Learning from Co-creation Practice

In the three preceding chapters, I presented two in-depth accounts of co-creation projects conducted in Bremen, Germany and a comparative case of a co-creation project conducted in Zaragoza, Spain. In the following, I reflect on the learnings from these three co-creation projects and attend to the central research questions posed in this book:

1. **Governing co-creation and sharing control**: What are the implications of different modes of governing and managing co-creation for the sharing of control? How do specific methods facilitate the sharing control?
2. **Sharing expertise**: How can a variety of stakeholders be engaged in meaningful ways? What are specific challenges and opportunities for sharing (lived) experiences to co-create digital public services for older adults?
3. **Enabling change**: What types of public services are most suitable for co-creation and to what extent do they enable individual and/or social change?

In the following, each of these questions is attended to in a separate section.

**Governing Co-creation and Sharing Control with Citizens**

From Arnstein’s (1969) ladder of citizen participation, we have learned that there are different degrees of sharing control between public administrations and citizens. In the review of different approaches to co-production of public services and co-design of information systems, different roles users may take in such a project were identified. These roles may be assumed by any relevant stakeholder (group), e.g. older adults, social care service providers, intermediaries, and government/public administration.

One of the most apparent differences in the governance structures of our co-creation projects was their different embedding in existing infrastructures,
collaborations, policy frameworks, and initiatives. These aspects had so far only received little attention in studies on co-creation. Through our three projects, we have demonstrated however, that this has an impact on the ways in which co-creation is conducted and the options for participation, scoping and sustainability. While in Zaragoza government units initiated and facilitated the co-creation process, in Bremen this task was assumed by a research institute. In Zaragoza, the core project group consisted of two departments of the city administration, which were supported by senior citizen centres. In Bremen Osterholz, we decided to establish a permanent group of eleven older residents that were engaged throughout the whole process (from idea generation and development of a service concept to the co-creation of software and data to the implementation and maintenance of the service). In contrast, in Bremen Hemelingen, a project board consisted of a research institute, software developers and a network of social care service providers. Table 1 provides a summary of the differences of our governance structures and interactions with different local actor groups.

In Zaragoza, the scoping of the co-creation project was driven by its alignment with the city’s engagement in the Global Network of Age-Friendly Cities and Communities (GNAFCC) and was expected to contribute to the city’s overall policies and strategies. The main drivers of the process were two departments: the Technical Office of participation, transparency and open government, and the Department for elderly care, which had an established working relationship. For the co-creation activities and recruitment of older adults, the project team used its existing collaborations with senior citizen centres. The open data infrastructure and relating IT-infrastructure played an important role in the planning of the project. For example, the co-creation process made use of an already existing collaborative map service. In contrast, the research institute in Bremen was more open with the scoping of the two projects. The role of certain local actors shifted as the scoping of the project and service idea evolved. This impacted on the roles and decision-making power of participants. Table 2 compares the three projects in relation to different aspects of sharing control as derived from the reviews of participatory approaches such as co-production, co-design and civic open data use.

In all projects users participated in the decision-making process (as advisors as well as representatives). Their participation was always voluntary. The requirements for users to act, expected to some degree knowledge of possible technological options; they needed access to relevant information and had to have the possibility to take an independent position (from the facilitators). In the following, I analyse the specific engagement of (1) local government, (2) social care service providers and (3) older citizens.

Local Government

While the city council organised and managed the co-creation project in Zaragoza, local government assumed a supportive and consulting role in Bremen. This resulted in differences concerning the openness of the processes, the scoping of the
| Field site        | Bremen Osterholz                                      | Bremen Hemelingen                                      | Zaragoza                                                                 |
|-------------------|-------------------------------------------------------|-------------------------------------------------------|--------------------------------------------------------------------------|
| Co-creation       | Research institute (iifib)                            | Research institute (iifib)                            | Local government—Technical office of participation, transparency and open  |
| facilitators      | Software developer (FTB)                              | Software developer (FTB)                              | government—department of elderly care                                     |
| (project board    |                                                       | Network of local service providers                    |                                                                          |
| steering activities) |                                                      |                                                       |                                                                          |
| Involved local    | District council City information provider            | District council District marketing City information  | Core project group + department of urban development and infrastructure   |
| government/public |                                                       | provider                                              |                                                                          |
| administration    |                                                       |                                                       |                                                                          |
| Involved older    | **Core group of 11 older adults:**                    | **46 older residents:**                               | **Core groups of 6 to 8 older adults for each of the three districts with  |
| citizens          | •16 regular workshops for a duration of 10 month      | •7 Walking workshops                                 | different skills and impairments:**                                     |
|                   | 80 older residents: •12 focus groups in which each    | •3×2 Focus groups                                    | •8 workshops for each district                                           |
|                   | resident participated once                            |                                                       |                                                                          |
| Involved social    | 3 neighbourhood managers 2 representatives from        | Network of local service providers including: 3      | 3 senior citizen centres from 3 districts                                |
| care service       | different Christian congregations 1 social service    | senior citizen meeting places 2 social care service  |                                                                          |
| providers          | centre 1 representative from the centre for          | providers 1 district marketing 1 neighbourhood      |                                                                          |
|                    | migrants and intercultural studies 2 representatives  | manager •8 regular meetings and participation in     |                                                                          |
|                    | from social welfare organisations •10 meetings and   | walking workshops and tablet workshops               |                                                                          |
|                    | participation in workshops of core group              |                                                       |                                                                          |
| Other involved     | Intermediaries: •8 interviews and participation in    |                                                       |                                                                          |
| organisations and  | workshops of core group                                |                                                       |                                                                          |
| individuals        |                                                       |                                                       |                                                                          |
Table 2  Sharing control in Bremen Osterholz, Bremen Hemelingen and Zaragoza according to characteristics of co-production, co-design and civic open data use

|                  | Bremen Osterholz | Bremen Hemelingen | Zaragoza |
|------------------|------------------|-------------------|----------|
| **Rationale for sharing control** | The needs of users should dominate the design of the service | Exploiting potential of open data infrastructure | Allow for user-centred and creative ways of open data-based service development |
| **Parties involved** | Commitment for both users and systems developers to cooperate | Facilitators steer process and allow for selective user involvement | Collaboration between public service provider and citizens/service users |

Learning Point 1: Local governments can assume different roles in a co-creation process. If they are to assume control over the maintenance of the service, the solution needs to respect framing conditions such as existing policies and strategies, existing IT and (open) data infrastructures, interoperability requirements, budget constraints and legal and organisational restrictions.

**Social Care Service Provider**

In both co-creation projects in Bremen, we made the experience that involving an already existing group of intermediaries and social care service providers with experience in collecting, editing and providing information is beneficial to the co-creation projects as well as their governance. Table 3 summarises different roles and tasks of local government in the three co-creation projects.

The scope of action for local governments differed between the three co-creation projects (Fig. 1). In Zaragoza, the city government controlled the planning of the co-creation project and kept the responsibility of maintaining the service. They invited citizens at particular points of time to share control over the process. In contrast, in Bremen, the local governments were either not or only marginally involved in the planning. For both co-creation projects in Bremen, the city information provider assumed control over the maintenance of the service (in collaboration with local social care service providers). In all cases, the final solution was dependent on the existing IT-infrastructures and had to be aligned with the cities’ strategy and policies. For Bremen this meant that we lost some of the design outcomes (e.g. age-friendly map design), because the city information provider wanted to use the same map-style across all of its services.
process as well as the sustainability of its outcome as those key partners might also carry on or support the service beyond the duration of the project (Lesson H-1.2).

Social care service providers took different supporting roles in our co-creation projects. However, the prerequisite for their commitment was that the outcome would benefit their work. In our co-creation projects, social care service providers assumed all roles but the one of a designer. One of the main learning points was that in the context of age-friendly cities and communities, intermediaries and social care service providers should also be understood as future users and hence be involved as such in co-creation processes. Overall, the close collaboration with social care

Table 3  Level of co-creation: roles and tasks assumed by local government units

| Role            | Bremen Osterholz                                      | Bremen Hemelingen | Zaragoza                                                                 |
|-----------------|-------------------------------------------------------|-------------------|---------------------------------------------------------------------------|
| Planning        | Facilitator                                           | None              | Selection of pilot districts                                              |
|                 | Engaging stakeholders (identify local stakeholders and support recruitment by promoting the project) | None              | Engaging stakeholders (identify and engage local stakeholders, ensure access to older adults) |
|                 | Provide facilities                                    | None              | Manage and organise co-creation activities                                |
| Build           | Explorer                                              | None              | Co-creating a service concept (explore information needs as part of Zaragoza’s age-friendly city initiative) |
|                 | Co-creating a service concept (explore information needs via interviews) | None              | Co-creating a service concept (explore information needs via interviews) |
| Idea former     | None                                                  | None              | Develop questionnaire for exploring ideas to use collaborative maps       |
| Designer        | None                                                  | None              | Design and implement digital service                                      |
| Data provider/curator/creator | Provision of data on institutions and public services in the district Review and validate data | Support of the content provision by providing video material on walks | Publish and provide data on facilities and co-created data |
| Run             | User of service/app                                    | None              | None                                                                      |
|                 | Evaluating the service (interviews)                   | None              | None                                                                      |
| Provider of service/app | Integration of app in the official city portal Maintain data | Integration of app in the city portal Maintain data | Integration of service in the City Council's website |
| Diffuser        | Promoting the app and the service on several events, supporting the dissemination of the service concept for other districts | Promoting the app and the service on kick-off event | Transfer of the service (applying the methodology and offering the generic tools to other cities and districts) |
service providers in Bremen Osterholz and Bremen Hemelingen was highly beneficial to the co-creation process in several ways:

- They acted as *gate-keepers* to local government and supported the recruitment of older adults.
- They acted as *champions* of our project and endorsed the process during council meetings.
- They acted as *communicators* by promoting the project in the local newspapers, their own publications and the district fair.
- They served as *data providers* with data about their own services and resources.
- They may ensure the sustainability of the service.

**Learning Point 2**: Social care service providers and intermediaries can take different (supporting) roles in co-creation processes. However, the prerequisite for their commitment is that the outcome will benefit their work and align with their existing service portfolio and funding.

In Bremen Hemelingen, we aligned our co-creation process closer to the services and resources of local social care service providers and intermediaries. Older adults were invited to participate as part of the service offerings of these service providers. We hence circumvented “cold recruiting” as in Bremen Osterholz and embedded our project as part of their existing service infrastructure. For example, the meeting places offered a variety of courses and meetings. They were ideally positioned to adopt our tablet courses as part of their service portfolio. Likewise did the neighbourhood walks fit well with the services provided by some of our collaborating
service providers. Hence, recruitment was done more effectively through social care service providers, because they are already actively involved with a broad range of older residents. The drawback was that some older residents may not have been addressed because of a bias against certain social care service providers (e.g. the church, a certain neighbourhood).

Learning Point 3: When embedding the process in existing services and activities, potentially only a certain part of the target group is addressed (e.g. through the church or in particular neighbourhoods). This may imply that complementary activities with other stakeholders ought to be conducted.

Engaging social care service providers for the recruitment requires a deep understanding and commitment of these intermediaries to the co-creation process. They may also help to reach out to older adults, who cannot participate throughout the whole life cycle of a project. For example, in Bremen Hemelingen, we conducted

Table 4 Roles and tasks of local service providers

| Role      | Bremen Osterholz | Bremen Hemelingen | Zaragoza |
|-----------|------------------|-------------------|----------|
| Planning  | Facilitator      | Engaging stakeholders (support recruitment) | Engaging stakeholders (identify and contact senior citizens groups, organise walks to attract older adults) Planning (organise focus groups) | Engaging stakeholders (support recruitment) and provide meeting space |
| Build     | Explorer         | Co-creating a service concept (explore information needs in interviews) | Co-creating a service concept (explore information needs in meetings) | None |
| Idea former | None              | Co-creating a service concept (constant feedback on refined service concept) | None |
| Designer  | None             | No                | None |
| Data      | Collect data (focus groups with older adults) | Review, validate and complete collected/co-created data | None |
| Run       | User of service/app | Evaluating the service (interviews) | Evaluating the service (interviews) | None |
|           | Provider of service/app | None             | Maintaining data on walks | None |
|           | Diffuser         | None              | Promoting the app and the service on kick-off event | None |
focus groups with older adults with mental health issues and a group of older adults from a senior residence home. Similarly, in Bremen Osterholz, we conducted focus groups with about 80 additional participants as part of the service co-creation and user testing. In Zaragoza, the city conducted a large survey as part of their diagnostic process before the project.

Table 4 provides a summary of the roles and activities assumed by social care service providers across the three co-creation projects. There was little engagement in Zaragoza apart from support of the recruitment and providing a meeting space. Bremen Hemelingen, was the only process in which social care service providers were regarded as target users as well.

The relative lower internet usage of older adults requires different communication channels than offering the service via an internet portal. Intermediaries who so far served as information brokers have to assume a digital information broker role for the new digital services as well (Lessons H-2.1, H-3.2). In the case of Bremen Hemelingen, we achieved this by engaging intermediaries and service providers in the core project group/project board who already organise walks for older adults in the district and welcomed the benefits of richer digital information.

Learning Point 4: The more beneficial social care service providers and intermediaries perceive a service to be for their work, the more likely it is that they will maintain it or support its maintenance (in particular with respect to data maintenance).

**Older Adults**

If we take the involvement of citizens in the co-creation of digital public services serious, it means that the initiators of such a process need to share control. Recruiting people for the duration of a co-creation project with open objectives and tasks unfamiliar to most older adults is a great challenge. Across the three co-creation projects presented in this book, the recruitment strategies emphasised that digital skills were welcome but no precondition. Given the focus on ageing in place in all projects, it was important to engage older adults with good local knowledge and local ties. Local social care service providers were key to the recruitment of older residents.

**Bremen Osterholz**

The decision-making process and scope of action in the first co-creation project in Bremen Osterholz was different to Bremen Hemelingen and Zaragoza. The emphasis in exploring the problem space was much higher, in particular because of the weight given to the exploration of the participants’ life worlds and lived experiences. The cultural probes, complemented through interviews and joint reflection workshops allowed participants substantial control over the direction of the project.
Based on the probes and reflective workshops, we co-created personas and scenarios, which helped to define the problem and value proposition (#3). Participants identified information needs of older residents and their resources based on these personas and scenarios. In subsequent co-design workshops, we negotiated what was possible within the frame of the project: in terms of technical feasibility, long-term sustainability and local government commitment (#4). Participants had again partial decision-making power in structuring data tables (our standardised forms), e.g. what kind of attributes were relevant (#5). However, because of considerations about the sustainability of the co-creation outcome, these were also shaped by the requirements of the city information provider bremen online with respect to suitable data structures (e.g. format of opening hours). Not all participants contributed equally to the creation of data and texts. In particular, the editorial work was very challenging for some and we had to engage further participants. Finally, the user testing was conducted in collaboration with participants and based on the co-created scenarios (#6). In Bremen Osterholz, the older participants had no stake in the provision of the service. Its maintenance is ensured through the city information provider and local social care service providers. Overall, this process only engaged a limited number of older residents directly in the co-creation project. Their contribution was complemented with the input of social care service providers and about 80 older residents were involved in focus groups at the beginning of the project for exploring the problem area and at the end of the project for user testing.
Bremen Hemelingen and Zaragoza

The data walks as conducted in Bremen Hemelingen and Zaragoza provided a way for older adults to become engaged in defining classifications (e.g. what kind of attributes are relevant to any given object). In both cities, we conducted walks for co-creating data. While in Bremen Hemelingen we conducted an initial and dedicated “ideation walk” to define relevant categories, attributes and information needs, this activity was included in the first walk in Zaragoza in which participants refined the documentation template. In both cities, we conducted a series of walks to collect information and create data. In Bremen, the focus was on collecting data about the walk and potential ideas for improvement (e.g. missing benches). Participants also realised that supplementary data, such as street lighting would be important. In Zaragoza, participants’ focus was on documenting incidents (e.g. damaged roads, high curbs) and collecting suggestions for improvement (e.g. additional benches).

The walks in Zaragoza were conducted by the facilitators and the core groups of older adults, which had been selected by the senior citizen centres. In contrast, in Bremen Hemelingen, social care service providers also planned and participated in the walks. Since walks were part of their service portfolio, these walks were announced via their communication channels (e.g. leaflets, newsletters) and open to anybody wanting to participate. Hence, the district walks addressed all older people who were interested in exploring the district or the different neighbourhoods jointly.

None of the walks was longer than 90 min in order to include also older citizens who are less mobile. All walks included a break. In Bremen as well as Zaragoza, people with walking aides and mobility impairments participated. In Bremen, we usually scheduled a lunch or coffee break to discuss the route and take stock; in Zaragoza participants always returned to the senior citizen centres for a debriefing session. In both cities, we emphasised the value of local knowledge.

While in Zaragoza, the same group of people participated in all walks in a given district, in Bremen the participants changed. In general, the walks in Bremen were well attended, but only a few participants engaged in other, more technology-related tasks later on in the process. The neighbourhood manager suggested that this was due to people’s prime interest in neighbourhood walks, or more specifically only walks in particular neighbourhoods. She argued that this may have been due to people being interested in meeting acquaintances and being able to socialise during the walks rather than wanting to develop a digital district guide. She further suggested that participants were interested in the history of the district and wanted to learn more. Judging from the number of participants per walk, we could clearly see that the two historical walks had the highest number of participants. Table 5 provides an overview and compares the different types of walks in Bremen Hemelingen and Zaragoza. Overall, we conducted one ideation walk in Bremen Hemelingen and six data co-creation walks. In Zaragoza, nine data co-creation walks were conducted.

Two participants from the later formed design group confirmed in our evaluation interviews that they experienced the recruitment strategy in Bremen Hemelingen as open and accessible. One stated that she particularly liked the opportunity to “have no barrier, just being able to see how it goes”. Another one stated that she liked the fact that people got “lured out of their house”. A potential weakness identified by
participants related to the socio-economic diversity of participants. A neighbour-
hood manager suggested that we mainly engaged senior citizens from the “middle
class”. This was confirmed by a participant from the core group who can be consid-
ered part of this “middle class”. According to their view, the challenge was to get
those people involved with low socio-economic status (“Getting them, that’s the
art”). Another participant, herself at this “lower end of the income scale” by contrast
observed that residents from the better-off neighbourhoods were missing, as they
did not have as much of an incentive to leave their gardens for a walk as residents
without private outdoor spaces. Since we organised the walks in Bremen Hemelingen
and Zaragoza in collaboration with social care service providers, we mainly
addressed those older adults who were already participating in their activities. In

| Table 5 Comparing ideation and data co-creation walks in Bremen and Zaragoza |
|-----------------------------------------------|
| **Type of walk** | **Ideation walk** | **Data co-creation walks** |
| Bremen Hemelingen | Bremen Hemelingen | Zaragoza |
| **Occurrence in project** | 1 | 6 | 3 × 3 (3 in each of the 3 districts) |
| **Goals** | Defining relevant categories/information needs | Collect data on pre-defined categories | Review categories (first walk) Collect data on pre-defined categories |
| **Number of participants** | 5 | Between 5 and 20 (usually with 5 active members) | 6 |
| **Participants** | Facilitators | Facilitators | Facilitators |
| Older adults | Older adults | Older adults |
| Social care service providers | Social care service providers | Social care service providers |
| Software developers | Software developers | Software developers |
| **Roles of participants** | Explorer | Navigator | Navigator |
| Ideator | Photographer | Photographer |
| Note-taker | Note-taker | Note-taker |
| Data creator | Data creator | Data creator |
| **Duration** | 60 min | 60–90 min | 60–90 min |
| **Duration of event** | ~2 h | ~2 hours (repeated walks over the duration of a co-creation project) | ~2 h |
| **Event makeup** | Walk-discussion (stop at café) | Walk-break-walk (stop for lunch or coffee and cake) | Walk—discussion—debriefing (start and finish at senior citizen centre) |
| **Outcome** | Initial list of information needs | Direct participants’ attention to (data about) urban infrastructures in relation to ageing in place Written notes on walks | Data on walks to be uploaded to collaborative maps |
addition in Bremen, others joint through newspaper announcements. Because walks are an everyday activity, the threshold was rather low.

In both co-creation projects, we conducted user test walks with older citizens at the end of the projects. In both cases, these were conducted with participants that contributed substantially to the projects. While in Bremen the focus was on identifying functional and design issues that needed attention, the walks in Zaragoza were meant to validate the data on incidents that were visualised on the collaborative maps. This kind of content evaluation had been integrated into tablet workshops in Bremen. In addition, participants had volunteered to assess the content by re-visiting the walks and updating data accordingly. Table 6 summarises the user test walks as conducted in Bremen and Zaragoza.

Overall, the scope of action and level of participation for older adults differed along the process. In Bremen Hemelingen and Zaragoza, the scope of action in defining the problem was to some extent limited as in both cases, the projects set out to describe walks (#1 in Fig. 3). In Bremen the reasons for focusing on walks was derived from the first co-creation project in Bremen Osterholz. In Zaragoza, the problem focus on walks was derived from a survey of citizens regarding the city’s age-friendly policies.

In Bremen Hemelingen, there was some more scope as participants decided on the types of walks and ways of describing them (#2). In both cases, participants refined lists of pre-defined categories and collected data on the walks according to structured templates. In addition, in both cases, participants proposed and decided on the actual walks to be worked on, collected data and produced content (#3). Finally, participants tested the service (#4).

The level of participation in Zaragoza was higher with respect to running the service, as citizens were actively asked to contribute data on incidents via the collaborative maps. In contrast, in Bremen Hemelingen, older adults became users of the service with limited scope for amending it. There is however, an option to

| Type of walk                  | User test walks | Zaragoza |
|------------------------------|-----------------|----------|
| Occurrence in project        | 2               | 1 × 3 (1 in each district) |
| Goals                        | User testing of new app | Validate data in collaborative maps |
| Number of participants       | 3–4             | 6        |
| Type of participants         | Facilitators    | Facilitators |
| Software developers          | Older adults    | Older adults |
| Roles of participants        | User            | User     |
|                              | Tester          | Data validator |
| Duration                     | 60 min          | 90 min   |
| Duration of event            | ~2 h            | ~2 h     |
| Event makeup                 | Walk—debriefing | Walk—discussion |
| Outcome                      | List of technical issues | Validated data on collaborative maps |
produce new walks and submit them in digital form to the city information provider. So far, this has not happened. Overall, the process in Bremen was open to anybody interested, whereas in Zaragoza, only those participants selected by the senior citizens centres could participate. The final service however, is open to all citizens in both cases. Since the Zaragoza service relies on citizens’ further contribution (reporting incidents), the running of the service is “co-produced” (#5). All suggestions for improvements from the co-creation process are included in the participatory budgeting process. Decision-making is hence delegated to citizens (#6). In Bremen Hemelingen, citizens may inform the service providers about necessary changes to the information provided in the app (e.g. closed roads, new cafés).

Learning Point 5: The ways in which control may be shared with older adults, depends on the types of co-creation methods employed. In all cases, interventions need to allow for a meaningful engagement with participants’ everyday life. Explorative methods such as probes allow for sharing control over the definition of the problem to be solved, ideation methods such as walks or standardised forms allow sharing control over classification schemes, prototyping allows for sharing control over design solutions.
Sharing Knowledge and Expertise

In order for co-creation projects to be successful, interventions are required that facilitate a role shift from older adults as (potential) users to co-creators. Co-creation projects need to allow for the sharing of expertise and establish older adults as experts. What is of importance in co-creation processes is the collaboration and sharing of knowledge across government, social care service providers, software developers and senior citizens. In chapter “Co-creating Digital Public Services”, it was argued that boundary objects may facilitate perspective making and perspective taking within and across communities of practices (Boland & Tenkasi, 1995; Gasson, 2005; Star, 2010). As all three co-creation projects presented in this book had a specific focus on ageing and neighbourhood, the boundary objects we co-produced had to facilitate the sharing of knowing about ageing (well) in these neighbourhoods.

The probes in Bremen Osterholz (also through the interviews and the workshops) provided an opportunity to establish older participants as experts of their life course, ageing practices and socio-material arrangements in their neighbourhoods. They also allowed them to document and reflect on their everyday practices, their socio-spatial networks, and practices relating to old age and technology use. Probes sensitised participants towards their own ways of “doing age” and were hence tremendously helpful in identifying needs and resources. For the facilitators they allowed to develop a better and more profound understanding of these practices and doings. The approach to probes that we adopted was hence fundamentally different to the original one, which left most of the interpretative weight to the designers (Boehner, Vertesi, Sengers, & Dourish, 2007; Gaver, Dunne, & Pacenti, 1999).

Probes facilitated the individual and communal perspective making and perspective taking of participants. Chapter “Co-creation in Practice I: Co-creating a Digital Neighbourhood Guide (Bremen Osterholz)”, presented some of the probes that we used during our project and how we used them. In contrast to other accounts found in the literature, the interpretation of probes were not used as an inspiration to us as designers (probes as response), neither were they used as mere representations of the interpretations of the participants. Rather, the probes facilitated a process of perspective making amongst the participants and perspective taking between participants and researchers. There was a transition in the ways in which probes were interpreted from what was important to individual participants to what may be interesting to others.

Data tables in Bremen Osterholz have proven to be an ideal boundary object for enabling collaboration between the different communities of practice involved in co-creation. They provided a “standardised form” (Star & Griesemer, 1989) which allowed for circulation amongst different participants and allowed to collect information in a standardised way. By so doing, they facilitated the development of shared classification schemes. At the same time, they acted as “repositories” (Star & Griesemer, 1989). The older adults participating in Bremen Osterholz used data tables as a tool to collect information. For the city information provider, data tables
stood for a general representation of the interests of co-creators, which they could compare to their own database.

The walking workshops in Bremen Hemelingen and Zaragoza were important for establishing the participants as experts. While walking along routes and places that the participants knew well, they were given the opportunity to contribute their local and/or historical knowledge. In Bremen Hemelingen, several participants described themselves as “contemporary witnesses”. In particular, after conducting the data co-creation walks, the participants felt encouraged to share their historical and local knowledge. This experience remained an important point of reference, motivation and confidence in subsequent co-design workshops and meetings. For example, one of the female participants said that even though the men were more knowledgeable with technology, she could contribute with her knowledge about the district’s history.

Hence, in all three co-creation projects, we adapted methods that allowed senior citizens to articulate and reflect on different dimensions of social participation and ageing in place (Table 7). The first dimension of socio-spatial inclusion that Wiles, Leibing, Guberman, Reeve, and Allen (2012) list is *older adults’ sense of attachment and social connection*. This includes participants’ knowledge about their neighbourhood and is grounded in their everyday experience of growing older in the district. This dimension came to be expressed in participants’ wish to include nice places and walks into the digital district guide in Bremen Osterholz rather than merely listing organisations (e.g. related to health services). As such, nice places are

| Socio-spatial inclusion                                      | Participants’ expertise and their tacit knowing of their district                                                                 | Articulation in probes in Bremen Osterholz                                                                 | Articulation in walks in Bremen Hemelingen and Zaragoza                                                                 |
|-------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Sense of attachment and social connection                   | Knowing a neighbourhood grounded in everyday experiences of growing older in the district                                      | Expressed through own socio-spatial networks as depicted in maps, participants are experts for their neighbourhoods | Participants planned routes either for recreation and historical interest (Bremen) or frequently used (Zaragoza)               |
| Sense of security and familiarity                           | Knowing where to find relevant information and resources definition of what relevant information is                           | Avoidance of places where a lot of young people “hang out” Location of toilets, benches Access to public transport (information) | Participants defined the categories and attributes that were relevant for describing walks                                |
| Sense of identity, linked to independence and autonomy      | Knowing where organisations and places are located, which services are provided, and how to access them                         | Nice places, defined by green areas Places of historical importance                                         | Participants felt confident to judge the suitability of routes and make suggestions for improvement                       |
dependent on the circumstances, abilities and preferences of older adults. In Zaragoza and Bremen Hemelingen, participants planned routes—either because they judged that these were routes frequently used by all older residents (Zaragoza) or because the routes were particularly well-suited for recreational walks or historical interest (Bremen Hemelingen).

The second dimension listed by Wiles et al. (2012) relates to a sense of security and familiarity. Knowledge about places in the neighbourhood is important in order to be able to plan a visit or tour. One of the tasks of participants in all co-creation projects was to define what information was relevant and important, what kind of attributes were useful. In Bremen Osterholz, this dimension came to be expressed through data on the location of toilets and benches, but also through information about public transport (e.g. how to reach a place) or information relating to accessibility. In Zaragoza, the sense of security was addressed by paying specific attention to the infrastructural problems in routes and ways to improve their age-friendliness. In Bremen Hemelingen, participants suggested to include additional information (e.g. on street lightning) to increase their sense of security.

The third dimension relates to a sense of identity, linked to independence and autonomy. In Bremen Osterholz, participants expressed a need to know where organisations and places are located, which services they provide and how they can be accessed. For example, information about the accessibility of public buildings enables people with mobility impairments to better plan their trips and hence increases their independence and sense of autonomy. This dimension was expressed through detailed information about nice places (such as the descriptions). In Bremen Hemelingen and Zaragoza, the participants felt confident to judge the suitability of routes and make suggestions for improvement. Their identities as knowledgeable subjects were confirmed through the ways in which the walking workshops were conducted.

Overall, the probes and walks enabled participants to reflect and articulate their tacit knowing. For example in Bremen Osterholz, certain beliefs and assumptions participants had about particular places in the district and whether and why they liked to go there or not were articulated through the probes. Being open and trustful with each other as well as being able to take perspectives about some of the differences, helped to identify why nice places were an important feature of the district guide and which. Hence, probes enabled perspective making and perspective taking within design teams of older residents developers, researchers and others. They proved to be a method to be used early on in the process to facilitate ideation and exploration. They also provided a basis for developing a shared understanding of the problem area and types of categories and classifications participants considered relevant. However, such a method needs to be coupled with an intervention that compares existing classification systems with these new ideas and supports a negotiation process between the two. In this respect, the data tables as standardised forms were very useful.

The walks allowed participants to define relevant data structures, categories and information based on their own experience. Participants suggested and planned routes in both Zaragoza and Bremen. They subsequently collected and validated
data on pre-defined categories. In Bremen Hemelingen, participants volunteered to guide a historical walk or facilitated contact with a local historian. Eventually, participants in Zaragoza and Bremen Hemelingen contributed feedback to the prototypes as life-world experts.

**Learning point 6:** Probes and walks established older adults as experts in the co-creation process. They sensitised participants towards their own ways of “doing age” and were hence tremendously helpful in identifying and articulating needs and resources. In particular, the walks in Bremen Hemelingen, allowed a variety of people to contribute to the overall process, even if they did not engage in the prototyping part. Standardised forms such as data tables or documentation templates for walks facilitated the development of shared classification schemes.

**Enabling Change**

**Individual Change**

This book investigated the extent to which co-creation projects can respond to the needs and interests of older citizens and thereby potentially enable change on the individual level. There was not one particular need to be satisfied with the co-creation projects, but rather older adults named five overlapping interests:

- doing something for their home district or getting to know the district better,
- engaging with new technology,
- learning new things,
- doing something to improve the image of their neighbourhood/district, and
- socialising with others.

Most of the participants mentioned an interest in the district or a specific neighbourhood as motivation to join the co-creation activities. For others, doing something for their district of residence was a strong motivation. One participant emphasised her sense of self-efficacy to be politically engaged and not to leave things to “the politicians”. Her participation in the process was part of her local political engagement.

Many participants stated that they wanted to improve (the image of) their neighbourhood/district. In the case of Bremen Hemelingen, this related strongly to the issue of segregation that was emphasised by the participating older adults as well as other stakeholders. The walks were relevant to those who wanted to learn more about the district and share their knowledge. In addition, participants expressed an interest and the feeling to need to engage with new technology. This interest was mainly grounded in their feeling of being socially excluded through non-use and the need to familiarise themselves with new digital technology. Only few participants were genuinely interested in learning how software development “works”.

All stakeholders we interviewed stated that the final digital service was relevant to older users. A social activities manager we interviewed in Bremen Hemelingen said, that “going for a walk is much more part of the reality of older adults than of younger generations”. In addition to the overall relevance of walks for older adults, the service providers, intermediaries and participants defined the value of the service for particular groups of older adults: Most emphasised the value for older people who do not know the district very well or have limited financial resources. The information provided also allowed for better planning of walks and hence increased people’s confidence in being able to “master” a walk in an unknown neighbourhood.

Hence, similar to accounts from other data walks, the participants were able to engage with their neighbourhoods in different ways. Drawing on an everyday activity such as walking and turning this experience into a digital public service, created value for different groups of older adults.

Overall, our findings suggest that for older adults, data walking workshops proved to be an effective and enjoyable form of engagement. This age group has a sustained interest in their neighbourhoods and what it means to grow older in a particular place. Walks combine a social practice with physical activity; both are viewed as having a positive effect on health and well-being. Furthermore, giving older adults the opportunity to share their experiences and knowledge was appreciated by the participants. Collecting this information and making it available in a digital service further values the participants and at the same time is beneficial to a broader target audience.

Hence, using this experimental form of engagement allows not only for critically engaging with data (Hunter, 2018; Powell, 2018; Van Zoonen, Hirzalla, Engelbert, Zuijderwijk, & Schokker, 2017; Wieringa & van Es, 2018), but also to engage a variety of citizens in civic tech activities to co-design, implement and evaluate digital public services that benefit their communities. Data walks are a promising method to facilitate “participatory open data projects” (Sieber & Johnson, 2015) by engaging citizens that are often excluded as partners in digital innovation. They are a method to enrich the current civic tech formats and allow a variety of citizens to engage with data about their neighbourhoods, districts and cities in a meaningful way. Such walks attract participants beyond the “usual suspects”, but they are also in themselves a meaningful activity to contribute to social participation. Hence, even if not all participants of walks continue their engagement in the digital service development, they still benefit from participating in and contributing to the process and its outcome. What needs to be admitted is that not everybody is willing or able to participate in a longer-term process. Nevertheless, such walks provide an opportunity for any community member to become involved selectively. Through such interventions, older adults cease to be subjects of digital innovation and become co-creators.

What is however challenging is to sustain these activities and ensure sustainable change. The logic of funded projects with a specific time frame, is that their lasting impact is rather selective. What is required beyond the mere co-creation of a technical artefact is to embed the resulting service into the existing service infrastructure.
In addition, an infrastructure for continuous collaboration is required so that co-creation projects are not limited to one-off engagements but become the norm in public sector innovation.

Learning Point 7: In co-creation, old age is not understood as a problem that needs a technological fix, but rather older adults’ expertise, lived experience and embodied knowledge become resources for the co-creation of value, knowledge and technology. Co-creation will only produce a lasting change on the individual level, if it is embedded in a continuous collaboration between government, social care service providers and older citizens.

Social Change

One of the main reasons for having users participate in co-creation projects is that they bring their expertise and lived experience into the process so that a successful service outcome is more likely. What we had to realise was that the claim for openness and user-centricity created a tension with respect to compliance with the framing conditions of our projects. For example, residents of an elderly care home in Bremen Hemelingen pointed out that there was no bus stop in front of their home allowing for more mobility in the district. They were hence not in need of better information services about the district but lacked physical access to the district in the first place. Although a valid point and certainly a major hindrance for the residents’ social inclusion, creating new bus stops, was by no means part of our co-creation project and out of scope of our grant agreement. This incident was one of many that demonstrated that a co-creation project was indeed a continuous negotiation and manoeuvring to identify a problem definition for which a solution was indeed within the scope of the project.

Latour (2007) argued that framing is something that actors constantly do. However, as Callon (1998) points out: “overflows are the norm: framing is expensive and always imperfect”. Figure 4 depicts how overflows are present in the first phase of a co-creation project which aims to “find the right problem” and in the third phase which aims to “find the right solution”. While exploring the life worlds of participants and reflecting on the results, the scope of a co-creation project may be exceeded in that the outcome of the exploration activities do not necessarily correspond to framing conditions such as existing policies and strategies or existing collaborations. Similarly, while developing potential solutions, users may propose design solutions and classifications that are incompatible with existing legal and organisational restrictions, existing IT and (open) data infrastructures or procurement laws.

Overflows are also productive as they allow adding value locally. For example, during the walks in Hemelingen, we noticed that there was a lack of benches in certain parts of the walk. A request was made to the local district council to fund benches in specific locations along the route. While overflows can be productive, it
is important for co-creation facilitators to be transparent about the restrictions and framing conditions. In general, the output and outcome of a co-creation process can be distinguished between data, apps and the service to be run. In addition, there may emerge new or amended collaborations between different stakeholders; policies and strategies may be developed further.

In addition, the co-creation of services may also challenge current inequalities in the use of digital services. For example, it has been noted that issue trackers such as FixMyStreet which report incidents in road infrastructures to public authorities are used over-proportionally by citizens with higher socio-economic demographics. Through such tools, they are hence able to make problems in their neighbourhoods more visible and potentially receive more attention. In Zaragoza, the co-creation project supported the use of such a collaborative tool by older adults. This hence made the place-making practices of older residents visible and allowed them to seek the attention of their public authority.

In the long term, social change will only be effective, if the sustainability of the co-created services is ensured. In Mobile Age, this was a key concern for the whole team. As described above, Zaragoza included the services in their existing service portfolio. In Bremen the services were adopted by the city information provider. Even though the official city portal had agreed to maintain the services in Bremen, it turned out that this was not as easy as anticipated. We were in close contact with the portal providers throughout the process to ensure compatibility. However, our co-creators made a number of design decisions that could not be implemented on the official portal due to its own guidelines and infrastructural requirements. Differences included for example the embedding of the services in the overall

![Co-creation Diagram](image-url)
district guides (at the city information portal you can see several other headings on the top and different social media channels on the bottom). The map that had been co-designed with older adults could not be used as a layer, because the city portal uses Google Maps as default. Hence, in the end, we had to dismiss certain design features in order to ensure the sustainability of the service.

Learning Point 8: The more open the process and the less restricted by existing infrastructures, the more difficult it is to make it sustainable. Facilitators of a co-creation process need to be transparent about the framing conditions. The social change stipulated by a co-creation project may then extend the outcome beyond the co-created service to new and amended collaborations, further development of strategies and policies but also changes in the IT and (open) data infrastructure and a cities service portfolio.

All three projects started with a concern on including older adults in the design of digital futures. This concern aligns with a number of policy frameworks such as the World Health Organization (WHO), OECD or the Covenant on Demographic Change that have identified requirements/needs for age-friendly cities and communities. The chapter on ageing societies and technological innovation closed with a review of current policy initiatives. According to the WHO, a more supportive and enabling social and physical environment is essential for people to age in better conditions. The WHO age-friendly cities approach proposes a framework of eight interconnected domains, as shown in Fig. 2 of chapter “Ageing Societies and Technological Innovation”. Considering these eight domains can help to identify and address barriers to the well-being and participation of older people: built environment and outdoor spaces; housing; transportation; social participation; respect and social inclusion; civic participation and employment; communication and information; and community support and health services.

In the following, I summarise how the three Mobile Age projects described in this book contributed to a range of objectives and actions associated with the action areas. Overall, there are a number of ways in which the action area social participation cross-cuts with others. Mobile Age has demonstrated that technology can

| Action plan                               | Mobile age contribution                               |
|------------------------------------------|------------------------------------------------------|
| Provide benches and toilets              | Mapping benches and toilets                           |
|                                         | Installing new benches/repairing broken benches       |
| Provide safe and clean environments      | Information about safe and clean environments (e.g. lightening) |
| Provide places for recreation and leisure| Information on places for recreation and leisure      |
| Provide parks and green spaces           | Information on parks and green spaces                 |

Table 8 Practice examples for outdoor environments from local age-friendly action plans and assessments compared to Mobile Age contributions (adapted from WHO, 2017)
indeed play a supporting role in each of these. The action area *outdoor environments* is associated with the objective to provide for places to be and stay outdoors. In Mobile Age, we collected data about outdoor environments as shown in Table 8.

With respect to the action area *transport and mobility*, one of the objectives is to provide an infrastructure for active mobility and walkability. The WHO action plan suggests, amongst other things, to promote walking among older people. Mobile Age contributed to this by providing information on accessible and interesting routes.

The action area of *information and communication* seeks to provide a “range of opportunities for social participation that are accessible for older people” (WHO, 2017). One recommendation on how to implement this is to “empower older people to participate in activities and increasing awareness of existing activities”. This was one of the core contributions of Mobile Age as it informed about events and their accessibility. The action areas of *social inclusion* as well as *civic engagement and employment* are meant to be advanced by “supportive environments for social exchange and places and providing opportunities for social contact in the community and neighbourhood”.

During our co-creation projects, we learned that the *impact of a co-created service goes beyond equipping older adults with relevant and appealing information*. The information provided in such a service also makes deficits in the physical infrastructure visible and can contribute to its improvement. When we presented the project to the district council of Hemelingen, members of the committee for construction and environment showed interest in the results and offered to discuss improvements. In Zaragoza, suggestions for improvement were collected on the collaborative maps. Some of the issues marked down, were immediately attended to by the city administration (e.g. road repair); others were referred to the participatory budgeting process (e.g. installation of new benches). Hence, digital information services are only a necessary but not sufficient means to improve social inclusion and e-inclusion. To achieve the desired impact, an information service developed in a co-creation process has to be embedded in the larger non-digital institutional environment and resources of a neighbourhood/district/city.

**Learning Point 9:** The co-creation of digital public services is not just a process to co-design technology, but also a process to co-create value from socio-technical innovations. The results of a co-creation process are not merely a technical artefact and related data, but a service that is embedded in new (or amended) collaborations between local actors and existing service infrastructures. Co-creation hence contributes to joint socio-technical future-making that produces new publics and enacts alternative imaginaries about old age.
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