Erik Höhne, Michael Schneider, Carolin Alippi, Elisabeth Borbe, Oliver Scharf

38 User-Centred and Sustainable Local Mobility – A Participatory Approach in the Neighbourhood

Summary: With the neighbourhood concept developed in the ZED Lighthouse, the actors involved are not only trying to meet the growing demand for local mobility through a research mobility station with neighbourhood caretaker as well as age-appropriate e-scooters and autonomous boxes for e-scooters. Rather, this concept also opens up perspectives and offers all the necessary aids for older people to be able to live in their familiar neighbourhood – and thus also to keep the neighbourhood itself structurally stable. With the help of user-friendly and participatory technology development, those affected are involved in the creation of new (socio-)technical solutions. The blueprint from Zwickau-Marienthal creates new perspectives, especially for large housing estates with homogeneous age structures, to bind their residents to the neighbourhood in the long term and to keep the estates liveable and lively into old age.

38.1 Introduction and Project Background

Since 2017, the lighthouse project "Zwickauer Energiewende demonstrieren" (ZED, "Demonstrating the Zwickau Energy Transition"), funded by two German federal ministries, has not only been developing holistic solutions for concrete social and technical problems of the energy and mobility transition, but also testing them on a real scale at neighbourhood level: How can energy consumption be reduced in a neighbourhood, renewable energies be integrated into the energy supply in a socially acceptable way, and a smart coupling of electricity, heat and mobility succeed? In short: How can urban districts become climate-neutral – without ignoring social aspects? A prerequisite for (socio-technical) problem solutions that are both sustainable and accepted is the involvement of social actors in the research process: ideally, their expectations, experiences and know-how are brought together with scientific and technical knowledge in such a way that the results of the research process can be integrated into science and society (cf. e.g. Weyer/Schmidt/Kirchner 1995, Schneidewind/Singer-Brodowski 2015).

Erik Höhne, Stadt Zwickau
Michael Schneider, Ludwig-Maximilians-Universität München
Carolin Alippi, Alippi GmbH
Elisabeth Borbe, Johanniter Unfall Hilfe e.V.
Oliver Scharf, Westsächsische Hochschule Zwickau

To this end, ZED not only involves numerous actors from local politics and administration, companies, science and civil society in the research process from the very beginning, but also uses a wide range of different participation formats – from focus groups and discussion forums to test drives and measurement campaigns to a research mobility station. The jointly developed solutions are then tested and continuously adapted to the requirements of users and operators in a living lab, the urban district of Zwickau-Marienthal.

Zwickau-Marienthal, with its 8,000 residents, is characterised by Wilhelminian style architecture structures and small housing estates that were built around its former (village) centre in the 1920s to 1940s. In the 1950s and 60s, the large housing estates Marienthal-Ost and -West were built in the row construction style common at the time. According to the "Integrated Urban Development Concept Zwickau 2030" (Stadt Zwickau 2022), these large housing estates in particular are considered areas in need of consolidation. This means that, among other things, a reduction in the number of flats, "cautious" deconstruction, but also a (family-friendly) consolidation of smaller flats is necessary. (Stadt Zwickau 2022) This is necessary to promote the influx of young families, to introduce targeted measures for "the significantly increasing proportion of residents older than 65 years" and to counteract "higher housing vacancy rates". (Stadt Zwickau 2022)

In fact, Zwickau-Marienthal with its 7300 inhabitants is almost paradigmatic for the rapidly advancing ageing in eastern Germany: while the Federal Statistical Office (destatis 2021) notes a 5% higher proportion of people aged 65 and older in Eastern Germany than in the Western Germany for 2020 (26% vs. 21% of total population), the municipal administration of Zwickau reports a proportion of this age group of 29.4% for the entire urban area (Stadt Zwickau 2021). In Marienthal-East, the proportion of residents aged 65 and older is significantly higher again: it is 35.9% here, and in Marienthal-West, at 28.5%, the proportion is roughly in line with the Eastern German average. (Stadt Zwickau 2022)

In the Marienthal living lab, we are dealing with a predominantly older population, for whom the INSEK 2030 already names a number of important urban development projects: In addition to barrier-free design in development and renovation measures in the public sector, it also lists, for example, measures of action in senior citizens' facilities, in the traffic area or for the further identification of residents with their district.

This article focuses in particular on those activities of the ZED lighthouse that were carried out together with and for the older residents of the Marienthal living lab. The aim was to open up perspectives for senior citizens in particular and to offer them all the necessary building blocks they need to be able to live in the neighbourhood they are accustomed to – and thus also to keep the neighbourhood itself structurally stable.

The approach followed in ZED is based on the concept of participatory and user-oriented technology development, i.e. those affected are themselves made participants in the development of new (socio-)technical solutions. (Schneidewind 2014, Heite/Rüßler/Stiel 2015) This approach and its implications for older residents and their specific needs are presented in the next chapter (38.2). Its implementation as a concrete

contribution to improving local mobility in the Marienthal living lab is then described in chapter 38.3. The article concludes with a summary and outlook (38.4).

38.2 User-Oriented Technology Development

In *Umwelten des Alterns* (English: the environments of ageing) described by Claßen/ Oswald/Doh et al. (2014), the neighbourhood is of central importance for the quality of life of older people; because of the "distance sensitivity of old age", older people are not only "constant and critical users and connoisseurs of their neighbourhood" (ibid.), they also interact more strongly with their local environment than more mobile young people (cf. Heite/Rüßler/Stiel 2015). Not least because of their differently developed mobility resources, such as less possession of a driving licence, less availability of a car, and a reduced mobility rate and daily distance, older people are more firmly anchored in "their neighbourhood" than younger people. Innovations and changes in this regard must therefore be particularly well designed and justified, and in the best-case scenario, older people are involved in the development of innovative solutions as co-producers in order to be able to systematically use their everyday expertise, their wealth of experience and their knowledge (ibid.).

From the perspective of user-oriented technology development (Bijker/Hughes/ Pinch 1987, Weyer 1997), the involvement of potential users in the R&D process gives them the opportunity to actively contribute their expectations and needs, but also their intuitions, heuristics and decision-making routines, and thus also improve the technical and economic chances of realisation (Gigerenzer 2013): A deeper understanding of the contexts of use as well as the everyday routines and expectations on the part of users enables, for example, more user-friendly product designs – and in general the development of technical systems and functionalities that people really want. This in turn should lead to fewer frictional losses in human-technology interaction (e.g. due to misuse) and to greater acceptance on the part of users (cf. Hickfang/ Möller/Schneider et al. 2020).

A prerequisite for this, however, is consistently opening up of the innovation network of professional players for potential users and for their interests and strategies – which we believe is necessary because the requirements and needs can change in the course of innovation projects and because there is (still) no significant demand for many innovations at the time of their market launch. In addition, a new technology is often only tested in the laboratory or as a prototype, but not under practical conditions, so that potential users may shy away from the "risk of the new". For these reasons alone, the success of a new technology cannot be explained by supply and demand factors alone.

For the technology providers, such an opening up of the innovation network offers the opportunity not only to adapt their developments to the requirements of the

potential users, but also to systematically include their idea potential and the context of use in the innovation process.

However, empirical studies, for example of "smart grid experiments" (Lösch/ Schneider 2017) or "urban labs" (Scholl/de Kraker/Hoeflehner et al. 2018, Reusswig/ Lass 2017), also show that innovation processes by no means follow a simple linear project course – from problem identification to idea generation to implementation in practice. Rather, they usually run in recursive loops, are characterised by numerous breaks and therefore resemble the "fireworks model of innovation". (Van de Ven/ Angle/Pooley et al. 1999) This means that they are subject to non-linear dynamics, surprises are pre-programmed, and the process is neither stable and predictable, nor dependent on chance. According to the authors, innovations are unpredictable not because they are at the mercy of chance, but because they are subject to a complex interplay of all actors involved in the process. The course of such interactions therefore represents an experiment with an open outcome, both for the participants themselves and for any observers.

Even if the courses of innovation processes and interactions regularly appear as (real) experiments, the authors observed three basic sub-processes of innovation courses, namely "initiation", "development" and "implementation", which are characterised by different events, actors, functions and framework conditions (ibid.).

Johannes Weyer (1997) argues similarly: he conceives of technology genesis as a "multi-stage process of the social construction of technology", whereby the actors involved in the process as well as their visions of use can change several times in the course of development. He describes the process itself as a sequence of social closures and subdivides it – ideally simplified – into the three phases of "emergence", "stabilisation" and "implementation": While in the "emergence phase" new, partly visionary and (initially) innovative technologies are usually developed away from established structures (typically in "niches" in the sense of Frank Geels' Multi-Level Perspective, Geels 2002), it is crucial for the "stabilisation phase" that social innovation networks of strategically capable actors are created, which not only take up the ideas, but also recombine their technical-apparative and social components and push forward the development of prototypes. In contrast, "enforcement" is an independent innovation process, which on the one hand must succeed in triggering recursive social learning processes that go beyond the "narrow" R&D networks from the stabilisation phase. On the other hand, the societal need for innovative technical solutions must first be "created" through "wide" networks with new actors from the user context. Without this change of actor constellations, without the opening of the innovation network and without the construction of societal demand structures and thus markets, even the most ingenious idea is doomed to failure.

This opening of the innovation network for the needs of potential users is described in the following chapter using the example of the development of innovative offers for local mobility, especially for older residents of the Zwickau-Marienthal living lab.

38.3 Participatory Development of Local Mobility Offers in the Marienthal Living Lab

The development and testing of own offers for older people in order to improve their local mobility took place in a multi-stage process, which can be described clearly with the three phases of the technology genesis model by Weyer (1997) already outlined above. Thus, the idea of creating such offers and developing corresponding technologies or services for them emerged outside of the established structures: not "classic" mobility providers or product developers, but niche actors from the user and user context raised awareness of the problem of only limited (local) mobility in the context of actor interviews and focus groups and proposed first neighbourhood solutions based on electric scooters for seniors (e-scooters). In the "stabilisation phase", the original ideas with their technical-apparative and social components were further developed within the framework of an iterative process with household surveys, test drives or creative workshops, new "strategically capable" actors were integrated into the innovation network and the development of a prototype – a research mobility station with its own "neighbourhood caretaker" – was advanced. In the "implementation" phase, adjustments were made to the requirements of the potential target groups, recursive social learning processes were initiated and thus the social need for these innovative socio-technical solutions was generated. In the following, the innovation process is outlined along these three phases of the technology genesis model:

Emergence Phase

The "generators of idea" were neither classic mobility actors, such as the local public transport provider, nor established product developers who developed this new mobility approach. Rather, the residents themselves reflected on the location qualities of their neighbourhood and provided creative input for a "future-oriented Marienthal". And it was the special project constellation with actors from the municipality, civil society, research and two service providers from the health sector – a nursing service and a medical supply store – that together set the further course of the innovation process.

At the beginning of the ZED Lighthouse, in-depth explorations were conducted with residents (N=10) and actors (N=16) of Marienthal with the aim not only to survey the image and other location characteristics of this neighbourhood from the respondents' point of view, but also to develop ideas and visions for a "future-oriented Marienthal". For many respondents, Marienthal is still a "place to feel good", a "very green", "great district" in a "good location", with a "great sense of belonging" and a high level of identification among the residents: "We are Marienthalers". Nevertheless, due to the "loss of jobs", but also of "shopping facilities", the neighbourhood has

increasingly become a "purely residential neighbourhood", a "mere place to sleep". Due to the "slow ageing" and the "influx of people from other areas" and with "different views" ("you don't want people like that as neighbours"), "ever greater areas of conflict" had also arisen, the "sense of community and cohesion" had become much less. It is therefore particularly important to strengthen "the community" again ("everything that promotes relationships is to be supported"), to "make the neighbourhood more lively again", i.e. to "combine living and working", but also to secure "the supply of trade" and the "accessibility of shopping facilities", especially for older people. It is therefore necessary that "urban planning and development no longer abandon planning" and instead of "demolition and deconstruction" actively work on the "future of Marienthal", e.g. do something against "traffic noise", against "vacancies", but also for "affordable housing" and for a "life suitable for the elderly".

The respondents' expectations of the ZED Lighthouse were mainly directed towards the two topics "We are Marienthal" and "More environmental protection": While visions such as "e-mobility for all Marienthalers", "mobility on demand" or, in the building sector, "zero emissions with recognisable added value for the residents" were developed for the environmental topic, the first topic was about "strengthening the community", for example through participatory processes or the "development of committed networks" (instead of "all-round state provision").

In a second step, the interview results were presented in three focus groups – again with interested Marienthalers and actors – and concrete "technology projects" (Weyer 1997) for the two topics were developed together with ZED Lighthouse partners. In all focus groups it became apparent that "We are Marienthal" and "More environmental protection" can not only be combined, but also fit into the overall goal of ZED to demonstrate a climate-neutral neighbourhood with smart sector coupling without neglecting social aspects.

The core of the new socio-technical project favoured by all participants is based on the fact that "e-mobility for all" can shorten distances and increase activity radii, especially for older people, and in combination with a contact person ("neighbourhood caretaker") can also contribute to "strengthening the community". In detail:

Since the large housing estates in the living lab do not have demand-responsive access to public transport, nor are everyday activities such as shopping or visits to the doctor within easy walking distance for everyone, cars have been the main means of transport used for everyday action. Since the large housing estates in the living lab do not have demand-responsive access to public transport, nor are everyday activities such as shopping or doctor's visits within walking distance for everyone, the car was used as the main means of transport for many of these purposes.

From ZED's point of view, however, the use or even an increase of motorised individual transport is not sustainable due to the consumption of fossil energy and CO_2 emissions. In contrast, the idea of establishing an alternative form of local mobility based on electric mobility is more sustainable, especially since it serves the interests of the residents (securing their mobility in the neighbourhood) and the project goals

(decarbonisation and sector coupling). However, in order to ensure that all residents in the living lab have access to it, from the developer's point of view it seems appropriate to develop a kind of sharing system with intelligent networking. In addition to such a sharing system, it must also be ensured that all interested parties are instructed at the mobility hubs that are still to be set up, so that they can also use the system and e-vehicles properly. This is the task of the neighbourhood caretaker.

Also, as a result of the in-depth explorations on the neighbourhood condition at the beginning, a neighbourhood caretaker could be a useful implication of the project, whose function goes far beyond instructing the users. In this sense they do not only provide support in securing local mobility. Rather, they act as promoters of social provision – with the aim of creating an offer with low-threshold access, identifying needs and initiating chains of help for early intervention of problem situations. Neighbourhood caretaker, who are provided and paid by a project partner in ZED, form an interface in the residential area for the utilisation of supportive services. They act as a confidant for all residents in the neighbourhood, support the referral of professional help and help the residents to help themselves. By providing information and being regularly present in the neighbourhood, the "neighbourhood caretaker" actively shape the social space of the residential area with the involvement of the residents. This increases the residents' attachment to the neighbourhood and the chance of a long, self-determined life in their familiar social environment.

This socio-technical core based on age-appropriate electric scooters for senior citizens (e-scooters) and neighbourhood caretaker was opened up to other actors from the user context in the "stabilisation phase" up to "prototype development".

Stabilisation Phase

First of all, test drives (N=12) with subsequent interviews with senior citizens (cf. Figure 38.1) on their spontaneous impressions, their expectations and general (mobility) needs showed that despite some structural and road traffic-related difficulties, the e-scooter is an enormous relief and enrichment of everyday life, especially for the health-impaired drivers. And in combination with the neighbourhood caretaker system and smart sector coupling, it can also make a contribution to age-structured and energy-efficient neighbourhood development. Nevertheless, in the early stabilisation phase, there was still a lack of corresponding parking and charging options as well as booking, payment and support systems. In addition, there was a lack of valid information about the existing movement patterns of the neighbourhood residents, their mobility behaviour and their needs for alternatives and new mobility options.

For the implementation of possible options such as "e-scooters for all", further (market) analyses, concept developments and participation steps with new strategy-capable actors from the user and user context were therefore necessary. Thus, in the course of the project, corresponding concepts were developed in (creative) workshops

Figure 38.1: Test drives with senior citizens in the neighbourhood and subsequent survey.
(source: ZED project (2019))

and public discussion forums such as the "ZED Forum", but also discussions were
held with potential sponsors, such as housing associations, operators of senior citi-
zens' homes, associations or voluntary services, as well as the (licensing) authorities.

At the second ZED forum "Marienthal – sustainably mobile", more than 60 visi-
tors discussed fundamental questions of the mobility turnaround and satisfaction
with the local traffic situation (cf. Figure 38.2). At various moderated topic tables, peo-
ple then considered what mobility in the neighbourhood could and should look like in
the future in order to make it as attractive as possible for every citizen – whether
young or old. In the opinion of the participants, options such as "e-scooters for every-
one" should ideally be implemented in such a way that the station for renting vehicles
is easily accessible (max. 500 metres from the home) and that there are also return
points at exposed destinations (e.g. doctors, supermarkets, allotment gardens). It was
also suggested in the ZED forum that the range of vehicles must also be usable for all
age groups, so additional types of vehicles such as e-bikes and e-load bikes were intro-
duced. Furthermore, the station itself should not only be a lending station, but also
serve as a meeting point in the neighbourhood through an appealing green exterior
design with seating options. Finally, the participants preferred a payment per use (no
monthly flat rate). The costs should be based on those of public transport and at most
be slightly higher. Flexible borrowing times without fixed opening hours would be
desirable.

Central questions, such as the further development of the new mobility approach
and the size of the potential market, were also integrated into the various waves of
the ZED Lighthouse household surveys. The assessments made and new ideas formu-

Figure 38.2: Discussion forum on Mobility.
(source: ZED Project (2019))

lated there by the respondents (Number of cases > 1.300) were embedded in the further development process.

Overall, the results of the discussion forums, actor and household surveys showed that the idea of setting up a mobility station in the Marienthal neighbourhood met with a broad response, both from residents and potential users as well as from actors from the (local) business community and the city administration. The information gained in this way was iteratively integrated into the new mobility concept, which was created within the framework of the project by the coordination of the City of Zwickau together with the Innovation Network.

The aim of this concept is therefore to ensure (local) mobility for all residents of the neighbourhood and to offer target group-specific environmentally friendly vehicles (e-scooters, e-bikes, etc.). In addition, the designated station is not limited to a mobility offer: it is also intended to be a place for meeting and strengthening the community. The "neighbourhood caretaker" helps people to help themselves, enables participation and at the same time provides information about the ZED lighthouse.

The questions already raised in the ZED Forum about the location of the station, about a design that is as appealing as possible and fits in with Marienthal, and about the e-vehicles to actually be provided for different target groups were finally put to the vote in further participation formats (focus groups and surveys[1]). The decision

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1 In total, there were three household surveys (two postal and one face-to-face survey – N: 740; 485; 103) and three focus groups (topics: old and young/ economic actors / social services and neighbourhood caretakers – N: 15 each).

was again based on the open and transparent project approach and was made in favour of a flexible, open and modern container solution Containers offer the advantage of being barrier-free, and they can – if necessary – be moved to other locations almost at will. It was also decided to equip the e-scooters with GPS tracking modules in order to learn about particularly frequently travelled routes and the destinations of the users. This could, for example, lead to the creation of further service or rental stations at highly frequented locations, or conversely, conclusions could be drawn about the structural or traffic condition of routes and paths that are hardly used, and measures for change could be suggested. This makes it clear that the development of the mobility offer is never complete with the completion of a station, but that the user, whether directly or indirectly, will always have a say in the further development with his or her information and tips.

A first important step towards stabilising the offer was taken with the opening of a prototype in summer 2020 (cf. Figure 38.3). In order to promote the visibility of this station, a communication concept was developed in advance by the project partners. Both the opening ceremony itself, to which all neighbourhood residents received invitations, and the subsequent campaign week with topics related to the new mobility service were well attended and received a lot of attention from local media. The mere fact that a mobility station is something new for Zwickau encouraged a positive response. In particular, its permanent presence (the station is open from 8 a.m. to 6 p.m. during the week) and the permanent presence of ZED project staff and neighbourhood caretaker created curiosity and led to countless conversations, especially with those residents who were not interested in borrowing an e-scooter. In a short time, the residents of the neighbourhood adopted the station as a new meeting place and space for conversations – among themselves and/or with project staff.

Through these discussions with the residents and the first users, as well as through accompanying systematic surveys, numerous insights were gained in the first weeks to further improve the service. As a result of the feedback, for example, the opening and break times were adapted to the demand and the rental offer was expanded to include a transport option with e-cargo bikes. In particular, the data collected on borrowing purposes, frequency and duration of use, as well as the willingness to pay for the service, which was initially still free of charge, should optimise the operation in the long term. However, this data and the results from the surveys are not only aimed at improving the mobility offer, they are also intended to make a contribution to sustainable neighbourhood development. The focus is on the following topics:

– What are the barriers to use among users? What are the preconditions for (improved) acceptance of the services by the users? How the offer could be further developed?
– What other types of vehicles would come into question and thereby expand the range?
– Can additional added value (neighbourhood pilot, information opportunities) strengthen the basic function of a lending station for sustainable, alternative mo-

Figure 38.3: The research mobility station opened in summer 2020.
(source: ZED project (2020))

bility in the neighbourhood and thus push the transport transition as a component of the energy transition?
–   Beyond its function as a meeting place, how can the research mobility station also contribute to "strengthening the community"?
–   Which professional services are necessary/desired to enable a long and self-determined life in the home environment?

In the course of the first months of trial operation, it became apparent that the strict limitation of lending and return times could prevent some borrowing opportunities: For example, some doctor's appointments could not be kept or summer evening activities, such as allotment garden visits, were not possible as a result. However, extending opening hours is a challenge, as staff costs in particular are a major cost factor for running such a station.

Against this background, the project consortium developed the idea of creating an autonomous, digital lending facility. A "mobility box" ("Mobilbox") to be operated by the users themselves (cf. Figure 38.4) makes it possible to borrow a scooter around the clock. After a one-time registration, they can independently borrow and return their e-scooter with a user card. At the same time, the operators record the user and the borrowing times via a digital interface.

The design of this box was also done in an iterative process with the participation of the users. This made it possible to organise the entire lending process in a target

Figure 38.4: Autonomous "Mobilbox" and e-cargo bicycles as further development
of the mobility concept.
(source: ZED project (2022))

group-specific and user-friendly manner as simply as possible. The feedback from the users also led to further improvements of the "Mobilbox" itself: Not only illustrative instructions for use and audio-visual accompaniment were developed, but an automatic light for borrowing in the dark and a traffic light solution that indicates the availability of vehicles have now also been implemented in the system. This feedback of findings and experiences from the user context were also enormously helpful for the hardware and software developers of the participating university.

Implementation Phase

Lighthouse projects like ZED have the chance to develop new ideas and also test them extensively in the living lab. Economic viability plays only a subordinate role, which hardly needs to be considered during the R&D process. But for the operators, the financing of the now "finished" technology is fundamental for a continuation after project completion, and for a permanent implementation of the mobility concept in Marienthal – but possibly also elsewhere – the existence of a market is decisive. On the part of the actors, there are various options and considerations that can play a role in financing the offer and creating markets:

- Refinancing through different tariffs for users
- Cross-financing of the mobility offer by sponsors of the neighbourhood (housing industry as well as entrepreneurs and service providers who profit directly or indirectly through an increase in customers)
- Cross-financing as a component of a neighbourhood service that can be booked via smart-home tools of the surrounding flats
- Financing of a staff-operated mobility station by integrating different uses (neighbourhood pilot, parcel station, sales opportunities for products, etc.)
- Economies of scale of "mobility boxes" and associated cross-financing of staff-operated mobility stations

The integration of further locations and the associated expansion of the network of actors is also crucial for the long-term success of the concept. Only if mobility is permanently available for the users and their mobility purposes (shopping, errands, stops) and is close enough to their homes, a mobility offer is a concrete option for use.

In perspective, it is therefore a consideration for those involved in the project, but also for later operators, to create a network of mobility points where the rental of e-scooters is possible. The already existing research mobility station could be the "spider in the web", so to speak, where expertise, instruction and registration are bundled and backed up by permanent staff. The many mobility points are then populated by the "mobility boxes", so that through their economies of scale, mobility stations also become profitable. As this approach is also a possibility for other districts with similar needs, initial impulses have already been integrated into urban mobility concepts based on the experiences of the Marienthal research mobility station and box. This adoption of the project results into urban planning guidelines and concepts is also a major goal of the ZED Lighthouse.

38.4 Summary and Outlook

Far-reaching demographic changes and the individualisation of lifestyles are making the population more diverse – even into old age. Cities and neighbourhoods are facing growing challenges in this regard, as age-related changes in demand and supply are also taking place: for example, demographically induced housing vacancies can destabilise neighbourhoods. As a result, new forms of social infrastructure provision are needed to make society and municipalities more robust and age-appropriate.

With the neighbourhood concept developed in the ZED Lighthouse, the actors involved are not only trying to meet the growing demand for local mobility through a research mobility station with age-appropriate e-scooters and autonomous mobile boxes. The concept is also intended to offer all the necessary building blocks and open

up perspectives that older people need in order to be able to live in their familiar neighbourhood – and thus also to keep the neighbourhood itself structurally stable.

The residents are involved in the development of new (socio-)technical solutions within the framework of user-friendly and participatory technology development. For the acceptance and thus the success of the mobility product, a solution that is as custom-fit and low-threshold as possible is necessary, especially for the older target groups – a solution in which the necessary digital elements are integrated in a user-friendly way and which also meets the requirements of the market and sustainability. Such a research and development process uses the experience and creative potential of the users as well as the expertise of the developers to continuously optimise the product so that its handling in operation is as simple and safe as possible. In practice, the technology genesis model has proven fruitful: The need has been identified, and the offer was continuously adapted to it in recursive loops. The changing constellation of actors from science and practice proved to be conducive to this.

Nevertheless, it must also be critically noted that innovations can also fail. That is why it is crucial to transfer the results into a sustainable business model. The fact that payment for the services has not yet been possible due to funding modalities, combined with the comparatively high fixed costs of the mobility station and boxes compared to app-based sharing services of established offers, leads to unanswered questions regarding refinancing outside of the project context. User-friendly and participative technology developments, as practised in the ZED project with the mobility station and the autonomous mobility boxes, are not straightforward. On the one hand, the offer must be designed to be as useful, convincing and simple as possible for users, which has been achieved through elaborate, iterative adjustment loops of the approach. On the other hand, innovations in the neighbourhood require great efforts to promote the offer, especially at the beginning. The target group-specific approach as well as free use show the effort and the low hurdles. All in all, this can often only be covered by funding projects.

However, the blueprint from Zwickau-Marienthal creates new perspectives, especially for large housing estates with homogeneous age structures, to bind their residents to the neighbourhood in the long term and to keep the estates liveable and lively into old age. In cooperation with the housing associations, especially smaller decentralised solutions in front of the entrance areas of flat blocks, such as the mobile boxes developed in Zwickau, offer enormous potential, on the one hand to provide mobility even closer and more targeted to the residents, on the other hand it also opens up new sales opportunities for the operators themselves due to economies of scale, as mobility is now possible for everyone from and to the doorstep. Enquiries from other cities demonstrate the need of municipalities to create age-appropriate services in neighbourhoods, so that the actors involved are confident that this solution can remain established after the project period.

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