map, grouped according to the categories used in the survey. This provided a starting point for discussion and refinement: participants worked through a series of three activities to review, validate, and position Actors within the system.

Activity 4a: Mapping Actors

Participants reviewed the pre-identified Actors and added any missing Actors using the following guiding question and sub-questions:

- “Who are the key Actors involved in digital inclusion in [neighbourhood]?”
 - “Who are the Actors who directly support or influence digital inclusion?”
 - “Who is indirectly involved or plays a background role?”
 - “Are we missing any Actors identified in the survey?”

Activity 4b: Validating Actors

Participants then reflected on which Actors were most important for achieving the system objective by marking ten of them on the map using the following guiding question:

- “Which ten Actors absolutely need to be in our system map?”
 - “Which Actors are particularly important for our system objective?”
 - “Which Actors are less important for our system objective?”
 - “Which Actors sit outside the system boundaries and should not be included?”

Activity 4c: Positioning Actors

Finally, participants explored relationships between Actors within the system using the following guiding question and sub-questions:

- “How do these Actors relate to one another?”
 - “Who has strong, established connections with others?”
 - “Who acts as a connector between otherwise separate parts of the system?”
 - “Are there Actors who depend on each other for something important?”
 - “Are there tensions, misalignments, or weak links we should note?”

Lessons Learned

There were several important lessons that emerged as a result of Workshop 1:

- **Beginning mapping early may be more beneficial than grounding in behavioural science concepts:** introduction to the method and related behavioural science concepts required more time than anticipated. While familiarisation with the methodology was important, it may be possible to explore concepts through mapping action rather than up-front preparation.
- **Narrow system objectives may be more beneficial:** Stakeholders tended to generate broad system objectives. With the exception of the Ealing trial, most objectives encompassed a wide range of issues, which in turn led to relatively large and complex system maps. Refining the objective more narrowly at an earlier stage may streamline the mapping process and generate more specific sets of Actors and Behaviours.
- **Defining system boundaries was conceptually challenging.** Many participants tended to interpret boundaries in concrete terms (such as geographic limits or specific Actors) rather than thinking about them as a conceptual tool for defining the scope of the system. In future projects, boundary-setting may therefore be more effective as a facilitator-led activity, informed by participant input but carried out between workshops once a clear system objective has been established.
- **Actor review and refinement is key to ensuring a workable map:** later workshops highlighted the importance of reviewing and refining the number of system Actors. Pre-populating the map with Actors sourced from the pre-survey resulted in a rich foundation that became more complex as

workshops progressed. Actor identification during workshops and continued refinement and prioritisation will mitigate this challenge.

- A related insight concerns the importance of prioritising Actors early in the mapping process. Setting aside time within the first workshop for participants to sort Actors into categories (for example central, peripheral, or external to the system) can help both facilitators and participants determine which Actors should remain on the map before moving to later stages such as Behaviour mapping. Crucially, this should be done in tandem with refining the system objective and boundaries.

Reflection Phase 1

Following Workshop 1, a short reflection phase was conducted to consolidate the outputs from the session and prepare the draft system map for Workshop 2.

During this phase, we reviewed and synthesised the insights generated in Workshop 1. This included refining the draft system objective, clarifying the system boundaries, and organising the list of identified Actors by sorting them into three categories:

- Central Actors: Actors inside the system boundary who are key to achieving the system objective
- Peripheral Actors: Actors inside or at the edge of the system boundary who are not central to achieving the objective but may be aligned with it
- External Actors: Actors outside the system boundary who are not central to achieving the objective but may influence the broader digital inclusion landscape of the neighbourhood

This categorisation allowed us to develop a clearer and more focused draft system map while maintaining a record of the full set of Actors identified during the workshop.

We then invited participants to review and validate the system objective, system boundaries, and the three Actor groups. Specifically, we asked them to confirm whether these elements accurately reflect their understanding of the neighbourhood system and its digital inclusion challenge, and to suggest any adjustments where needed.

Workshop 2: Behaviours & Connections

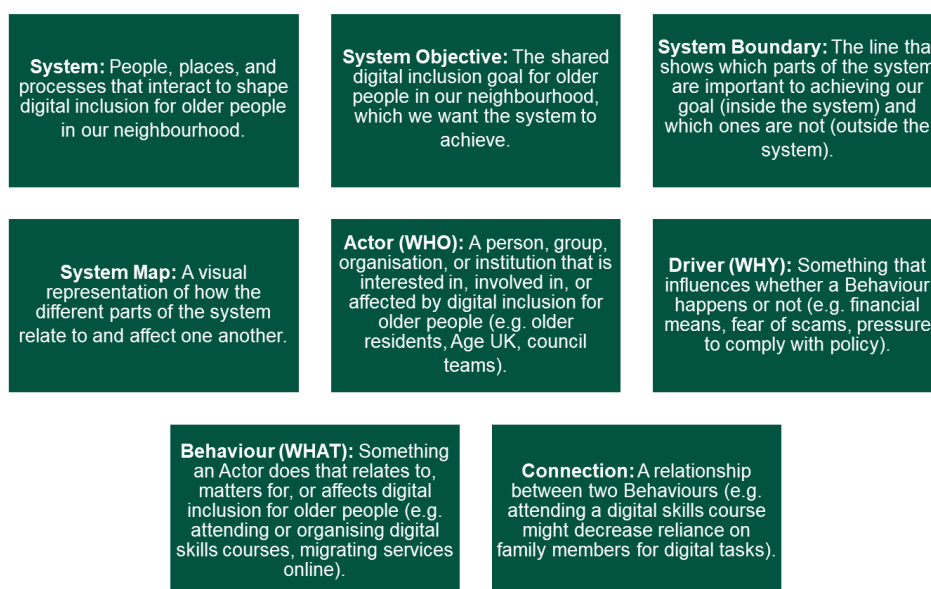
Workshop 2 marked the transition from identifying Actors to mapping their Behaviours within the system. The session took place in person, using activity sheets, pens, and post-it notes to support collaborative mapping exercises.

Part 1: Review of Draft Map

Wider stakeholder participants were invited to join Workshop 2, which began with a review of the project aims, the BSM method, and progress to-date. The system objective was reviewed and the system boundary categories introduced. Participants were informed that the focus would be on central and peripheral Actors, while external Actors were excluded from the mapping activities at this stage.

Participants were then provided with an updated glossary of key terms, which had been refined based on feedback from the accessibility exercises conducted during Workshop 1. The glossary included the following definitions:

Figure A1: Glossary of key BSM terms



Activity sheets were provided that detailed the central and peripheral Actors identified during Reflection Phase 1. The distinction between Behaviours and Drivers was described.

Participants were instructed to think of Behaviours both as actions currently taking place in the system as well as those that should be happening in the context of the overarching digital inclusion goal. They were furthermore encouraged to think of 'chains of Behaviours', meaning that Behaviours could be broken down into smaller steps where appropriate in order to capture greater granularity.

Part 2: Mapping Behaviours

Three main Behaviour mapping activities were conducted. Participants began by exploring Behaviours of the target group – older residents – in relation to digital inclusion via an individual brainstorming exercise on their activity sheets before expanding the discussion to Behaviours involving surrounding organisations and support networks.

Activity 1: Mapping Behaviours of older people

The guiding question and supporting prompts were:

- “What are the things older people in [neighbourhood] do (or don’t do) in relation to digital inclusion?”
 - “In what situations do older people come into contact with digital devices and services in their everyday lives?”
 - “When they need to use something digital in these situations, what do they typically do?”
 - “If something is difficult or doesn’t work, what do they do next or who do they turn to?”

This was followed by a reflection on the Behaviours of central and peripheral Actors in the system; again conducted on individual activity sheets where they were asked to identify, for each specific Actor, Behaviours that help or hinder digital inclusion.

Activity 2: Brainstorming Behaviours of Central Actors

The guiding question and supporting prompts were:

- “What are the things our central Actors do (or don’t do) that affect the digital inclusion of older people in [neighbourhood]?”
 - “In your experience, what does this Actor currently do that helps digital inclusion of older people?”
 - “In your experience, what does this Actor currently do that hinders digital inclusion of older people?”

Participants then reviewed their notes and identified two to three of the most important Behaviours for each Actor. Importance was defined in terms of high impact, frequency, or wide reach within the system. Participants wrote these Behaviours on post-it notes and placed them around pre-labelled Actor post-it notes on the table.

Activity 3: Selecting and placing key Behaviours on the map

The guiding question and supporting prompts were:

- “What are the things our central Actors do (or don’t do) that affect the digital inclusion of older people in [neighbourhood]?”
 - “What are the most important things this Actor currently does that help or hinder digital inclusion of older people?”
 - “What should this Actor do to help digital inclusion of older people?”
 - “Which actions might be easy or hard to change?”

Mapping was followed by a group discussion, during which participants reviewed the Behaviours that had been placed on the map; during this discussion, additional Behaviours were added where relevant, and in some cases new Actors or potential Drivers were identified. Reflection and feedback were also sought from participants.

Lessons Learned

Several key lessons emerged from Workshop 2:

- **Regular boundary and Actor review is necessary:** Some Core and Wider Stakeholders recognised discrepancies in the Actor lists, particularly regarding which Actors had been classified as central. Misclassification or lack of knowledge of Actors highlighted limitations in the process and the

potential for uncertainty. Regular review of Actors and boundaries, with clear criteria for each layer, will help to define Actor positions, as well as identify gaps in knowledge, and where further information would be useful.

- **Distinction between present and normative (ideal) Behaviours is needed to support mapping:** Mapping current Behaviours and normative 'should' Behaviours introduced complexity for participants. This further confused discussion regarding potential solutions or interventions; and made the interpretation of Behaviours more difficult during later analysis. A focus on current Behaviours which includes that are imperfect, infrequent, or inconsistently applied is advised.
- **Older resident perspectives were vital for validity and richness of the map:** the exercise focused on Behaviours of older residents highlighted the importance of incorporating direct resident perspectives wherever possible. Many participants felt that they were not fully equipped to represent the lived experiences of older residents when describing these Behaviours. Direct prior resident engagement and resulting data and insights are advised.
- **Potential bias towards positive role of organisational Actors:** Behaviour mapping for organisation Actors tended to generate actions that supported digital inclusion, with fewer examples of limiting or exclusionary Behaviours. Prompts detailing barriers, unintended consequences, or exclusionary practices could help generate a more balanced representation.

Reflection Phase 2

Following Workshop 2, we conducted a second reflection phase to consolidate the Behaviours identified during the session and prepare the map for the next stage of the process. During this phase, we joined up Actors and Behaviours generated during the in-person workshop as Actor-Behaviour nodes and transferred them onto the MIRO map. Actor-Behaviour nodes were grouped into clusters to improve readability and prepare the map for further analysis; clusters reflect broad areas of activity within the digital inclusion system, such as health and social care interactions, accessing public services, and access to devices or connectivity. We then mapped out Connections between Actor-Behaviour nodes as positive links (increasing the likelihood of a Behaviour happening), negative links (decreasing the likelihood of a Behaviour happening), and ambivalent links (either increasing or decreasing the likelihood of a Behaviour happening).

Participants were then invited to review the draft Actor-Behaviour map asynchronously on MIRO. They were asked to identify the Behaviours they considered most important by upvoting them using thumbs-up emojis. Participants were encouraged to prioritise Behaviours that were particularly relevant to the target group, the target neighbourhood, and the agreed system objective, as well as Behaviours that occur frequently or have a significant impact on digital inclusion outcomes.

Participants were also invited to add comments or clarifications to existing Behaviours where needed, and to propose additional Behaviours if they felt that important elements were missing from the map. These contributions were used to further refine the map and prepare the materials for Workshop 3, where the relationships between Behaviours and their underlying Drivers were explored in greater depth.

Workshop 3: Drivers

Workshop 3 focused on identifying the Drivers that influence Behaviours within the system. The session began with a brief review of the system objective, both to confirm that it continued to reflect participants' understanding of the local digital inclusion challenge and to remind participants of the goal guiding the mapping process.

Part 1: Review of Draft Map

A short explanation of how Actors and Behaviours had been synthesised into connected Actor-Behaviour nodes on the draft map was provided. Participants were guided through a review of the existing map. This was done by:

- To make the map easier to engage with, Actor-Behaviour nodes were presented cluster by cluster; allowing participants to examine the map in manageable sections.
- For each cluster, participants reviewed Behaviours and Connections shown on the map. This included identifying missing Behaviours, correcting misinterpreted or mislabelled Behaviours, and reviewing Connections between Behaviours.

Part 2: Mapping Drivers

Participants received a brief introduction to Drivers, drawing on the COM-B model. Participants were provided with a printed-out version of the COM-B model alongside a set of guiding questions to help them identify potential Drivers. Importantly, participants were not asked to categorise Drivers into the COM-B components. Instead, the framework was used as a diagnostic tool to encourage participants to consider a broad range of factors that might influence whether a Behaviour occurs.

Activity 1: Brainstorming Drivers

Participants first completed an individual brainstorming exercise using printed activity sheets that contained the Behaviour clusters, which was guided by the following question and sub-questions:

- "What influences whether a Behaviour happens or not?"
 - "Is the Actor able to do this – do they have the knowledge, skills, confidence, and practical ability needed to carry out the Behaviour?"
 - "Does the Actor have the chance to do this – with the right support from others and the time, resources, systems, and environment in place?"
 - "Does the Actor want or need to do this – because they believe it matters, see the value, or are influenced by habits, emotions, or routines?"

Following this individual exercise, participants moved into a group activity in which they jointly discussed and prioritised Drivers for each Behaviour cluster.

Activity 2: Mapping Drivers

Using printed versions of the Behaviour clusters, participants collectively identified and placed the most important Drivers influencing the Behaviours in each cluster. These Drivers were written on post-it notes and placed directly onto the printed cluster maps. The group discussion again used the same guiding question as the individual exercise:

- "What influences whether a Behaviour happens or not?"

Lessons Learned

Several lessons emerged as a result of Workshop 3:

- **Behaviour clusters need further definition to support participants to understand what they represent:** While clusters were introduced as a practical tool to make the map easier to review, participants often interpreted them as representing complete or self-contained parts of the system. As a result, participants frequently commented that clusters did not include all relevant Behaviours or suggested that Behaviours should move between clusters. A clearer explanation of the purpose of clusters as an organising tool is therefore needed. Visualising clusters as part of the full system map may help this.
- **More detailed explanation of Connections and their role is needed to support understanding and application in the map:** Reviewing Connections between Behaviours also proved challenging. Participants often found it difficult to assess whether Connections accurately represented causal relationships within the system. A clear explanation of how Behaviours can form chains of action, where one Behaviour enables, influences, or constrains another is needed. This is advisable once Behaviours have been refined to a manageable number.
- **Behaviours and Drivers were often misunderstood:** A maintaining a clear distinction between Behaviours and Drivers was important but often challenging. Participants often moved between describing Behaviours and the factors influencing them, which is understandable when discussing complex systems. Facilitation was therefore needed to support understanding and to capture important insights that emerged during the discussion.
- **COM-B classification may be better undertaken outside of the workshop process:** More broadly, the workshop reinforced the value of using the COM-B model as a guiding framework rather than a strict classification tool during participatory exercises. Some participants naturally attempted to categorise Drivers using COM-B but this process requires time and analytical distance. If required, this may be best completed by facilitators during post-workshop analysis.

Reflection Phase 3

Reflection Phase 3 was undertaken by the research team who reviewed the outputs from the workshop review session and adjusted the maps. This included: clarifying Behaviours, removing Behaviours that were no longer considered relevant to the system objective or collapsing similar ones, and correcting or refining Connections between Behaviours where necessary.

We also reviewed and organised the list of identified Drivers to integrate them into the draft map. In addition, Drivers that appeared frequently across multiple Behaviours were identified and highlighted as ‘overarching Drivers’; rather than linking these to a single Behaviour, they were represented as larger Drivers positioned around the map to reflect their broader influence across different parts of the system.

These refinements resulted in a consolidated draft system map, which was then used as the basis for the analysis and intervention idea generation in Workshop 4.

Workshop 4: From Leverage Points to Interventions

Workshop 4 was facilitated online using Miro and began with a brief presentation of the near-final Behavioural Systems Map, including an overview of the map structure and a map legend explaining how to interpret the different elements. Participants were also reminded how a systems map can be read as a narrative connecting Actors, Behaviours, and Drivers, illustrating how actions and influences interact within the system.

This introduction was followed by a broad review of the map.

Part 1: Review of Draft Map

Activity 1: Reviewing the Map

Participants reviewed the map and provided feedback on its structure and content. Participants were encouraged to begin with clusters they were most familiar with, before moving on to other sections given the size of the map. Participants were able to correct and refine Behaviour labels, add comments where clarification was needed, and suggest further adjustments directly on the MIRO board.

The following guiding question and sub-questions were used:

- “What stands out to you as you explore the map?”
 - “Which parts of the map are easiest to understand or work well for you?”
 - “Where do you find yourself pausing or getting confused?”
 - “Which elements immediately stand out as important?”

Activity 2: Refining Drivers

In Activity 2 participants reviewed and refined the Drivers that had been identified during Workshop 3, including suggesting Drivers to be added or removed.

Part 2: Identification of Leverage Points

Participants then undertook identification of leverage points within the system. Leverage points were introduced as places within the system where intervening could shift Behaviours in meaningful ways and help move the system towards the agreed objective – these points might include Behaviours or Drivers with many Connections, bottlenecks where progress becomes stuck, or areas where barriers cluster and prevent positive Behaviours from occurring.

Activity 3a: Identifying Leverage Points

Participants explored the map to identify and describe potential leverage points, e.g. detailing how intervention at these points might influence other Behaviours within the system. Participants were asked to identify and mark: Behaviours or Drivers with many Connections, Behaviours or Drivers that sit at an important point in the system, Behaviours or Drivers they believe are particularly important based on their local expertise. To do this, participants followed the guiding question:

- “Where in the system are interventions most likely to lead to meaningful change?”

Activity 3b: Refining Leverage Points

Participants then refined the leverage points identified through a feasibility lens, considering where meaningful change might realistically be possible. This was done through considering the following guiding question and sub-questions:

- “Where in the system do we realistically have the ability to intervene?”
 - “Do any Actors in the system have influence over this? If so, who?”
 - “Is this something that could be changed in practice, rather than only in theory?”

Part 3: Drafting Intervention Ideas

Finally, participants began to develop initial intervention ideas based on the feasible leverage points identified.

Activity 4: Drafting Intervention Ideas

Intervention drafting was introduced including a draft structure to support the process. This included detailing (1) what action would be taken; (2) who would carry it out; and, (3) who the intervention would be for. Participants then drafted ideas onto the MIRO board.

To support this process, we also presented solution-oriented ideas that had emerged during earlier workshops; these ideas had previously been set aside during the mapping process but were reintroduced here as potential starting points for intervention design.

Guiding question:

- “What kinds of interventions could act on these leverage points?”

Once participants had drafted their ideas, the group discussed which leverage points the interventions addressed, how they contributed to the system objective, and their potential benefits and drawbacks. This discussion helped prepare the groundwork for further developing and refining selected interventions after the workshop series; ultimately moving towards more detailed intervention blueprints.

Lessons Learned

Several important lessons emerged from Workshop 4:

- **Interventions emerged early in the process and should be recognised and captured for development:** A key learning from throughout the workshop series was that intervention ideas tend to emerge much earlier in the process, often as early as Workshops 1 and 2. While it is important to guide participants through the structured steps of BSM, it is equally important to capture and retain these early ideas so they can be revisited at the appropriate stage.
- **Identification of leverage points was most effective when local expertise was prioritised:** leverage points were best mapped through participant lived and professional knowledge – and not through rigid frameworks or formal criteria. Open discussion was undertaken to support innovation and creativity. This limited restriction that may have come through structured frameworks.
- **Tools such as the APEASE framework require up front introduction and integration into the design process to be fully utilised:** From a facilitation and delivery perspective, using an evaluation framework such as APEASE can be highly valuable in systematically refining and assessing a longlist of intervention ideas. However, when planning to do so, it is best to introduce the relevant framework during the workshop to enable participants to utilise it in the subsequent reflection phase. Furthermore, it is also helpful to focus resources on a manageable number of the most promising ideas, while keeping others documented for potential future development.

Reflection Phase 4

In this final reflection phase, we focused on synthesising and refining the intervention ideas generated during Workshop 4. We began by grouping ideas according to the leverage points they addressed, and where appropriate, combining similar ideas into more cohesive intervention proposals.

These were then developed into a longlist of 5-6 draft interventions, each outlined in a consistent format. This included a description of the overall idea and purpose, potential delivery leads, target Behaviours, intended beneficiaries, and the specific leverage points addressed, as well as any key risks or considerations where relevant.

Participants were then invited to review and prioritise these interventions. They were asked to comment on the draft proposals to ensure they accurately reflected their ideas and to provide further insights, particularly regarding delivery roles and beneficiaries.

To support structured prioritisation, participants were also asked to assess the interventions using the APEASE framework (Acceptability, Practicability, Effectiveness, Affordability, Side-effects, and Equity). Based on these assessments, they were then asked to identify their top three interventions, helping to determine which ideas should be taken forward for further development.

This process enabled a collective and evidence-informed prioritisation of interventions, forming the basis for selecting a smaller number of proposals to be developed into detailed intervention blueprints for the final outputs.

Post-Workshop Activities

Upon conclusion of the BSM workshop series, we conducted post-workshop synthesis and evaluation activities to bring together insights from across the project and assess the outcomes of the BSM process in each neighbourhood.

Synthesis Sessions

The project team held internal synthesis sessions to review and compare findings from the spatial analysis, resident engagement, BSM workshops, and additional data and information shared by the teams when available. These sessions focused on identifying where insights converged, where they diverged, and what the key conclusions were for each neighbourhood's digital inclusion challenge. This combined analysis informed the development of the intervention blueprints: for each neighbourhood, three of the original five to six draft interventions were selected for further refinement based on which ideas best responded to the combined insights from all three evidence streams.

As part of this process, each intervention was assigned a readiness score to assess how close it is to implementation:

- 1 (Low Readiness): no clear owner, design and development required, and early engagement necessary
- 2 (Moderate Readiness): intervention is feasible and grounded in existing assets, but requires piloting, scalability testing, and refinement
- 3 (High Readiness): ready to be tested with target groups and refined where necessary; near implementation, with low barriers and low risk profile for implementation.

Post-Workshop Survey

Finally, participants were invited to complete a post-workshop survey, designed to complement the pre-workshop survey in assessing how participants' knowledge, perspectives and opportunities for digital inclusion in their selected neighbourhood have changed as a result of the project.

The survey included Likert-scale questions on:

- Whether the intervention blueprints developed are tailored to local needs
- Whether the interventions are implementable within 6 months
- Participants' understanding of organisations working in the neighbourhood digital inclusion system
- Whether the potential for collaborations have increased as a result of the project
- Participants' confidence in independently applying BSM in their organisations

Participants were also asked open-ended questions about:

- The benefits or positive outcomes of participating in the BSM workshops
- Any disbenefits or challenges they experienced
- Any additional reflections on the project

Together, these post-workshop activities helped evaluate the process, capture learning, and refine the final intervention blueprints, ensuring that the project outputs were grounded in both the workshop process and the wider evidence gathered throughout the project.

Lessons Learned

Lessons from the post-workshop phase include:

- **Time and clear guidance are needed to review and reflect on intervention ideas before synthesis.** While participant feedback was included where available when prioritising and refining interventions, additional time and more structured reflection guidance would likely have resulted in more detailed feedback and overall stronger participant input.
- **Spatial analysis should be undertaken up front as part of neighbourhood BSM to help define scope and provide key contextual information and data:** spatial analysis was beneficial to the study and on reflection should be undertaken ahead of Workshop 1 to inform Actor and asset mapping, and provide an early evidence base for understanding the neighbourhood context.
- **Resident engagement should ideally happen at earlier stages and at multiple points throughout the mapping process.** Resident engagement added vital insight to the study and enabled stakeholders to sense-check emerging maps, validate Behaviours and Drivers, and ensure that the map reflects lived experience as well as organisational perspectives. Running these evidence streams in a more coordinated and iterative way may result in a more robust systems map and more grounded intervention development.
- **Triangulation of data sets should be undertaken throughout the BSM process, as opposed to during synthesis alone:** Another important learning was that the three evidence streams used in this project – spatial analysis, BSM workshops, and resident engagement workshops – would ideally be more carefully sequenced and reviewed concurrently, rather than being brought together primarily at the synthesis stage.

Annex A2: Evaluation note

Overview

The methodology to the ongoing reflection and evaluation of the BSM method and its practical application to neighbourhood-level digital inclusion is detailed in the main report, in the methodology section.

Area specific feedback, reflections and learning are also detailed in the main report at the end of each of the neighbourhood study sections. These insights, which were gathered through the project (from participants and researchers) and through in-depth discussions with 26 participants post-workshops, fed into the report's findings and informed the BSM Toolkit.

This Annex presents the extent of delivery against the intended outputs and outcomes of the project, which were stated upfront in the project proposal.

Reporting and feedback from the core participants for each area provides evidence of the delivery of these outputs and outcomes. This includes the post-workshop survey that explored how participants' knowledge, perspectives and opportunities for digital inclusion in their selected neighbourhood have changed as a result of the project.

There were 14 responses to the post-workshop survey (9 core and 5 wider participants), in addition to the in-depth discussions with 26 participants.

Main outputs and outcomes

The extent of delivery against the intended output and outcomes is presented in Table A2.

Table A2: Trial metrics – delivery of outputs and outcome

Intended outputs	Delivery and evidence
1) Four BSM workshops delivered per local authority (20 total).	<p><u>Delivered.</u></p> <p>All five areas completed the four BSM workshop process.</p>
2) Minimum of 15 participants per authority, spanning council, VCS, and community organisations.	<p><u>Not delivered – fewer participants in practice. Participant recruitment was adapted to each area in project inception.</u></p> <p>Following the design of the workshops and stakeholder recruitment for each area, a smaller core group of participants was established for consistent input throughout the BSM. This core group varied from two to four participants.</p> <p>Beyond this core group, additional participants (spanning council, VCS, and community organisations) were involved in the workshops, from three to eight participants.</p> <p>In total, the number of participants varied from five to 12 per area.</p> <p>Of the five areas, two involved at least ten total participants through the BSM workshops.</p>

	Further input and insights were gathered through bespoke community engagement, which was possible during the trial for three of the authorities.
3) One systems map and Intervention Blueprint per authority, each with at least three actionable interventions.	<u>Delivered.</u> A bespoke behavioural systems map was created for each area, with shortlisted interventions (following synthesis and application of APEASE) as actionable blueprints.
4) The intervention Blueprints and the BSM Toolkit are disseminated.	<u>Delivered.</u> The Intervention Blueprints and BSM Toolkit are published and openly accessible. Their access will be tracked by downloads through the dedicated website that DG Cities has developed.
Intended outcomes	Delivery and evidence
80% of participants report that Intervention Blueprints improved the tailoring of local strategies.	<u>Delivered, at an area level.</u> Core participants from four of the areas reported (in the post-survey) that they agree or strongly agree that: <i>'The Intervention Blueprints/outlines we developed are more tailored to the local needs of our target neighbourhood/community'</i> . The other area reported that they neither agreed nor disagreed.
75% of authority and VCS staff reporting increased confidence to apply BSM independently.	<u>Delivered, at an area level.</u> Core participants from four of the areas reported (in the post-survey) that they agree or strongly agree that: <i>'I am confident I could implement Behavioural Systems Mapping again within my organisation/ team.'</i>
80% of older resident participants feel their perspectives were valued.	<u>In practice, participant recruitment was adapted to each area.</u> The project design did not focus on older residents for the workshop participation but identified core and wider participants for the workshops from a broader cohort with local knowledge, delivery, and representing older residents. Community engagement was also used in three areas to include the perspectives of other older residents. <u>However, this metric was delivered across all workshop participants.</u> Across the reflection interviews (26 participants) and post-surveys (14 responses) for a range of different participants,

	<p>almost all reported that they felt that their perspectives were valued and fed in through the project.</p>
<p>Three authorities incorporate BSM-informed interventions into strategic plans within six months.</p>	<p><u>Some indication, but long-term monitoring is required.</u></p> <p>Core participants from three of the areas reported (in the post-survey) that they agree or strongly agree that: <i>'The Intervention Blueprints we have developed will be implementable in some form within six months.'</i></p> <p>A core participant from another area expressed caution on the timeline for implementation, including the need to work with other partners and neighbourhoods, but with intention to bring the BSM outputs into their developing digital inclusion strategy for implementation.</p> <p><u>It will useful to gather insights and reflect on how interventions are utilised going forward, with a further post-project evaluation point (see next steps below).</u></p>
<p>Evidence of stronger cross-partner collaboration, demonstrated through new joint initiatives.</p>	<p><u>Emerging delivery.</u></p> <p>Core participants from two areas reported (in the post-survey) that they gained stronger collaboration with local organisations through the project.</p> <ul style="list-style-type: none"> - In one of these areas, a specific digital initiative was introduced in the neighbourhood during the trial due to collaboration made through the BSM workshop. <p>Another area demonstrated emerging collaboration of different teams and local objectives through the BSM workshops, with a wider participant reporting stronger collaboration with local organisations due to the project.</p> <p>Further, core participants from all five of the areas reported (in the post-survey) that they agree or strongly agree that: <i>'The potential for collaboration between organisations has increased as a result of this project.'</i></p> <p><u>It will useful to monitor and reflect on further cross-partner collaboration and new initiatives, at a further post-project evaluation point (see next steps below).</u></p>
<p>Intended outcomes</p>	<p>Delivery and evidence</p>
<p>80% of participants report that Intervention Blueprints improved the tailoring of local strategies.</p>	<p><u>Delivered, at an area level.</u></p> <p>Core participants from four of the areas reported (in the post-survey) that they agree or strongly agree that: <i>'The Intervention Blueprints/outlines we developed are more</i></p>

	<p><i>tailored to the local needs of our target neighbourhood/community'.</i></p> <p>The other area reported that they neither agreed nor disagreed.</p>
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Further outcomes

Further reporting from the post-Survey included the following –

- Core participants from three of the areas reported that they gained: *'A clearer understanding of digital inclusion needs in the neighbourhood'.*
- Core participants from four of the areas reported that they gained: *'A better picture of the local actors and how they interact'.*
- Core participants from four of the areas reported that they gained: *'New ideas for improving digital inclusion for older residents'.*
- Participants from all five of the areas reported that they gained: *'Skills in using behavioural or systems mapping tools'.*
- One core participant stated that they did not gain anything from the project.

Participants were also asked in the post-survey to share the benefits and disbenefits they experienced from participating in the BSM workshops.

A common benefit was that BSM challenged assumptions, brought in new perspectives, and enabled digital inclusion and its complexity to be better understood. The useful role of independent facilitation was noted, alongside the importance of 'stepping back' and following the BSM process to build understanding in a structured and disciplined way. Participants also noted learning outcomes, covering behavioural science topics, the COM-B model, and of their local neighbourhoods and stakeholders.

In terms of disbenefits, the common reported challenge was its time intensity. For example, the challenge of balancing existing workloads and priorities with BSM and with their being a lot of information and concepts within the short time frame of the trial. More time would have also allowed for more and more tailored community engagement within and alongside the BSM process.

These benefits and disbenefits, alongside those surfaced through the in-depth discussions with 26 participants, have been reflected into the findings and learnings about the methodology and its application. This has also enabled the BSM Toolkit to present guidance for delivering BSM in the right way given the challenge, area, and stakeholders.

"We have used this opportunity to widen the understanding of behavioural science and BSM within the council and within other participating organisations... It will be another tool in our toolbox... This work was highly valuable and has formed a key part of our discovery and helped us to define the systemic problems and opportunities to do things differently." (Local authority participant)

"The structured and independently facilitated Behavioural Systems Mapping workshops gave us the mental space to really focus as a team - addressing one, complex problem and get into the details of relationships and challenge our assumptions." (Local authority participant)

"I really felt the benefit of a very systematic approach that drives us to focus on the specific objective as well as challenging our assumptions about what interventions might have the highest impact for our digitally excluded residents." (Local authority participant)

"BSM was a novel approach to exploring a complex and confounding local issue." (Wider participant, local VCS)

Next steps

It will be valuable to continue to learn from the different areas about how they have been able to utilise the BSM outputs and outcomes to date – their behavioural systems map, intervention blueprints, understanding of and collaboration for digital inclusion, and the BSM toolkit – going forward. This will include how the project has shaped their response to digital inclusion in their selected neighbourhood area, as well as to other areas, and whether and how they have been able to implement their intervention blueprints that were developed in the project.

Further, participants highlighted the value of sharing and learning from the other areas going forward about the challenges and opportunities they experience and address, and how different areas apply BSM and intervention blueprints over time.

It is recommended that further reflection and evaluation activity is undertaken to add to the test and learn approach. A further evaluation point in six months' time will be useful to share and capture post-project learning and to build the evidence of what works for BSM in practical applications.

Annex A3: Spatial method

Spatial analysis was utilised as one of three methods to understand the nature of digital exclusion at the neighbourhood level. To do so this study defined a standard spatial index lens that measured the risk or likelihood of digital exclusion, while a second layer of indicators aimed to explore other potential exacerbating factors more closely, making the analysis more bespoke. This approach, unlike focusing on the whole city or on open-source data solely, aims for tailored, community-focused interventions to maximise effectiveness. The analysis examines the neighbourhood as a whole, as opposed to looking at older residents as a single, homogeneous group and takes a participatory approach to layer two, following a similar principle as the Digital Inclusion Action Plan.

Theoretical framework on composite indicators and digital inclusion

Digital exclusion has been measured by tools like the Digital Exclusion Risk Index (DERI), developed by Salford and the Greater Manchester Combined Authority. DERI assesses risk based on demography, deprivation, and broadband connectivity, calculating an overall score for local authorities. Local authorities, including Essex County and Liverpool City Region, have adopted and adapted DERI to target interventions. Bespoke indices, such as the Internet User Satisfaction, focus on specific groups or barriers, but generally measure exclusion across all age groups or fail to target older people at the neighbourhood level.

This pilot explored neighbourhood-level digital exclusion for people over 60, recognising intersections with other high-risk groups (low-income, older people, people with disabilities, unemployed, NEET). Wider research confirms these groups are more likely to be digitally excluded. Therefore, the spatial analysis used indicators like low-income, age, disability, access (ability to be online), and skills (ability to use devices) to map digital exclusion across areas.

A Composite Indicator (CI) was synthesised from eleven individual measures into a one-dimensional index, to assess digital exclusion, using a geometric aggregation, where each indicator was assigned equal weight and the final score was rescaled to a 0-1 range within each local authority. To avoid undefined values arising from log transformation of zero scores, a small constant of 0.001 was added to all scaled indicator values prior to the aggregation. This type of aggregation does not allow strong performance on one indicator to fully compensate for weakness on another.

Introduction to the layers

While traditional CIs typically rely only on a set of nationally available datasets, this methodology overlays distinct analytical lenses including but not limited to open-source data. This ensures that the findings are locally validated and statistically and behaviourally significant.

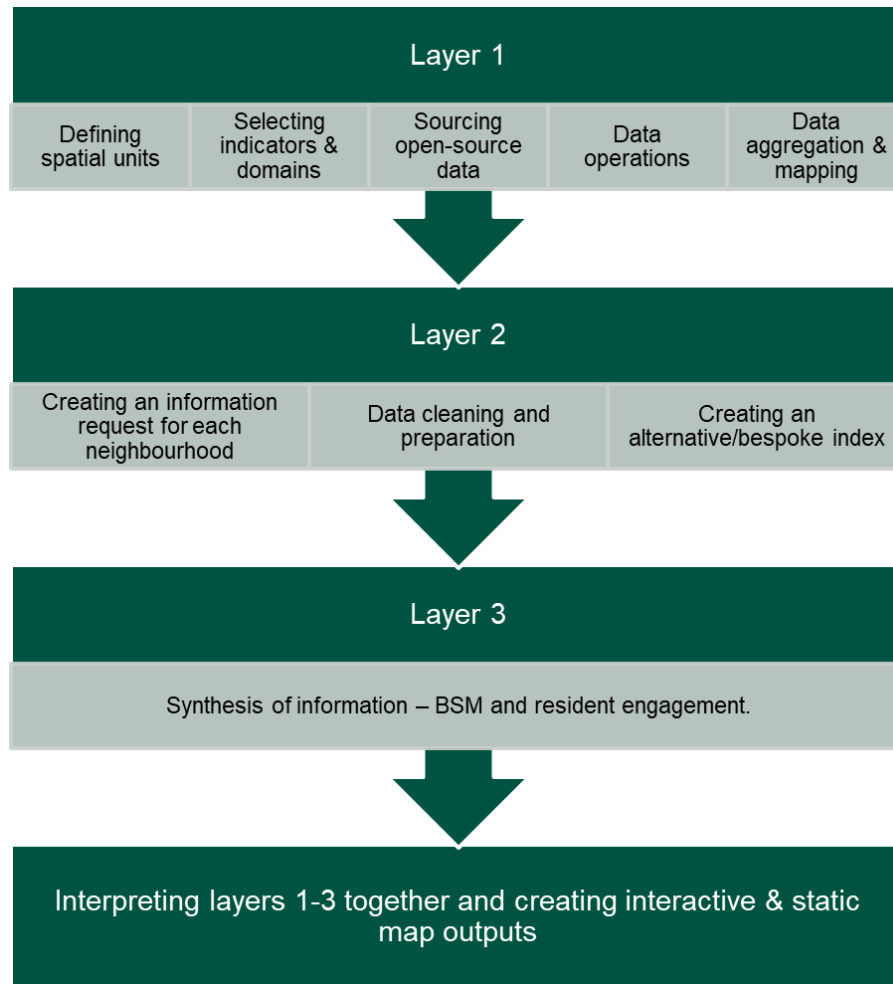
Layer 1: The Spatial Baseline (Open-Source): The foundation of the analysis is built upon standardised, open-source data at the Lower Layer Super Output Area (LSOA) level. This layer provides a high-resolution of risk or likelihood in the neighbourhood, allowing for benchmarking against the local authority. This is a common method when building a CI to measure a concept through a spatial lens.

Layer 2: Local Knowledge (Bespoke Information Requests): The second lens incorporates granular data obtained through information requests to neighbourhood leading teams. This includes the mapping of community assets/Actors, such as libraries and community hubs, geocoded, postcode or household data within neighbourhoods, as well as an open ask for other key information that the teams might have access to. This layer transforms the map from a local authority study into a bespoke neighbourhood analysis.

Layer 3: Synthesis with the Behavioural Analysis & Resident Engagement: The final lens applies the COM-B framework - assessing how Capability, Opportunity, and Motivation interact to drive digital Behaviour. By

reading the spatial and local data through this behavioural model and comparing it to the experience of residents shared by them, we can distinguish between an individual who is likely to lack the physical opportunity to get online (devices) and one who is likely to lack the motivation or capability in each neighbourhood. This ensures that the resulting intervention ideas target the root cause of exclusion as close as possible for each neighbourhood.

Figure A2: A methodology chart to understand digital exclusion for over 60-year-olds at the neighbourhood level



Spatial units and selected indicators for the standard index (Layer 1)

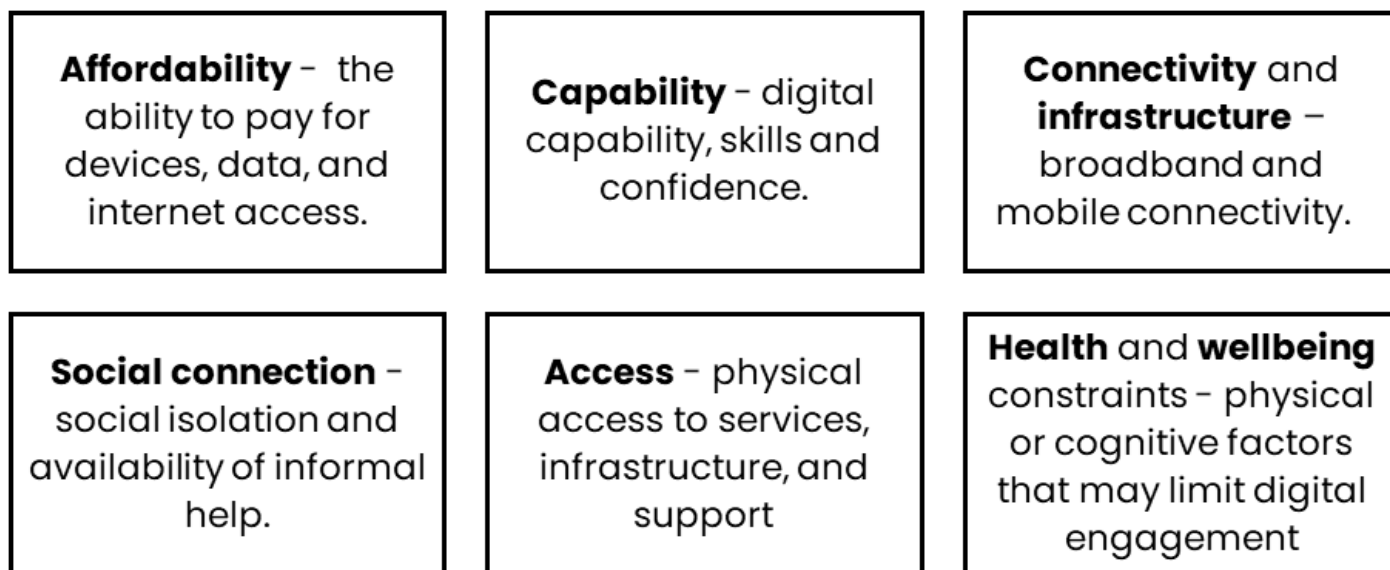
The primary spatial unit of analysis is the Lower Super Output Area (LSOA) and Output Area (OA), using 2021 boundaries. LSOAs are small, statistically stable geographies commonly used in national datasets and allow meaningful variation to be identified within neighbourhoods. An LSOA is a group of OAs in the same geographical area and tends to contain 1,000–3,000 residents and 400–1,200 households. This analysis aims to understand digital exclusion on as granular a level as possible, however, some data is only released at an LSOA level so the analysis is flexible and shifts between these two levels.

Layer 1 of the spatial analysis includes all LSOAs within each local authority, creating a local authority index. Then, each team chose LSOAs, to which we refer to as ‘selected neighbourhood(s)’. The selected neighbourhoods do not always align to the LSOA boundaries, so the data at the LSOA/OA level can sometimes be partly included in them. For this pilot project the selected neighbourhoods were made up of varying numbers of LSOAs, some contained 1-2 perfectly aligned LSOAs, while others were at a larger scale with up to 16 LSOAs, partially fitting within one LA’s selected neighbourhoods. All findings are centred around

understanding the focus areas as close as possible, while also referring to the wider local and national context.

The overall, standard composite digital exclusion index (layer 1) was constructed for each local authority at its own scale, including all LSOAs within it. It draws on eleven indicators, which feed into six domains – affordability, accessibility, social connection, capability, health and wellbeing, connectivity and infrastructure. The index provides a quantitative picture of where digital exclusion risk or likelihood is most concentrated across the borough, identifying the intensity of exclusion, the type of risk, and the dominant barriers that are likely to drive digital exclusion.

Figure A3: Principal themes



A framework of datasets used for each theme at the LSOA level is shown below. Some themes are made up of 2 components, called a primary and secondary indicator, both holding the same weight. This helps to gain a better understanding for themes where the primary indicator might not provide enough information.

Table A3: Principal themes and their relevant indicators¹

Theme & Geography	Primary indicator	Source	Notes	Secondary indicator
Affordability	Income Deprivation Affecting Older People Index (IDAOPI)	Indices of Deprivation (IMD 2025)	A financial indicator for people aged 60+	N/A
Capability	Digital Propensity Index (DPI)	Census 2021	A behavioural proxy; measures whether people used their digital skills when given the opportunity, not whether they can in general.	Adult Skills IMD sub-domain (literacy and maths skills)
Access (formal support)	Geographical Barriers to Services sub-domain	IMD, 2025	Measures physical proximity to key services. Uses the Department for Transport's (DfT) Connectivity Tool.	N/A
Social connection	Proportion of one-person households aged 65 and over	Census 2021	Demographic and social factor relevant to digital exclusion among older people.	English as a Second Language
Health and wellbeing constraints	Disability prevents day-to-day activities a lot	Census 2021	People who assessed their day-to-day activities as limited by long-term physical or mental health conditions or illnesses are considered disabled.	N/A
Connectivity and infrastructure	Broadband coverage and performance (residential)	Ofcom 2025	Percentage of premises unable to receive 10 mbit/s.	Superfast broadband (SFBB) availability

¹ Income Deprivation Affecting Older People Index (IDAOPI) and Proportion of one-person households aged 65 and over are indicators that measure the older populations specifically.

Data Operations

Given that digital exclusion is a multidimensional issue, there is not a standard way to measure it. We have followed best practices and guidance from wider research projects:

- Datasets are cleaned and standardised using reproducible scripts in R.
- Variables are synched using official LSOA/OA codes to ensure consistent joins across datasets.
- Each dataset is validated to ensure one record per LSOA/OA for mapping purposes.
- Non-spatial datasets are joined to LSOA/OA boundary files to create a single spatial dataset per neighbourhood. Spatial data is stored in GeoPackage (GPKG) format, enabling seamless use across R and QGIS.

Each LSOA was assigned a dominant digital exclusion theme based on which of the six theoretically-derived themes – Affordability, Capability, Connectivity & Infrastructure, Social Connection, Access, and Health & Wellbeing – contained the highest-scoring indicator among the three variables with the greatest scaled values for that area. This approach prioritises the intensity of the leading indicator over the number of variables per theme, ensuring that a single strongly-performing variable within a theme is weighted appropriately against themes with broader indicator coverage.

In parallel, a risk category was assigned to each LSOA based on the count of indicators scoring above 0.6 on the within-LA scaled 0–1 range, with thresholds calibrated to the empirical distribution of the data: Low (0–1 indicators), Medium (2–3), Medium-High (4–5), and High (6 or more). Given that scoring is relative to each LA's internal range rather than a national benchmark, these categories reflect relative exclusion risk within each LA rather than absolute levels.

This thematic classification allows us to see the main driver for digital exclusion in a given area – given the open access datasets – and ensures results remain interpretable and directly inform the design of targeted interventions

Indicators for the 'bespoke' index (Layer 2)

The second layer is a mixed-methods complement to the standard quantitative index. We shared an information request with the local authority partners and several teams provided more granular, neighbourhood-specific data and information that allowed us to move below LSOA levels. This local context allowed us to confirm the broader spatial patterns revealed by the standard index and to understand more about the exacerbating drivers

There is not a standard set of data that goes into the second layer; some variables were relevant and used for all neighbourhoods, these include the Ageing in Place Classification (AiPC)², the Output Area Classification³, the output areas with residential properties receiving download broadband speed of less than 10mbit/s⁴, the location of key assets, and an accessibility indicator – for London neighbourhoods the Public Transport Accessibility Levels (PTAL) bus scores were used, while for the rest a walking/driving catchment was created⁵.

² Bespoke geodemographic classification targeting people aged 50 and over in England at the LSOA level. Source: The Geographic Data Service

³ A hierarchical geodemographic classification at the Output Area level. Source: The Geographic Data Service and ONS,

⁴ Download broadband speed of less than 10mbit/s can be a more affordable option but often limits use to a single device and for basic tasks like searching the web. This dataset was sourced from Ofcom.

⁵ PTAL bus scores were sourced from TfL; the walking catchment was created at 800m; the driving catchment was measured in minutes using the road network at 10- and 15-minute distances.

Location of key assets that may support digital inclusion, such as libraries, community centres, and health facilities, are assessed spatially to understand access to support. These are identified as key Actors in the Behavioural Systems Map and information about their attributes has been provided by each LA team where possible.

The accessibility analysis focused on proximity-based measures, including walking and driving catchments, public transport connectivity, availability of parking and accessibility features at the asset location⁶. Where available, information about the digital offer of assets – provided free WiFi, device loan schemes, devices available to use on site, digital training/courses, and digital support – was also included.

Information about asset's attributes and accessibility is not included in the vulnerability score; instead, it is used to contextualise findings and identify potential service gaps. This separation avoids conflating levels of need with the presence or absence of existing provision and helps us understand the link between LSOAs with potentially higher risk of digital exclusion and key local assets.

The London neighbourhoods – Havelock estate, Horn Park, and West Green and Noel Park – were more diverse and had higher proportions of people whose English was not their first language. Therefore, for these neighbourhoods we assessed the census variable – English as a second language: do not speak well/at all. For Havelock estate, a key aim was income maximisation, therefore deprivation at the OA level was also tested.

Therefore, for each neighbourhood we aim to portray a detailed picture of the local assets and their relevance to digital exclusion for older people, include other data available locally and add specific census variables, relevant to the context, building on the standard index to a bespoke local understanding.

Overlaying BSM mapping and engagement insights (Layer 3)

Synthesis of data

The spatial analysis presented here represents one stream within the broader mixed-methods nature of this pilot project. The spatial maps were informed by and references against the other analytical outputs, created in parallel. These include the physical asset locations and classifications, which were directly drawn from the actors identified throughout the Behavioural System Mapping (BSM) workshops. The final BSM maps identified key organisations, community resources and digital service providers key to each neighbourhood through stakeholder participation, which ensured that the physical assets in the spatial analysis reflect local understanding. Similarly, qualitative insights gathered through 1:1 discussions with older residents further informed the interpretation of spatial findings and validated the insights.

The findings of all streams will be incorporated into the interactive maps, available on the project webpage.

⁶ For Waltham, the NELC team provided information on streets where older-people residential schemes with properties for over 60s are predominantly located. Each asset was buffered at 800m, which is considered a typical walking distance of about 10 minutes from the residential areas.

Declarations of interest: The authors declare the following interests: Edward Houghton is a Non-Executive Director of Public Voice CIC, a participant organisation in the project. Public Voice CIC had no role in the design, analysis or reporting of the project.

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