The participation of the architect

Research and design project investigating the potential of reusing structuralist strategies for adaptable housing

Graduation studio Revitalising Heritage
Mark Riepema
Student number: 4604431

Tutors:
Lidwine Spoormans
Nicholas Clarke

Image 2: Relationship between the role of different stakeholders and the development of adaptable housing (Image by Author)

1.Introduction

Introduction

Changing something to your house. Most people do this regularly: buying a plant and placing it in the window sill, moving your favorite chair or painting a wall in a different colour. This type of small changes can be made within any house and by every resident. For changes of this type a house has to be flexible in their use. But many residents once in a while also make bigger changes to their houses. For example to create an extra bedroom, bathroom on the ground floor or a whole new façade. These kind of changes are less straight-forward. There are several reasons why people want to make them: external factors such as technical requirements or societal developments but also internal factor such as changing fashion, changing family composition, life-phase or life-style change (Brand, 1994)(image 2). To accommodate change on this level buildings have to be adaptable: they should be suitable to be changed physically.

Making an adaptable building is not an easy task. It demands the designer to have insight in potential changes caused both internal and external factors. The quicker those factors change the harder it becomes to develop a structure that can adapt to them. This happened several times in the past. From the end of the nineteenth century onwards external factors changed rapidly and the traditional housing typologies, often build without involvement of professional architects did no longer comply. Architects had more knowledge of new technologies and considered it their task to intervene. But until then architects used to design special buildings such as churches, which internal use hardly changed over time (Habraken, 1967). So when architects started to involve in the first halve of the twentieth century they had a tendency to forget about the wishes of residents, which caused several social problems. The balance between the role of architect and residents was lost. In a reaction to this structuralist architects in the nineteen sixties and seventies developed ideas about the participation of residents in housing (Habraken, 1985). Their approach did not solve the whole issue, but did contribute to the development of relatively successful housing types such as the “bloemkoolwijk” and the later VINEX neighbourhoods. A new balance in the relation between architects and residents in housing emerged.

But after a few decades of relative calmness we are again facing large changes in the housing requirements in the twenty-first century: both internal and external factors are changing quickly. The biggest external factor is the climate change caused by the emission of greenhouse gasses. In anticipation of this problem the pollution has to me lowered by the application of insulation and new heating and cooling systems. Meanwhile the average family composition is changing: the number of single-person households, elderly and divorced people rises quickly. As a result of this there is a big housing shortage. These problem can only be solved by adapting our existing housing stock, which demands architect to take on a new role again. To do that they have to understand which potentials for change the existing houses have and where they fall short. In my research I will investigate this for the neighbourhood Goedewerf in Almere, a typical “bloemkoolwijk” of which 20 percent of the Dutch housing stock consists (De graaf, 2012).This neighbourhood is built by structuralist architects and is expected to express their ideas about adaptability.

Structuralist ideas on adaptability

Research question
Which strategies for adaptability and residents' participation did structuralist architects use in their residential designs and what was their result?

Design question
How can these strategies help contemporary architects to adapt structuralist housing to the needs and requirements of future residents?

Current issues:
1. Realisation of new homes
2. Renovation of existing houses

Image 3: Research and design question connect structuralism to current issues (Image by Author)

Image 4: Design location: Goedewerf, Almere Haven (Image by Author)

2.Problem Statement

Problem statement:

To keep good quality housing affordable in the future under these changing circumstances we are currently facing two main assignments:

1. Realisation of new homes. This problem is addressed within the TU Delft in the one million homes project, which is related strongly to the Open Building network (Open Building Network, 2020). This group of architects, engineers and developers connected to the TU Delft calls for the reuse of the ideas of structuralist architect John Habraken (Habraken, 1985).

2. The renovation of existing houses to make them more sustainable. This is done by the so-called renovation wave that the European union tries to achieve. Within the TU Delft this topic is addressed in the "renoveren met respect" project that investigates value based models for the renovation of housing built between 1965 and 1985.

Within the New Heritage studio both issues are addressed together within the context of nineteen seventies an eighties residential areas. A large part of the Dutch housing stock consists of this type of neighbourhoods, they often have relatively much potential for densification and a their insulation is currently often insufficient.

In my project I want to use adaptability as a guiding theme to address these problems. This focus serves both a societal and a scientific purpose. Contemporary ideas about Open Building can be strengthened by reuse of the ideas of structuralist architects of which the effect is already visible in their buildings. And on the other hand the adaptability of these existing building has to be strengthened to become more sustainable and house new groups of residents.

Research Questions:

The main question of the project is divided in a research question and a design question. The two questions are mentioned below and are both subdivided into a number of sub questions. The research question is:

Which strategies for adaptability and residents' participation did structuralist architects use in their residential designs and what was their result?

- *How did structuralist architects think about the adaptability of houses and participation of residents?*
- *How were their ideas translated in their designs?*
- *How are these houses and neighbourhoods used and adapted?*

These questions are addressed in step 1-3 of the methodology.

How can these strategies help contemporary architects to adapt structuralist housing to the needs and requirements of future residents?

- *How would the residents want to live?*
- *Which strategies can be used to enable future residents to appropriate these buildings the way they want and how can they be involved in the design process?*
- *Which changes to the buildings are required to help residents to live more sustainable in them, and how do these relate to the applied strategies?*

These questions are addressed in step 4-5 of the methodology.

Sources:
Literature
Sketches

2020s

1. Identify
different strategies

Methods:
Critical comparing theoretical ideas and build designs

Products:
Overview of strategies

Sources:
Drawings & sketches
Own observations

2. Investigate
how they are applied

Methods:
Studying case study projects

Products:
Tree diagram strategies and atributes

Sources:
Interviews & surveys RmR
Research previous studios

3. Evaluate
effects on design locations

Methods:
Analyse outcomes existing research
Mapping results of strategies
SWOT analysis

Products:
SWOT analysis
Tree diagram

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Sources:
Kamari model
Literature
Group analysis

4. Define
a brief

Methods:
Introducing different scenarios
Literature study

Products:
Brief
First sketches

Sources:
Residents
Renovation models
Reference project

5. Design
an integrated plan

Methods:
Scenario based design
Model making
Evaluation with Kamari model

Finished design
Evaluation potential of strategies

Image 5: Methodology schem (Image by Author)

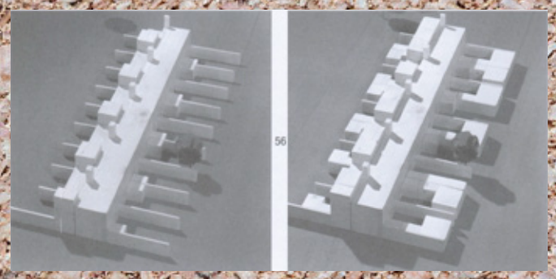


Image 6: Molenvliet Barendrecht (Habraken, sd)

Image 7: Diagoonwoningen Delft (Von der Nahmer, 2019)

Image 8: Kasbah Hengelo (Wikipedia,2020)

Image 9: Groeiwoningen Eindhoven (Bijlsma, Maaskant & Schreeur, 2001)

Image 10: Noordvliet Leeuwarden (Abe bonnema Stichting,sd)

3.Methodology

Methodology:

The research and design process is divided in five steps, as visible in image 1, which all have their own methodology and sources. In the first to steps a group of casestudy projects by structuralist architects is used find the different strategies. The following projects are currently selected:

- Diagoonwoningen Delft – Herman Herzberger
- Groeiwoningen Einhoven 't Hool – Van den Broek en Bakema
- Molenvliet Barendrecht – Frans van der Werf
- Kasbah Hengelo – Piet blom
- Noordvliet Leeuwarden- Abe Bonnema

1. Identify different strategies

Literature and sketches of the case study projects are studied to distinguish the different strategies. Literature is used in three different ways. Theoretical literature by structuralist architects is used to grasp the ideas that these architects had behind their designs. It should be written by influential structural architects and gives arguments why they want to make their housing adaptable and what their purposes were.

As second type of literature are those texts in which the architect does not only give theoretical ideas but also insight in his own design process and strategies. I expect to find less books of this type than the previous one. But when they are available they can be used to directly identify the used strategies.

Also later, secondary, literature about structuralism is used. It should give a wider scope and some background information about architecture in the 1970s. It will not directly used for the research but forms a starting point to find primary sources and gives some context.

Other importants resources are drawings, sketches and other documents from the archives of structuralist architects in Het Nieuwe Instituut. These are used to distract design strategies that may not be described in the applied literature.

The final product of this step is a list of design strategies for adaptable architecture as used by the structuralist architects. This list is illustrated and explained by the experimental project cases.

2. Investigate how they are applied

In this step I want to find out which strategies the architects applied in the casestudy projects and how they did this, by studying drawings and making site visits. For each of the selected cases drawings have to be gathered from Het Nieuwe Instituut and municipal archives. For every project the physical characteristics of the buildings and background knowledge are used to define which strategies are used.

All the information gathered in this step in combined into a tree diagram that shows the different strategies, the cases they are used in, their physical characteristics/attributes and current appearance. An example of what this diagram could look like is shown in image 2.

3. Evaluate effects on design location

In this step the focus shifts from the larger group of case studies to the design location in Almere Haven. An assessment is made of the effects of the used strategies on the use and adaptation of the design location. The most important sources for this assessment are the outcomes of earlier research done in the Renoveren met Respect project such as the surveys and the New heritage studio, both the outcomes from earlier studio's and the analysis done in the current studio.

On the bases of the available information the

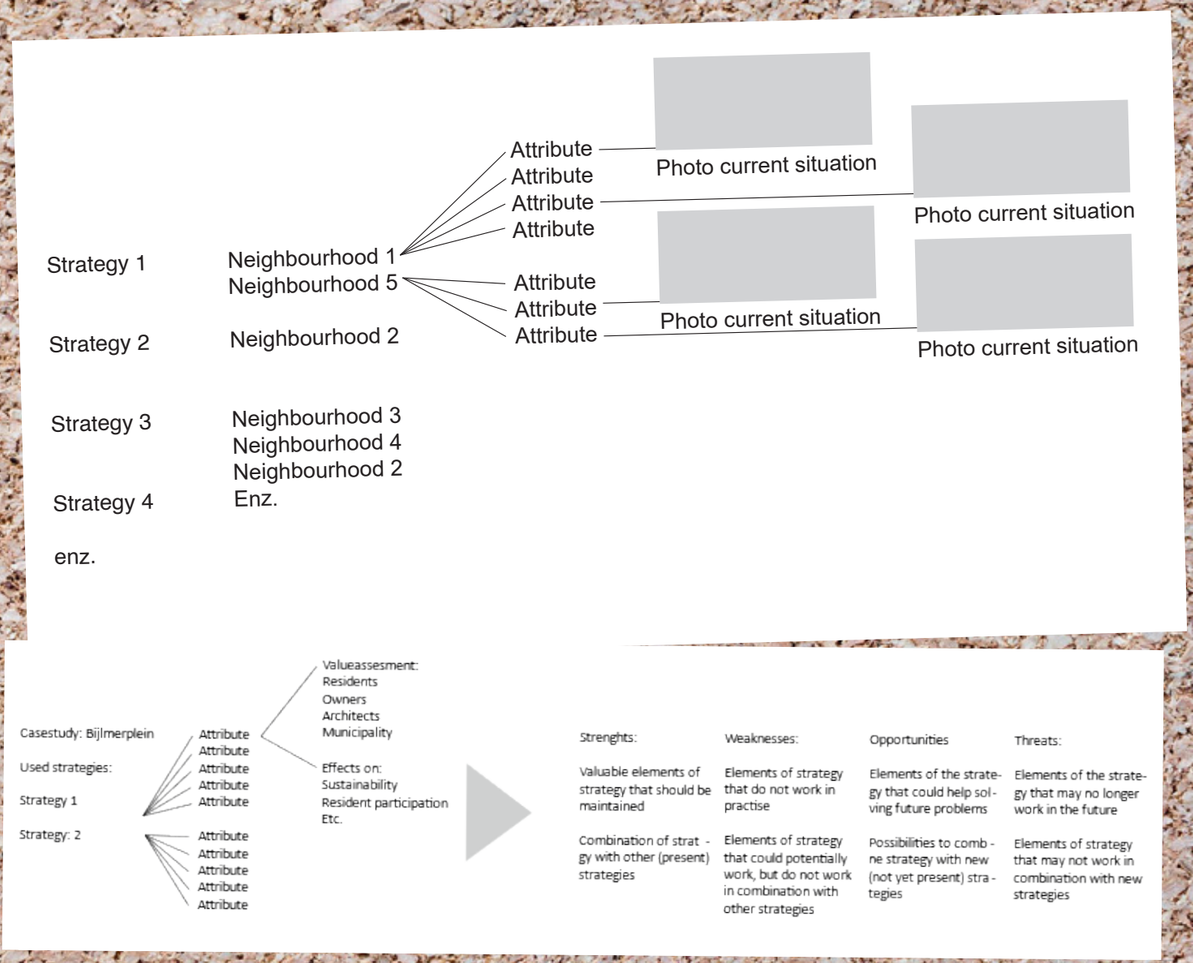


Image 11: Tree diagram (Imag by Author)

Image 12: Tree diagram to Swot analysis (Image by Author)

4.Methodology

case will be positioned in the tree diagram made in step two. This leads to an overview of the used strategy, attributes and present values in the project. A Swot analysis is made to evaluate the effects and potential of the used strategies (image 3).

4. Define a brief

On the bases of the inventory of values and the SWOT analysis a strategy will be developed in which the characteristics of the existing building are connected to the renovation and housing assignment.

In this phase more research will be done into practical issues such as the ownership situation, technical characteristics and regulations. On the bases of that information the outcomes concrete strategy will be developed that should enable the residents of the area to adapt their dwellings to their future needs. This plan should make clear which elements of the sustainability and housing assignment are addressed collectively and which ones by the individual residents. Also the divisions of design tasks between architect and residents will be addressed. These choices are substantiated by the outcomes of the previous steps.

5. Design an integrated plan

Finally, the chosen strategy is developed into a complete design for the chosen site. The purpose of the design is not to solve all issues around housing and sustainability in once but create a framework in which the these can be addressed and maintained in the future.

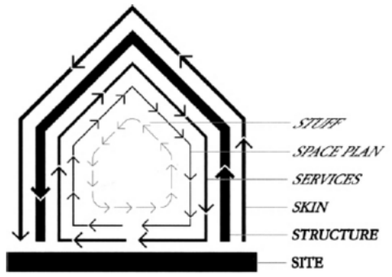
On the bases of the transformation framework a design is made for the collective elements and the predefined parts of the individual houses. In this design all element of the Kamari wheel (Kamari, ..) should be addressed. On the bases of this preliminary design different scenarios for the design of the individual houses are made and their potential development over time is sketched. On the bases of that scenario the design can be evaluated as done to the current situation in step 4, this can lead to a redefinition of the transformation framework and a next version of the plan. This cycle is repeated until the design successfully addressed all required aspects.

4.Theoretical framework

Theoretical framework

In this section I will give an overview of literature that influenced my thinking on the theme of adaptability and will play a role in the research and design in this graduation project.

General literature on adaptability



SHEARING LAYERS OF CHANGE. Because of the different rates of change of its components, a building is always tearing itself apart.

Image 13: Six shearing layers of change (Brand, 1994)

Brand, S. (1994). How buildings learn, what happens after they're built. London: Penguin Books.

Brand's book explains how buildings are adapted by their users and is probably most known by the six layers model that het introduces to illustrate this process. Brand opposes to the contemporary architects who design buildings that shouldn't change, which he believes is an illusion. He proposes the idea of a study of buildings in time that should make sense of the way buildings change and help designers to make buildings that are built for change.

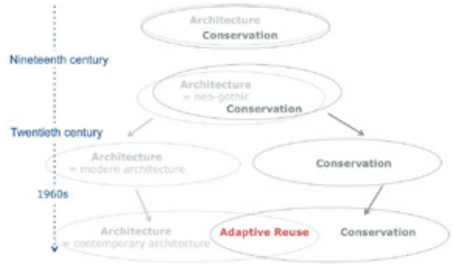


Image 14: Development of adaptibe reuse as a discipine (Plevoets & Van Cleempoel, 2019)

Plevoets, B., & Van Cleempoel, K. (2019). Adaptive reuse of the built heritage. London: Routledge.

In this book Van Cleempoel and Plevoets give an overview of the historical development of the growing field of adaptive reuse. They describe how the discipline came to be as a reaction to the professionalization of architecture and conservation in the nineteenth an twentieth century. Different adaptation strategies are discussed.

Brands idea of the study of buildings in time is closely related to my approach in this project, and for example his 6 layers can be used directly in step 1 and 2 of my research to distinguish the type of adaptability a certain strategy offers. Plevoets and van Cleempoels book has a less direct connection my own topic since it does address the deliberate design of adaptable structures as researched in this project, but the adaptive reuse of existing buildings. Their ideas about the changing relationship between architecture and conservation can be used in step 3-5 and the final evaluation to position the found strategies and my own design within this larger field.

4.Theoretical framework

Structuralist Architects on adaptability

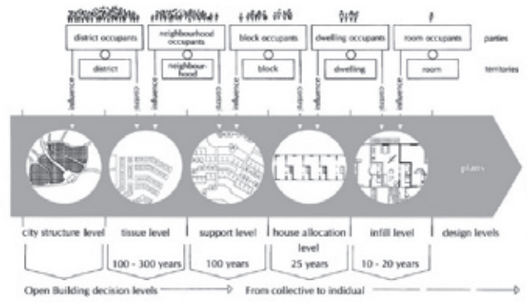


Image 15: Different levels in Open Building (Open Building Network 2020)

Habraken, J. (1985). De dragers en de mensen, het einde van de massawoningbouw. Eindhoven: Stichting Architecten Research.

Habraken, N. J., Boekholt, T. J., Thijssen, A. P., & Dinjens, P. J. M. (1976). Variations: The Systematic Design of Supports. The MIT Press.

De dragers en de mensen (Supports and people) was Habrakens first book in which he unfolds the core of his ideas about adaptability. He explains how people want to house themselves, why modernist mass housing does not meet this need and proposes a new housing model that should use new technologies in a more human-centered way. In his later book "*variation*" he explains how his ideas about supports can be applies in practise.

Van der Werf, F. (1993). Open ontwerpen. Rotterdam: Uitgeverij 010.

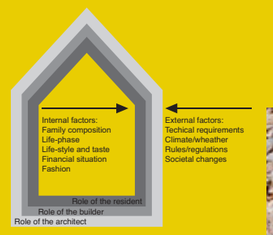
Van der Werf describes how adaptable design is realised on different scale levels: the urban tissue, the support and the infill. He uses examples from his own practise and finishes with a perspective on the future of open buildings.

Hertzberger, H. (1996). Ruimte maken, ruimte laten. Lessen in architectuur. Rotterdam: Uitgeverij 010.

This book is an overview of lessons about architecture that Hertzberger wanted to teach to his students and other interested parties. These lessons are illustrated by his own work and references to others Appropriation of the building by users, flexibility an also adaptability are important themes in the book and placed within the context of many other structuralist ideas.

Habrakens first book has a slightly different character than the other three, since it is more theoretical while the other focus on the application of his (and other) ideas. As mentioned in the methodology chapter both types will be used in step 1 and 2 but the latter three can also be used in the design phase as guidelines for my own design.

Historic back-ground

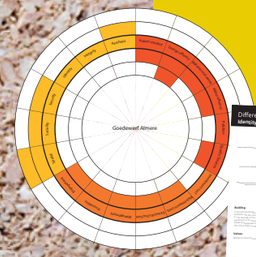


Theoretical framework

Output:

Reflection on possibilities for reuse of structuralist neigh-bourhood for redesign of housing

Current issues



Research question

Which strategies for adaptability and residents' participation did structuralist architects use in their residential designs and what was their result?

1. Identify
different strategies

2. Investigate
how they are applied

3. Evaluate
effects on design locations

4. Define
a brief

5. Design
an integrated plan

Research

Design

Researchproces
Casestudies

Designproces
Goedwerf Almere Haven

Design question

How can these strategies help contemporary architects to adapt structuralist housing to the needs and require-ments of future residents?

Output:

Structuralist strategies for adaptability
(answers research question)

Output:

Testcase: redesign of hou-sing based on structuralist strategies
(answers design question)

Image 16: Research and Design Scheme (Image by Author)

5.Relevance

Relevance

With this project I hope to contribute to a number of societal issues. As explained in the introduction and problem statement the most important ones are the current housing shortages and sustainability issues. This project investigates if and how strengthening the adaptability of existing residential areas on the bases of structuralist strategies could help to solve these problems. This is done by first evaluating the potential for adaptability of the case study location on the bases of its physical characteristics and underlying structuralist ideas and then combining these ideas with current issues to make and adaptable redesign.

This approach is an attempt to bridge the gap between contemporary ideas in the heritage field, such as adaptive reuse, and architectural approaches to adaptability such as the open building network, that often tend to focus on new structures.

Of course my research is just a small step in this process, focussing on a very specific building type and potential solution. But the fact that the typology of the casestudy, a "bloemkoolwijk", is so widespread in the Netherlands makes it easy to generate general ideas that are also usable in similar neighbourhoods on other locations. On the other hand the focus on structuralist housing, in which ideas about adaptability were already explicitly applied, helps to deepen insights on what really makes a building adaptable.

The final purpose of the project thereby is to reconsider the role of the architect in the housing process under these changing circumstances on both a personal and an academic level.

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6.Biblography

Biblography

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