

Research plan

# Prevention of Cognitive Impairments Through Architectural Design

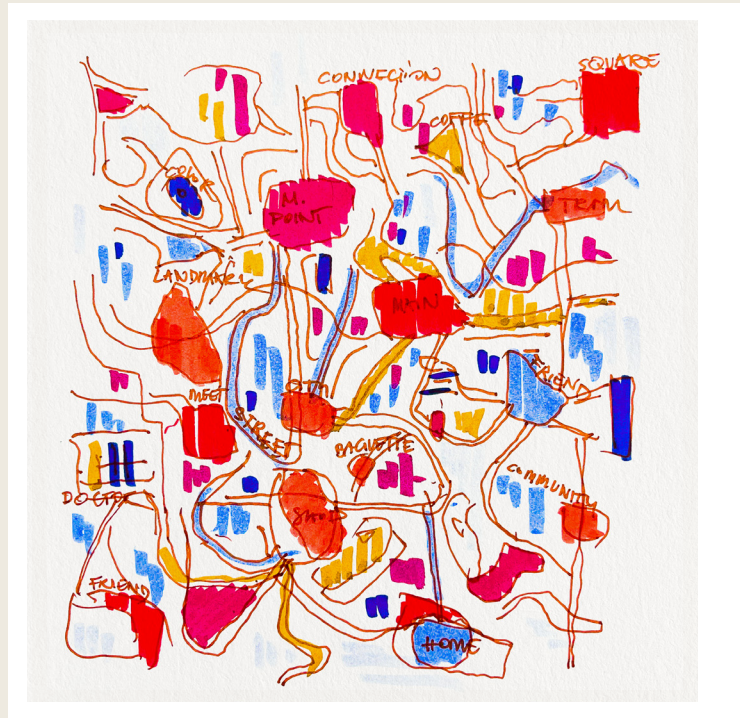


Figure 1. 'Mental Map of the Neighbourhood' Author's own Sketch

Iga Potok | Tutors: Birgit Jürgehake, Elke Miedema, Frederique van Andel

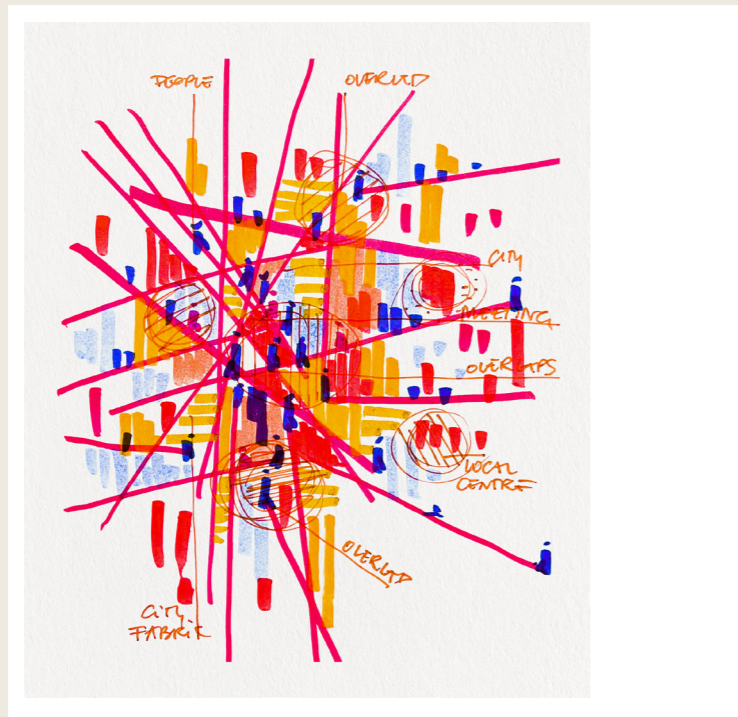
**Graduation Studio** 'Towards a Healthy and Inclusive Living Environment'  
Designing for Health & Care

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## Key words:

*Prevention, Intergenerational, Encounter, Inclusivity,  
Aging in place*



*Figure 2. 'Overlaps'  
Author's own Sketch*

# Introduction



Figure 3. 'Personal Motivation'  
Author's own Sketch

## Background

Future predictions for an increase in diseases such as Alzheimer's, dementia and depression require a quick reaction. Studies show that the number of people living with dementia will triple by 2050.<sup>1</sup> Moreover, the increasing social exclusion of people of all ages and the spread of diseases like COVID-19 drastically increases the number of people struggling with depression.

In consequence, architects are put in the spotlight and encouraged to come up with design strategies that help prevent the development of the aforementioned diseases. Due to the changes in demographics and a shift to an aging society, the healthcare system is no longer able to facilitate care for people in nursing facilities. During our recent field trip to three nursing homes in The Netherlands, Peter Boerenfijn, the CEO of Habion, a company that specializes in elderly care facilities, informed us that there is now more than ever a need for new design strategies of inclusive and inter-generational housing.

The cost of providing care and housing is double the cost of catering solely care. Therefore, the Dutch government thinks of new solutions, like "aging in place", that require fewer staff to take care of the ones in need. The term "aging in place" refers to one's ability to live independently, comfortably and safely in one's home and community, in spite of age, mobility and wealth.<sup>2</sup> This coincides with the will of the elderly to reside at home for as long as possible. Therefore, a new model of inclusive architecture and co-existence needs to be developed.

## Problem statement and goals

The absence of inter-generational contact and a deficit of care-taking in communities leads to societal exclusion of the elderly and increases the development of diseases such as Alzheimer's, dementia and depression. Inspired by the phrase "prevention is better than cure" this research aims to discover how to prevent the development of the aforementioned diseases through implementation of design strategies. It is indisputable that appropriate preventive measures are more effective than the treatment, both in terms of patient's well-being and cost.

Research shows that modifying certain risk factors can reduce the probability of developing dementia by around a third.

1. "Worldwide Dementia Cases to Triple by 2050," Alzheimers Research UK, 2021, <https://www.alzheimersresearchuk.org/worldwide-dementia-cases-to-triple-by-2050/>.

2. "Aging-in-Place | Meaning In The Collins English Dictionary," in *Collins English Dictionary*, 2012, <https://www.collinsdictionary.com/submission/401/Aging-in-place>.

The most prominent risk factors according to the NHS are: untreated depression, loneliness or social isolation and lack of regular exercise.<sup>3</sup> Staying mentally, socially and physically active as well as maintaining a healthy and balanced diet are the most effective ways of prevention.<sup>4</sup>

**The main goal of the research project is to foster daily inter-generational contact to strengthen communities and prevent the development of cognitive impairments.**

Community can be understood as a “friendship between different people or groups, and a sense of having something in common”.<sup>5</sup> The similarities and overlaps are the key elements that bring the community together.

Therefore, this research aims to identify overlaps of needs and wants of different generations regarding neighbourhood and housing design. To be able to create these catalyst spaces it is important to understand what kind of places can promote interaction between different age groups and strengthen communal bonds.

Research question:

**What inclusive design strategy can encourage daily inter-generational contact, strengthen communities and prevent cognitive impairments?**

To support the main research question, additional sub-questions, arise:

1. What are the specific needs and wants of different generations in terms of neighbourhood and housing design and how do they overlap?
2. How can the design of public and collective spaces in housing and the neighbourhood foster regular contact between generations?
3. How can architectural design provide stimuli to prevent cognitive impairments?

Design Hypothesis:

There is currently no available cure for diseases like dementia and Alzheimer’s. Therefore, scientists emphasize the importance of early prevention. Physical and social activity are key factors of prevention.<sup>6</sup> Design strategies can help incorporate these preventative measures into people’s daily lives. Consequently, the hypothesis is:

**Architecture that inspires physical movement and social interactions reduces the probability of developing cognitive impairments and depression.**

3. “Can Dementia Be Prevented? -Dementia Guide,” NHS, 2020, <https://www.nhs.uk/conditions/dementia/dementia-prevention/>.

4. “How to Reduce Your Risk of Alzheimer’s and Other Dementias,” Alzheimer’s Society United Against Dementia, 2021, <https://www.alzheimers.org.uk/about-dementia/risk-factors-and-prevention/how-reduce-your-risk-alzheimers-and-other-dementias>.

5. “Community | Meaning In The Collins English Dictionary,” in *The Collins English Dictionary*, n.d., accessed October 1, 2022.

6. “O Chorobie Alzheimer’a i Ucieczce Przed Neurodegeneracją (About Alzheimer’s Disease and Escaping Neurodegeneration),” *Całkiem Fajna Audyca by Podgórska Ogólnie [Joanna Podgórska]*, accessed October 13, 2022, <https://open.spotify.com/show/53a4kWGvbq5x9VkrFL815x>.

## Theoretical framework



Figure 4. Kenneth Josephson, 14 x 11 Or 20 x 16 Inch Gelatin Silver Print, photograph (Chicago, n.d.).

The theoretical framework of this research aims to describe other thought-provoking studies that have already been done on the topic of this research. The studies are divided in three sections that correspond to the main research question: prevention (design for physical and mental wellbeing), inter-generational living (design for encounter) and inclusive and accessible design.

### Prevention: design for physical and mental wellbeing

It is crucial for this research to understand that architecture plays an important role in one's emotional health and physical well-being. The redevelopment of Paris in the 19th century by Georges-Eugène Haussmann was pivotal to battling infectious diseases like cholera and tuberculosis. The intervention massively improved the design of buildings, streets and neighbourhoods.<sup>7</sup> The reformation of Paris is important to this research because it emphasizes how architecture can improve health, safety and quality of life. In the early 20th century, architectural movements aimed to reshape cities and introduce healthier housing. Some main socialist exponents were the Garden City movement in England and the Life Reform movement in Germany.<sup>8</sup> The architects emphasized the importance of fresh air, sunshine and greenery, rejecting the old confined layouts and dim tenement buildings.<sup>9</sup> In 2016, inspired by Jane Jacobs<sup>10</sup>, scientist Carlos Moreno developed the concept of a "15-minute City". It is based on the idea of 5-minute walkable neighbourhoods that together build a 15-minute city. Citizens are able to reach living, working, commerce, healthcare, education and entertainment spaces, within a 15-minute walk or bike ride from their houses.<sup>11</sup> Research proves that people are more likely to walk to a destination if it takes up to 15 minutes. Therefore, this strategy promotes physical movement and, ultimately, well-being. Additionally, the 15-minute distance better serves vulnerable groups of people (like women, children, people with disabilities, and the elderly)<sup>12</sup>. Short distances encourage people to walk and increase the probability of spontaneous encounters. This strategy strengthens the interconnectivity of the community, which is one of the key aspects of prevention.

7. Harald Sack, "Baron Haussmann's Renovation of Paris," SciHi Blog, March 27, 2019, <http://scih.org/baron-haussmann-renaissance-paris/>.
8. Margaret Campbell, "What Tuberculosis Did for Modernism: The Influence of a Curative Environment on Modernist Design and Architecture," *Medical History* 49, no. 4 (January 2005): pp. 463-488, <https://doi.org/10.1017/s0025727300009169>.
9. Aleksandra Troć (2021), <https://repository.tudelft.nl/islandora/search/subject%3A%22Healthy%255C%2BAgeing%22>.
10. Jane Jacobs, *The Death and Life of Great American Cities* (New York: Random House, 1961).
11. Carlos Moreno et al., "Introducing the '15-Minute City': Sustainability, Resilience and Place Identity in Future Post-Pandemic Cities," *Smart Cities* 4, no. 1 (August 2021): pp. 93-111, <https://doi.org/10.3390/smartcities4010006>.
12. Georgia Pozoukidou and Zoi Chatziyiannaki, "15-Minute City: Decomposing the New Urban Planning Eutopia," *Sustainability* 13, no. 2 (2021): p. 928, <https://doi.org/10.3390/su13020928>.

A crucial fundament of this research is the work of Joanna Podgórska. Podgórska emphasizes the importance of prevention in cases of Alzheimer's disease. She names being socially and physically active as well as having a balanced diet amongst the most important preventative measures.<sup>13</sup> These measures have become the key aspect of my research and will be translated into architectural strategies.

### Inter-generational living and design for encounter

Jane Jacobs, a writer and activist, often emphasised the value of social interactions. In "The Death and Life of Great American Cities" she pointed out that "A neighbourhood is not only an association of buildings but also a network of social relationships, an environment where the feelings and the sympathy can flourish."<sup>14</sup> Inter-generational contact is a key missing piece in our times. More and more researchers nowadays start to focus on how relationships could potentially improve the well-being of elderly citizens. Social policy professors, Simon Biggs and Ashley Carr, are particularly interested in inter-generational spaces. Biggs and Carr, research how these communal places can be reemphasized to promote collective activity. Their research aims to develop a framework for better understanding of inter-generational relationships. They emphasise the need for more flexible creation of space, which comprises the emotional and social side of communities.<sup>15</sup> The topic of inter-generational living and designing for encounters is particularly important to my research because it is interwoven with as many as three of my sub-questions. A recent lecture by Johannes Pedersen, a partner at Nord Architects, gave preeminent input to my research.<sup>16</sup> During the lecture, Pedersen emphasized the importance of functional synergies within the neighbourhoods. Public spaces that they design come in dialog with surrounding architecture and people and foster contact between different age groups. Through their architecture, Nord architects create social bonds and dependencies between generations. This concept is particularly relevant to my research and future design. It shows how architecture is capable of creating meaningful and lasting inter-generational connections.

13. "O Chorobie Alzheimera i Ucieczce Przed Neurodegeneracją (About Alzheimer's Disease and Escaping Neurodegeneration)," *Całkiem Fajna Audyca* by Podgórska Ogólnie [Joanna Podgórska], accessed October 13, 2022, <https://open.spotify.com/show/53a4kWGvbq5x9VvRFL815x>.
14. Jane Jacobs, *The Death and Life of Great American Cities* (New York: Random House, 1961).
15. Simon Biggs and Ashley Carr, "Age- and Child-Friendly Cities and the Promise of Intergenerational Space," *Journal of Social Work Practice* 29, no. 1 (February 2015): pp. 99-112, <https://doi.org/10.1080/02650533.2014.993942>.
16. Johannes Pedersen, (October 6, 2022).

### Inclusive and accessible design

Several studies have already been conducted on the importance of inclusive and accessible design. Sophie Handler investigated the concept of age-friendly cities and communities and identified a range of design strategies that help to shape such places. Doing so, she pays particular attention to initiatives that improve the living conditions and the living environment of old people. Some of her findings are collected in the form of a design handbook which gives a comprehensive overview on the existing age-friendly design strategies.<sup>17</sup>

Kevin Harris provides the assessment of factors that make the place age-friendly. He investigates the importance of different factors, like the neighbourhood's built and green environment, social support and connections, and measures how they respond to the quality of life, health and well-being.<sup>18</sup>

In the 1960's Henri Lefebvre, coined the phrase 'right to the city' understood as "the right to shape urban life".<sup>19</sup> Lefebvre was particularly interested in the connections between different functions, like "life-work, leisure, privacy and family life".<sup>20</sup> In 1996, Lefebvre emphasized "the right of users to make known their ideas on the space and time of their activities in the urban area"<sup>21</sup> His theories were one of the first examples of participatory design. It is important for this research to understand the connections and overlaps between users and functions, for which Lefebvre's theory is a starting point.

The above-mentioned theories will provide a basis for research questions and bridge the research gap between prevention and architecture. This framework will help incorporate preventative measures into architectural solutions. I will come up with design strategies that:

- encourage physical activity through a walkable neighbourhood design
- foster social interactions through functional synergies and communal spaces
- create an inclusive environment and make the space accessible and all-age friendly
- promote inter-generational living through design which takes the aspect of aging into account

17. Sophie Handler, *An Alternative Age-Friendly Handbook* (Manchester: University of Manchester, 2015).

18. Kevin Harris, *Age Friendly Societies in Our Time? A Literature Review* (Toronto: Wilder Research Center, 2013), <https://www.olderentants.org.au/content/age-friendly-societies-our-time-literature-review>.

19. Sophie Handler, "GLOSSARY OF AGE-FRIENDLY TERMS\*", in *An Alternative Age-Friendly Handbook* (Manchester: University of Manchester, 2015).

20. Simon Biggs and Ashley Carr, "Age- and Child-Friendly Cities and the Promise of Intergenerational Space," *Journal of Social Work Practice* 29, no. 1 (February 2015): pp. 99-112, <https://doi.org/10.1080/02650533.2014.993942>, 107.

21. Henri Lefebvre, *Writings on Cities*, trans. Eleonore Kofman and Elizabeth Lebas (Oxford: Blackwell, 1996).

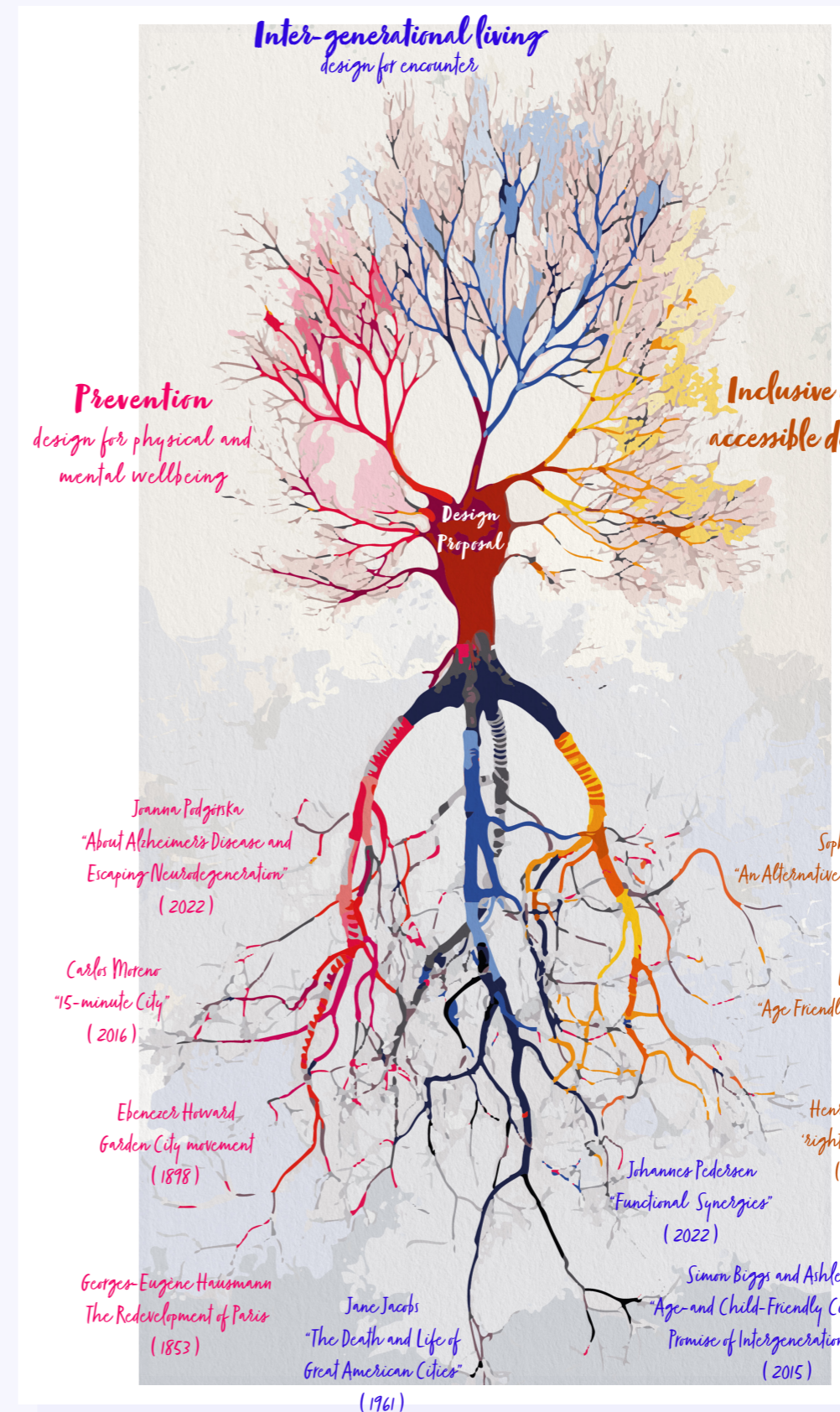


Figure 5. 'Framework diagram' By author including adaptation of a sculpture.

# Methodology

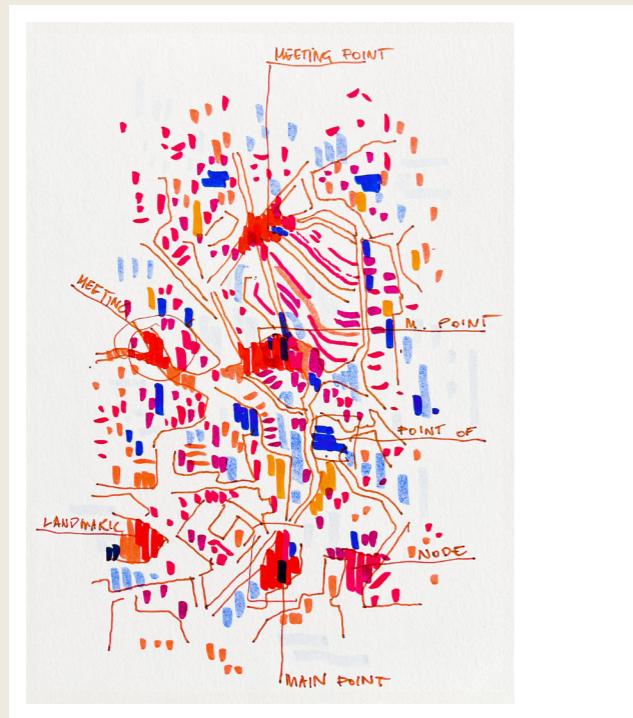


Figure 6. 'Map of Overlaps'  
Author's own Sketch

This research will be carried out through a selection of research methods including a literature review, collecting data, analysis of case studies as well as fieldwork related methods such as observing, sketching, mapping and analysing.

## Literature review

To provide a necessary background to my research, I will do a literature review of books and articles as well as an analysis of existing research, concerning the topic of co-housing and inclusive living and prevention. Exact information can be found in the 'Theoretical framework' section and bibliography. The literature review will provide answers to all three of my sub-questions.

## Data research

I will investigate how we can prevent or minimize the effects of diseases like dementia, Alzheimer's or depression through architectural design. I will look into the research done by Joanna Podgórska, who has a PhD in biological sciences in the discipline of biochemistry and is an author of many scientific publications in the field of neurobiology and biochemistry of neurodegenerative diseases. Data research will provide answers to my third sub-question related to prevention.

## Interviews

To support my research, various interviews will be conducted.

The first one regarding preventative measures that can be incorporated into the architectural design, will be held with my cousin, Weronika Potok who has a PhD in cognitive science and psychology. Because of her broad knowledge about cognitive impairments and ways of prevention of such conditions, this interview will be substantial for my research.

During my fieldwork I will conduct interviews with the people living in the neighbourhood of Jezyce in Poznan and ask if and how the neighbourhood could be improved to inspire more inter-generational contact. The results of the interviews from the fieldwork will be collected in the form of a graphical novel together with the findings of my anthropological research and mapping. Interviews will provide answers to all three of my sub-questions.

## Case studies

To find out what strategies have proven to be most efficient, case studies of co-housing as well as age-friendly and inclusive projects will be conducted through analysis of floor plans, sections, pictures and articles.

The case studies will include:

1. Share Kanazawa, an inclusive, multigenerational community in Kanazawa designed by, GOI Architecture & Associates
2. Vindmøllebakken Housing, a co-living housing project by Helen & Hard Architects
3. The Architect, a retirement house combined with a nursery and communitycentre by LEVS architecten
4. A comparative study of 2 co-existence projects and an Alzheimer's village in Oslo by Nord architects

The case studies will provide answers to the second sub-question related to the design of public and collective spaces and regular inter-generational contact.

### Fieldwork

The fieldwork will take place in two segments. One dedicated to meeting the target group and the other dedicated to analysing a specific neighbourhood. Both parts will require prior preparations and planning such as preparing interviews and questionnaires, analysing statistical data and scheduling appointments.

### Anthropological research

During the first part of my fieldwork I will conduct anthropological research and interviews while I try to get to know the needs and wants of old people. I will join group activities of the elders at the "University of the Third Age"<sup>22</sup> in Poznan and conduct questionnaires that I will prepare prior to the meetings. I will also live at my grandma's place for a week during which I will observe her daily routine, her habits, her usual commutes and conduct interviews with her and her friends. The anthropological research will provide answers to all three of my sub-questions.

### Mapping and sketching combined in the form of a graphic novel

In the second part of my fieldwork, I will focus on a specific neighbourhood in Poznan to understand where the paths of its inhabitants cross and how the neighbourhood works for different users. I will do that by mapping the movements of various groups in the neighbourhood to determine which are the most and least connective places. I will check if the chosen neighbourhood works in the framework of 5 minute walkable neighbourhoods and a '15-minute city'. The results will be collected in the form of generalised and specific findings. I will develop them further and critically apply the knowledge in my future design proposal. I will apply them to the context of the chosen design site.

22. The University of the Third Age is an educational facility created to educate and stimulate the retired members of the community

I will also use similar techniques to develop site specific analyses. For my design proposal, I will primarily focus on a neighbourhood cluster (3-4 buildings and shared public spaces, as well as the areas between them), but I will also consider the wider context of the surrounding environment within 15 and 5 minutes from the site, and propose a master plan for the 5-minute neighbourhood. In my design I will tackle both public spaces that encourage social contact and physical activity as well as inclusive and future proofed housing.

I will present the fieldwork findings both in the form of mappings as well as sketches compiled as a graphic novel. Mapping and sketching will provide answers to my first and second sub-questions related to the needs and wants of citizens and inter-generational contact.

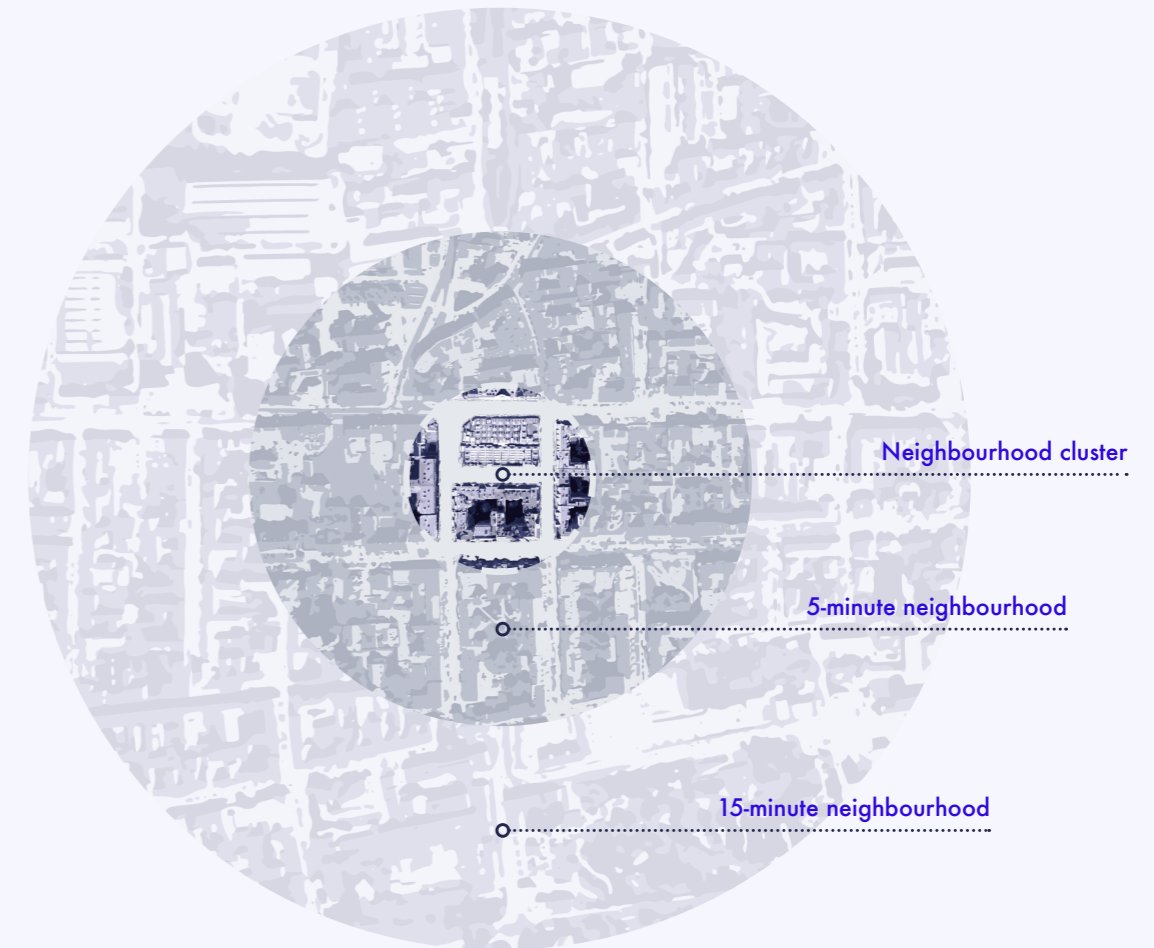


Figure 8. 'Scales of the Neighbourhood' Author's own diagram



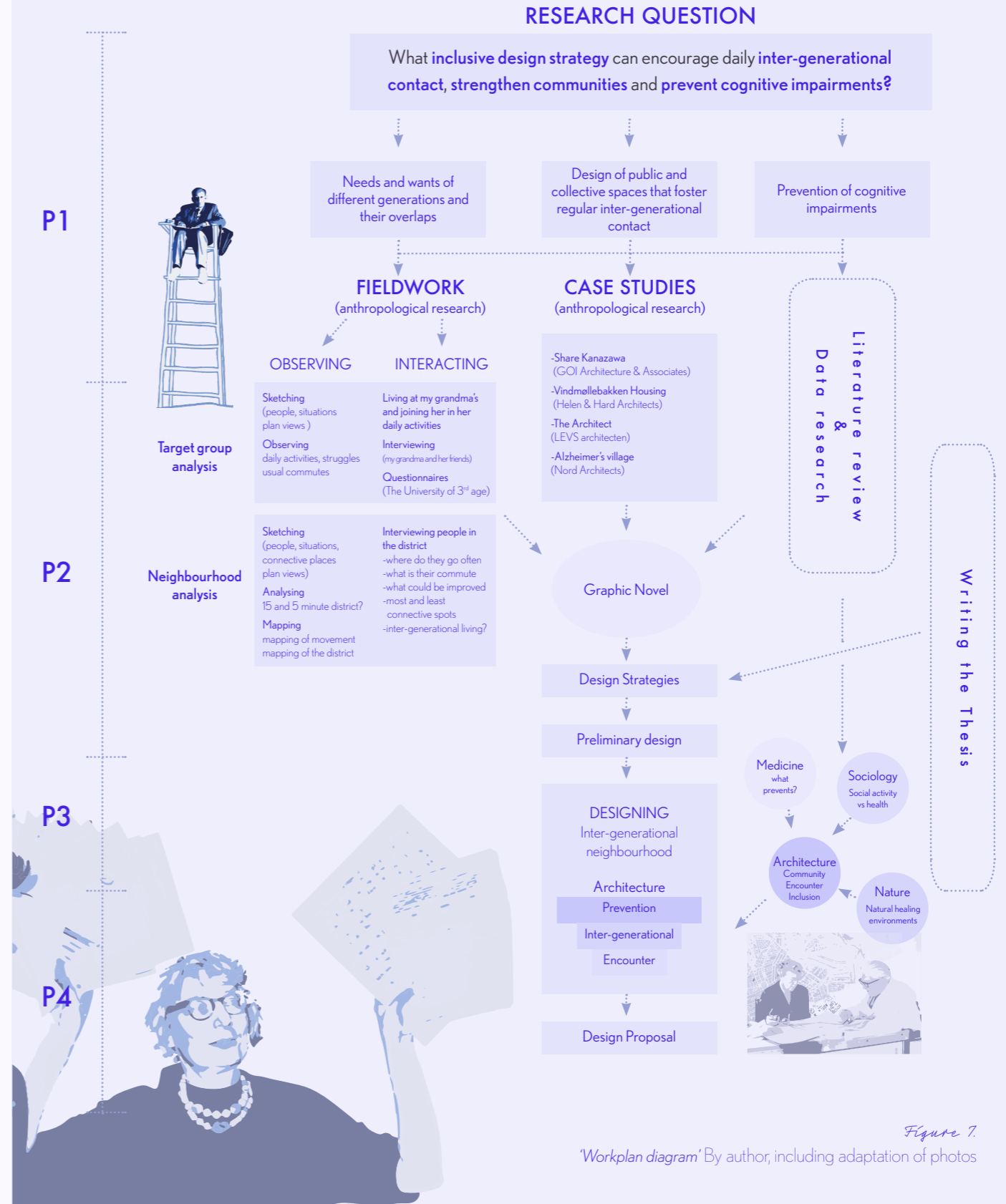
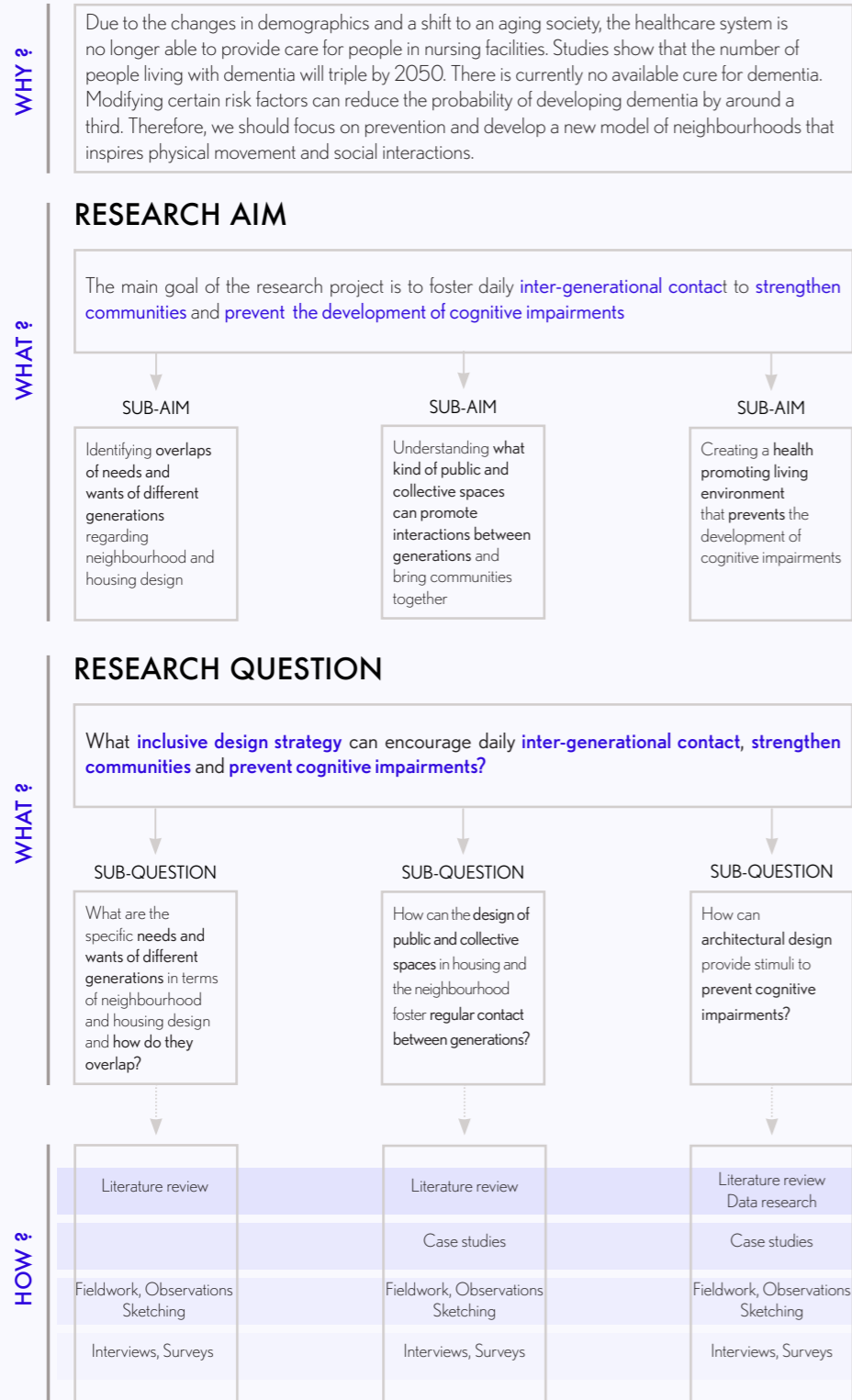


Figure 7. 'Workplan diagram' By author, including adaptation of photos

# Glossary

inclusive design inter-generational  
accessibility all-age-friendly community  
aging in place 'right to the city' well-being  
all-age-friendly community aging in place  
'right to the city' well-being inclusive design  
inter-generational accessibility all-age-  
friendly community aging in place 'right  
to the city' well-being all-age-friendly  
community aging in place well-being  
inclusive design inter-generational inclusive  
design inter-generational accessibility  
all-age-friendly community aging in  
place 'right to the city' well-being all-age-  
friendly well-being inclusive design inter-  
generational accessibility aging in place

Figure 8. 'Glossary'  
Author's own Graphic

To support my research, the main terms that characterise my future design will be explained.

## inclusive design

The term inclusive design refers to "a design approach where the built environment (...) is designed and/or adapted in such a way that it meets the needs of all, regardless of age or ability".<sup>23</sup>

## accessibility

A term that strongly relates to inclusivity. It translates to "capable of being easily reached and/or is available to as many people as possible (...) as a spatial concept, relates to inclusive design principles".<sup>24</sup>

## all-age-friendly

Is "a general term applied to mean favourable to and accommodating of all generations (...) often used to broaden relevance of an older-age-focused policy agenda".<sup>25</sup>

## inter-generational

The term inter-generational means "involving persons of different generations".<sup>26</sup>

## community

Community can be understood as a "friendship between different people or groups, and a sense of having something in common".<sup>27</sup>

## aging in place

The term "aging in place" refers to one's ability to live independently, comfortably and safely in one's home and community, in spite of age, mobility and wealth.<sup>28</sup>

## 'right to the city'

The term refers to one's "right to shape urban life (...) phrase originally coined by sociologist Henri Lefebvre in *Le Droit à la Ville* (published in 1968)".<sup>29</sup>

## well-being

The term can be understood "as the state of feeling healthy and happy".<sup>30</sup>

23. Sophie Handler, "GLOSSARY OF AGE-FRIENDLY TERMS\*", in *An Alternative Age-Friendly Handbook* (Manchester: University of Manchester, 2015), pp. 6-10.

24. Sophie Handler, "GLOSSARY OF AGE-FRIENDLY TERMS\*", in *An Alternative Age-Friendly Handbook* (Manchester: University of Manchester, 2015), pp. 6-10.

25. Sophie Handler, "GLOSSARY OF AGE-FRIENDLY TERMS\*", in *An Alternative Age-Friendly Handbook* (Manchester: University of Manchester, 2015), pp. 6-10.

26. "Intergenerational | Meaning In The Collins English Dictionary," in *Collins English Dictionary*, 2010, <https://www.collinsdictionary.com/dictionary/english/intergenerational>.

27. "Community | Meaning In The Collins English Dictionary," in *The Collins English Dictionary*, n.d., accessed October 1, 2022.

28. "Aging-in-Place | Meaning In The Collins English Dictionary," in *Collins English Dictionary*, 2012, <https://www.collinsdictionary.com/submission/401/Aging-in-place>.

29. Sophie Handler, "GLOSSARY OF AGE-FRIENDLY TERMS\*", in *An Alternative Age-Friendly Handbook* (Manchester: University of Manchester, 2015), pp. 6-10.

30. "Well-being | Meaning In The Collins English Dictionary," in *The Collins English Dictionary*, n.d., accessed October 1, 2022.

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- Figure 8.* Potok, Iga. *Glossary*. Author's own Graphic. 2022