Flexible housing for the amateur

Flexible building concepts explored in the age of the amateur

Pelle Leijten - 4478274
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Abstract:

Flexible housing is offered as a way to extend the lifespan of architecture. This research paper explores the different ways to design flexible housing through the publications of Habraken, Brand, and Leupens as well as the findings by organizations like OBOM and Openbuilding.co. Three modern housing projects in Amsterdam, Superlofts houthavens, CiWoCo, and Patch-22 are analyzed on the criteria of flexibility as proposed in the publications. While highly flexible, some choices made either by the architect, constructor, or the current resident, might limit the choices a prospective resident might be able to make when they want to rearrange the interior.

A newly emerging target audience called 'the amateur', that greatly values high quality and customization, would be very suitable for this type of flexible housing. The paper analyses their preferences based on three case study projects (Superlofts houthavens, CiWoCo, and Patch-22) as well as a questionnaire and a series of short interviews. it is essential to consider the character of each design element (site, structure, skin, circulation, services, space plan, and stuff) in order to study the effectiveness of this building strategy.

Keywords:

Bijlmermeer, Gliphoeve, Urban expansion, Modernism, Urban revival

Contents:

Illustration 1 (cover): *INTERSECTION FIELDS IV: Highrise of Homes* (Wines, 1981)

"Het is een van de grote wonderen van ons bestaan dat de bevrediging van sommige behoeften een zeer positieve, persoonlijke, ja bijna creatieve actie van ons verlangt. Zelfs vandaag behoeft het nog geen betoog dat wij niet kunnen leven van consumptie alleen, hoe aantrekkelijk en vernuftig deze ook mag worden aangeboden. Maar de massawoningbouw reduceert de woning tot een consumptie—artikel en de bewoner tot een consument. Want alleen in deze sfeer kan verlangd worden dat de gebruiker afwacht tot het pro dukt hem geheel voltooid wordt aangeboden."

- John Habraken (1985 p.19)

"It is one of the great wonders of our existence that the satisfaction of some needs requires a very positive, personal, even almost creative action from us. Even today, it goes without saying that we cannot live on consumption alone, however attractive and ingenious it may be. But mass housing reduces the house to a consumer article and the occupant to a consumer. Because it is only in this sphere that the user can be expected to wait for the product to be offered completely completed. "

- John Habraken (1985 p.19)

 Habraken, N. J. (1985). *De dragers en de mensen.* Scheltema & Holkema.

Problem statement

The current housing shortage in the Netherlands has created a need for mass-produced housing. While convenient in creating large amounts of dwellings in short amounts of time, mass-produced housing also has its drawbacks. Personality and customization for residents get lost in the process. In the 1960's John Habraken noticed a very similar situation. The Netherlands was building large amounts of residences without truly considering the needs of the residents. This would often lead to unhappy residents and many of these buildings becoming unwanted only years after completion. Are the ideas of John Habraken from the mid 20th century still applicable in 2020?

Research questions

This research paper looks at the flexible housing movement, and how its ideas can be applied to modern architecture. This paper looks at the historical context of the flexible or open building movement and analyzes its most important characteristics. Furthermore, the paper looks at the application of these ideas in three modern architectural projects in Amsterdam, because of the nature of these projects the experiences of the residents is of utmost importance. The main question this paper tries to answer is *'How can the ideas of the flexible housing movement be used to facilitate the amateur?'*. To answer this question a series of sub-questions have to be answered first. The first set of questions relates directly to the historical context of the flexible housing movement; *'What are the ideas of the flexible housing movement?',* and *'How did the ideas of the flexible housing movement develop over the last 60 years?'*. The second set of questions looks at the application of the ideas from the flexible housing movement in architectural projects from the last 10 years; *'How have the ideas of the flexible housing movement been applied in the last 10 years?'* and *'How do the different applications of the flexible housing movement allow for flexibility?'*. The last set of questions asked in this paper relate directly to the resident; *'Who is the amateur?'*, *'Which parts of their residence do residents want to be flexible?'* and '*How do residents use this flexibility after the project has been completed?'*

Relevance

On the 5th of April 2020, only weeks after the WHO announced the coronavirus to be a global pandemic on March 10th 2020, the Dutch television show 'Tegenlicht' presented two interviews about life after the crisis (van der Haak et al., 2020). Li Edelkoort and Dirk de Wachter predicted that the world would experience a reset after the crisis: our culture could drastically change. Dirk de Wachter (a psychiatrist) saw new types of solidarity emerge, and a lack of social contacts during the corona epidemic could lead to people realizing the value of human relations. Whereas, Li Edelkoort (a trend forecaster) saw the corona epidemic as the catalyst for her long-predicted 'Age of the Amateur'. While our current society had grown accustomed to consumerism and mass-produced goods, the early days of the corona epidemic had renewed interest in making your own goods. (van der Haak et al., 2020) A resurgence of the *arts & crafts*, goods produced locally, but more importantly of high quality. (Grimm, 2020)

The amateur is defined by their heightened interest in quality and personalization, plus they reject mass-produced goods; these views align very much with the views of John Habraken. In his book 'De dragers en de mensen' he states that mass housing has reduced the dwelling to consumption, and the resident to a simple consumer. All personal and creative acts that are part of a home have been lost in the process of mass production homes. (Habraken, 1985) This paper explores the current preferences personalization and adaptability of their residence and compares these to the ideas of the flexible housing movement as first proposed by John Habraken in 1961.

Grimm, M. (2020, April 8). Amsterdam is sinds de coronacrisis één groot broodparadijs. *Het Parool*. https://www.parool.nl/nieuws/amsterdam-is-sinds-de-coronacrisis-een-groot-broodparadijs~b4946c7e/?referrer=https%3A%2F%2Fwww.google.com%2F
Habraken, N. J. (1985). *De dragers en de mensen.* Scheltema & Holkema.
v.d. Haak, B., Vermeulen, B., & Wiering, F. (2020, April 5). *Virus vergezichten.* VPRO. https://www.vpro.nl/programmas/tegenlicht/kijk/afleveringen/2019-2020/virus-vergezichten.html

Source analysis

Since the publication of John Habrakens book 'De dragers en de mensen' in 1961, many publications have come out in the Netherlands with similar concepts. Each of these had in common that they tried to lengthen the lifespan of a building, by allowing its infill to be flexible and change over time. This paper looks at the publication made by John Habraken, as well as Bernard Leupen, OBOM, and Openbuildin.co. While much is published about the architectural principles that allow for flexibility, less has been published about the impact these principles have on the lives of the resident, and if the resident is content with the solutions that have been provided.

Methodology

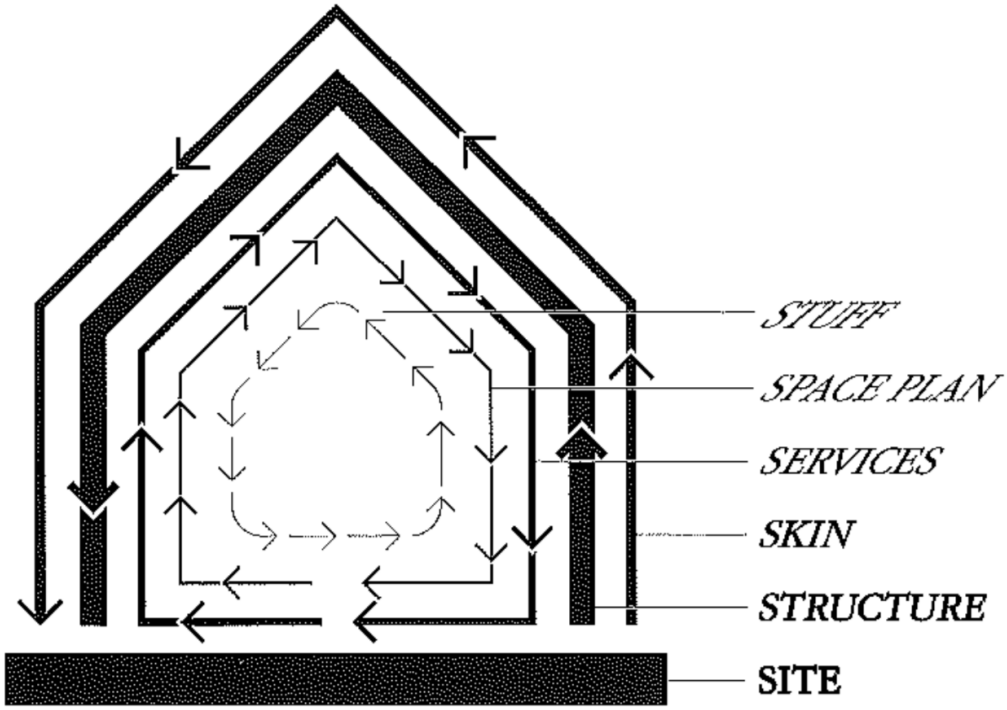
To answer the research question *'How can the ideas of the flexible housing movement be used to facilitate the amateur?'* this paper will utilize 3 different research methods. We will looks into existing publishings, both from John Habraken as well as other works based around the same topic.

To answer the first set of questions *('What are the ideas of the flexible housing movement?', and 'How did the ideas of the flexible housing movement develop over the last 60 years?')*, we are going to consider the **historical context** around the flexible housing movement.

To answer the second set of questions *('How have the ideas of the flexible housing movement been applied in the last 10 years?' and 'How do the different applications of the flexible housing movement allow for flexibility?')* a **case study** of three modern projects is conducted. This way we can analyze the modern interpretation of the flexible housing movement.

To answer the third set of questions *('Who is the amateur?', 'Which parts of their residence do residents want to be flexible?' and 'How do residents use this flexibility after the project has been completed?'),* the paper investigates what residents of these projects liked and disliked about the approach to flexible housing taken by the chief architect, through means of a **questionnaire**, and a series of **interviews**.

 Habraken, N. J. (1985). *De dragers en de mensen.* Scheltema & Holkema.



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

Illustration 2: Shearing layers of change (Brand, 1994b, p. 13)

 Brand, S. (1994b). Shearing layers [Illustration]. In *How Buildings Learn: What Happens After They're Built* (p. 13).

Discussion

The supports:

When the book *'De dragers en de mensen'* was first published in 1962, it did not perform very well. The publisher even commented that the book would not be read by many; however, everyone that read it had an opinion of the matter. He seemed to have been right on this matter, only 40 books were sold per year within the Netherlands. However, when the book was translated into English, this changed drastically. The book quickly became translated into many languages, and Habrakens ideas quickly made their way around the world. (Supports, z.d.)

Eleven years after the original publishing the English version was released, '*De dragers en de mensen'* was translated to *'Supports: An Alternative to Mass Housing'*. The title had become less poetic, but certainly more straight forward, making it for many readers more enticing. Reviews at the time found the translation to be long overdue and welcomed it with open arms. They were especially fascinated by the new role Habraken proposed for architects and planners. Since Habraken argues that building is implicitly involved in possession, homeowners should take part in the construction of their own homes. "*Habraken no longer sees the architect playing his traditional role of the creative dictator."* Habraken proposes a way to solve the *"confused professional relationship"* between the architect and the homeowner. Both parties felt responsible for the creation of their home, but according to Habraken, this should be more of a symbiotic relationship. But of course, mass housing stood central in the book. Habraken showed how the system fails to develop the technology. Housing shouldn't become obsolete as it grows old, the housing should transform along with the needs of the inhabitant, and this would only be possible if dwellings were designed for the individual rather than the masses. (Lawson, 1973, p. 130; Habraken, 1985)

The idea of a dwelling adapting to its owners would inspire many architects after Habraken, Frank Duffy would later come up with the concept of "Shell, Services, Scenery, and Sets" or "Shearing layers" (Depicted in the illustration 2 on the left). Steward Brand would later expand on this concept in his book '*How buildings learn: What happens after they're built'*. In this concept, Frank Duffy describes a building and its many layers, each of these layers however has its own lifespan. Take for instance the outer layers of the diagram, in many instances, the 'site' goes unchanged for a very long period; even the 'structure' of a building might last anywhere between 30 - 300 years. On the other hand, the inner layers might change on a whim: how often won't the furniture you own be replaced within the lifespan of the entire dwelling? (Brand, 1994) Similar to the design strategy as proposed by Habraken, in the model of 'Shearing layers' if the structure and the skin have been designed flexibly, the lifespan of a building can be extended far beyond what it would have normally been. (Habraken, 1985)

Bernard Leupen looks at multiple case studies in his book *'Kader en generieke ruimte: Een onderzoek naar de veranderbare woning op basis van het permanente' (Framework and generic space: A research on the adaptable dwelling on basis of the permanent)* these case studies all overcome the problem of adapting dwellings within an existing structure. His research started with the realization that the average building has a lifespan of 100 years, over time different households will inhabit the dwelling, and each one of these households will have different wishes. Like Duffy before him, he splits architecture up into a set of distinct layers:

-The supporting structure (which carries the building),

-The skin (which separates inside and outside),

-The staging of the space (furniture, inner walls, and detailing of the dwelling),

-The service elements (shafts and installations),

-The circulation (stairs, hallways, and elevators).

Brand, S. (1994aw). *How Buildings Learn: What Happens After They're Built* (Reprint ed.). Penguin Books.
Habraken, N. J. (1985). *De dragers en de mensen.* Scheltema & Holkema.
Lawson, B. (1973). A review of: "Supports: An Alternative to Mass Housing." By N. J. HABRAKEN (Translated by B. Valkenburg). (London: Architectural Press, 1972.) [Pp. viii + 97.] £3-00. *Ergonomics*, 16(1), 130–131. https://doi.org/10.1080/00140137308928400
Supports. (n.d.). Habraken.Com. Retrieved December 10, 2020, from https://www.habraken.com/html/supports.htm

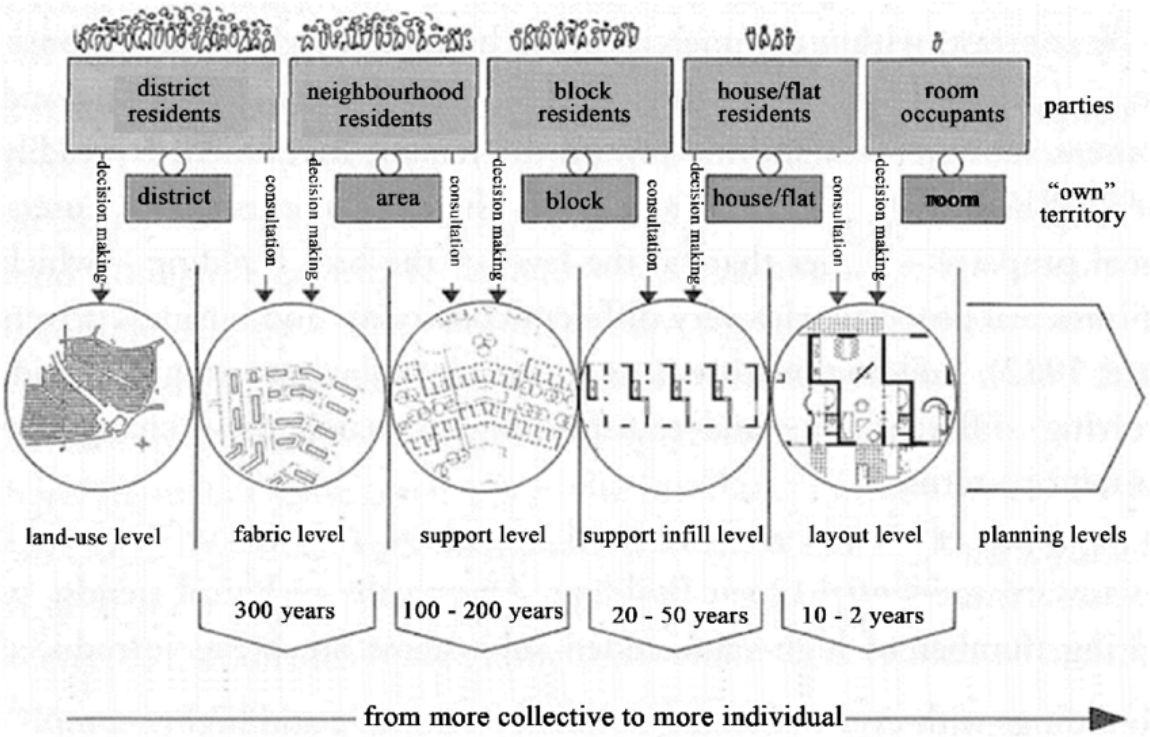


Illustration 3: Levels of decision making (Cuperus, 2001a, p. 3)

8 Cuperus, Y. (2001a). Levels of decision making [Illustration]. In *An introduction to openbuilding* (p. 3).

Additionally, he identifies three ways of flexibility; renovation, expandability, and versatility. Renovation and expandability can be designed quite straightforward, with the use of a light structure as proposed by among others Habraken. Versatility on the other hand has more intricacies to it, by designing spaces without a very strong purpose in mind, these spaces can later be reused with different functions, giving the dwelling a new life without much intervention. The danger with his design principle is that the space can quickly feel without any purpose at all. (Leupen, 2002)

The Technical University of Delft launched the OBOM (open building strategic studies) in 1985. Led by Age van Branden and later Ype Cuperus, OBOM continued their research into the concepts of flexible architecture as described by John Habraken. In his paper '*An introduction to Open Building'* Ype Cuperus described the levels of influence for the neighborhood, and the individual to support the Open Building design process as first described by John Habraken (Illustration 3 - Shown left). They described six levels of decision making, each level was assigned a lifespan, and one or two occupants have control or influence over the design. Since the higher levels both accommodate and limit the lower levels, and vice versa, these different levels of decision making should be disconnected but coordinated. The longer the lifespan of the level, the larger the group making decisions should be. (Cuperus, 2001)

The openbuilding.co foundation is the unofficial continuation of OBOM, it was founded by a collective of architects within the Netherlands. Just as OBOM, openbuilding.co continues the work as laid out by Habraken in his book 'Supports'. While OBOM applied a more theoretical approach, openbuilding.co takes a very practical approach and applies these ideas directly to architecture. They aim to extend the lifespan of architecture by designing structures that can adapt to many ways of use. Openbuilding.co has subdivided their efforts into three scales, 'open cities', 'open architecture', and 'open systems'. According to openbuilding.co, urban designs filled with open buildings are better at adapting to changing needs and thus more resilient for the future resulting in what they call the 'open city'. 'Open architecture' allows residents to make changes to their dwelling and their surroundings, giving the building ways to adapt to changing circumstances the architect could not have foreseen. And lastly, 'open systems' to provide truly flexible housing, the systems within the architecture would also have to allow for these changes, these would include among others the structure, the technical systems but also the facade. Openbuilding.co aims to research different solutions and the consequences of this way of designing for each of these three scales. (Open building, 2019)

Modern architecture (case studies)

To analyze the three case study projects the five layers of flexibility as proposed by Bernard Leupen in his book; 'Kader en generieke ruimte: Een onderzoek naar de veranderbare woning op basis van het permanente' (Framework and generic space: A research on the adaptable dwelling on basis of the permanent) are used:

1. The supporting structure (which carries the building)
2. The skin (which separates inside and outside)
3. The staging of the space (furniture, inner walls, and detailing of the dwelling)
4. The service elements (shafts and installations)
5. The circulation (stairs, hallways, and elevators)

(Leupen, 2002)

Cuperus, Y. (2001b, January). *An introduction to open building.* https://www.researchgate.net/publication/237116327_AN_INTRODUCTION_TO_OPEN_BUILDING
Leupen, B. (2002). *Kader en generieke ruimte.* Uitgeverij 010.
Open building. (2019). *BUILDING FOR THE FUTURE.* Openbuildings. https://www.openbuilding.co/

Superlofts - Houthavens
Architect: Marc Koehler Architects
Apartments: 70
Status: Build
Year: 2016
Location: Amsterdam

Description:

Marc Koehler Architects designed together with Architecten Cie, Thijs Asselbergs, Space encounters, and Hootmans ArchitectuurBureau three plots in the Houthavens Amsterdam. These three plots would be the first of a series of projects led by Marc Koehler Architects called 'Superlofts'. These superlofts were to be constructed according to the principles of Openbuilding.co and would not rely on a developer for funding, but instead, be funded directly by the prospective buyers, cutting out the middleman. (MarcKoehlerArchitects, 2016)

Superlofts Houthavens consists of 70 lofts, the lofts range in size from 35m² upto 200m². The superlofts consist of three separate plots. Each plot has two buildings, a low-rise, and a mid-rise section, connected on the ground floor by an elevated courtyard. This paper will focus on the midrise building of the superlofts. This section is 70 meters tall and consists of ten floors. On the ground floor is a collective lobby, on the second to ninth floor consist of double high casco lofts, with large lofts on the tenth floor. (MarcKoehlerArchitects, 2016)

Photograph 1: De Hoofden backfacade (v.d. Burg, 2017)

MarcKoehlerArchitects. (2016). S*uperlofts Houthavens gives 70 families personal freedom, views and community.* https://marckoehler.com/project/superlofts-houthavens/

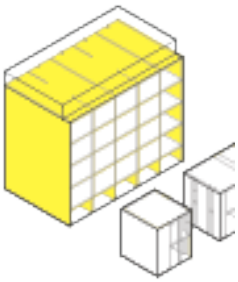


Illustration 4: The supporting structure in Houthavens *(Own image)*

1. The supporting structure (which carries the building)
The lofts of the Houthavens are constructed with concrete. Both walls and ceiling are made up of two-meter wide panels. All of these prefabricated elements are load-bearing, because of this it will be difficult to merge multiple units. The outer shell of the superloft thus dictates the maximum floor space. (MarcKoehlerArchitects, 2016)

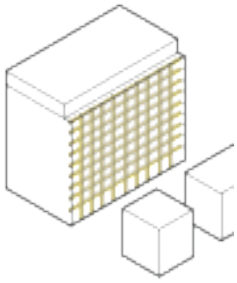


Illustration 5: The skin in Houthavens *(Own image)*

2. The skin (which separates inside and outside)
The facade consists of a modular system of aluminum frames and glass. The windows are split into four main sections, the bottom two have a height of at least 2.6 meters and the two sections have a height of at least 2.4 meters. In case an added mezzanine reaches the facade these top and bottom sections dictate the height at which the floor can be placed. Multiple infills for these sections were available giving prospective buyers a small amount of freedom to choose their facade. The balconies have variable widths depending on the interior layout. (MarcKoehlerArchitects, 2016)

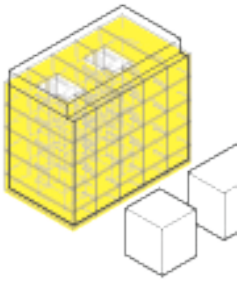


Illustration 6: The staging of space in Houthavens *(Own image)*

3. The staging of the space (furniture, inner walls, and detailing of the dwelling)
Each loft is between 3 to 8 meters in width, and 5 to 6 meters deep. The depth of the space depends greatly on the typology, but the maximum depth is 18 meters for a double-sided apartment. Because of the height of the space, a 10-centimeter tick mezzanine can be mounted anywhere in the loft, these structures are hung from the ceiling and give the resident the ability to double the floorspace of their loft. (MarcKoehlerArchitects, 2016)

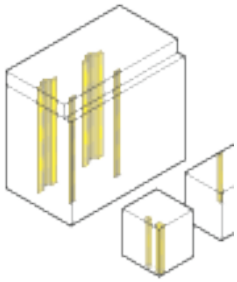


Illustration 7: The service elements in Houthavens *(Own image)*

4. The service elements (shafts and installations)
Each apartment is fitted with floor-heating and cooling, eliminating the need for extra installations to be installed above the floor. Each superloft is outfitted with double shafts allowing for relative flexibility when positioning the facilities and installations. The use of wireless lighting switches gives residents a bit of extra flexibility when installing their electrical wiring. (MarcKoehlerArchitects, 2016)

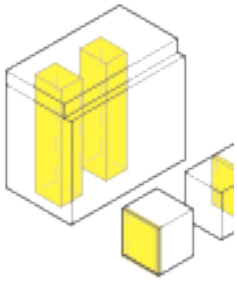


Illustration 8: The circulation in Houthavens *(Own image)*

5. The circulation (stairs, hallways, and elevators)
The superlofts are a portico typology. An elevator and set of stairs connect the ten floors of the superlofts, because of the double-height of the lofts the elevator only stops every other floor. Two doors provide access to the lofts, one on the ground floor and another situated directly above it on the first floor. The extra front door gives the residents the ability to move their 'public' space to the first floor, however, because the elevator does not stop here this becomes less practical. (MarcKoehlerArchitects, 2016)

CiWoCo
Architect: Gaaga Architects
Apartments: 11
Status: Build
Year: 2019
Location: Amsterdam

Description:

Similar to the Superlofts, CiWoCo consists of two buildings connected on the ground floor by an elevated courtyard: a lowrise building that consists of four stories and three ground-bound residences on the opposite side. The building in total has space for 11 residences and is thus much smaller compared to the other two case studies. To create visual unity between the two buildings both are cladded with reclaimed Adobe wood. (GAAGA studio for architecture, 2019; Wilde, 2019)

Studio Gaaga designed CiWoCo with sustainability in mind, for them this also meant extending the lifespan of the building. They applied multiple ways to expand the lifespan of CiWoCo, the building had to be adaptable to the changing needs of future residents, but also demountable. Instead of pouring concrete directly on top of the pipework, Gaaga separated the structure from the systems. (GAAGA studio for architecture, 2019; Wilde, 2019)

Photograph 2: CiWoCo Facade boterbloemstraat (Gaaga, 2019)

GAAGA studio for architecture. (2019). *Gaaga | CiWoCo Amsterdam.* Gaaga.Nl. https://www.gaaga.nl/projecten/ciwoco-amsterdam
Wilde, A. (2019, August 31). *ARC19: CiWoCo 1.0, Amsterdam – GAAGA.* De Architect. https://www.dearchitect.nl/projecten/arc19-ciwoco-1-0-amsterdam-gaaga

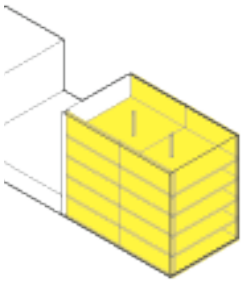


Illustration 9: The supporting structure in CiWoCo *(Own image)*

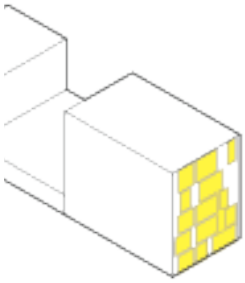


Illustration 10: The skin in CiWoCo *(Own image)*

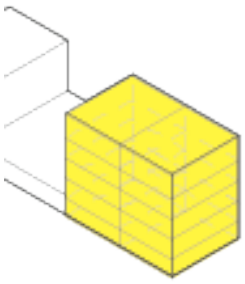


Illustration 11: The staging of space in CiWoCo *(Own image)*

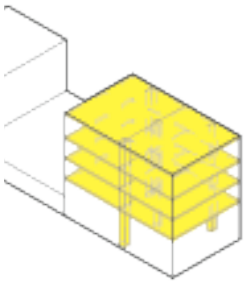


Illustration 12: The service elements in CiWoCo *(Own image)*

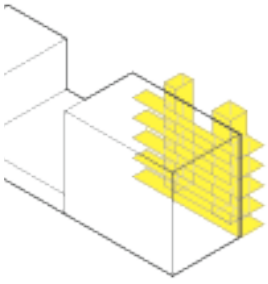


Illustration 13: The circulation in CiWoCo *(Own image)*

1. The supporting structure (which carries the building)
Like the structure of the Superlofts, the structure of CiWoCo is built with prefab concrete panels. There are two small columns on each floor, otherwise, the floorplan is free from structural elements. Each floor is split up into two apartments, due to this structure, these can still be merged. However because the floors are made of concrete as well, it is not possible to merge apartments vertically. (GAAGA studio for architecture, 2019; Wilde, 2019)

2. The skin (which separates inside and outside)
The windows of CiWoCo are positioned playfully with varying width and positions. This gives each apartment a different set of rules to play with when designing the interior walls. Because interior walls are only able to connect to the closed part within the facade the options for creating interior spaces are greatly limited by the facade. (GAAGA studio for architecture, 2019; Wilde, 2019)

3. The staging of the space (furniture, inner walls, and detailing of the dwelling)
The floors consist of one large open space split in the middle to create two smaller apartments. While this gives residents the possibility to merge two apartments in the future, the apartment at the moment is quite small resulting in slight limitations when designing the layout of the interior. Studio Gaaga designed the apartments to include a variable zone, these zones allow for multiple functions, relating to the idea of versatility as proposed by Leupen. (GAAGA studio for architecture, 2019; Wilde, 2019)

4. The service elements (shafts and installations)
Two of the four cores are situated in between the two apartments, combined with retention walls and a lowered ceiling, these give the resident different possibilities when placing their installations. However, while one core is situated directly against the close exterior wall, the other core is right in the middle of the apartment: this can create problems when merging multiple units. (GAAGA studio for architecture, 2019; Wilde, 2019)

5. The circulation (stairs, hallways, and elevators)
Studio Gaaga utilized a corridor typology for CiWoCo allowing them to create multiple access points to the dwellings. These allow residents to use different entrances to their dwelling than originally conceived by the architect as well as allowing residents to rearrange the interior layout around different access points giving residents more freedom when they adapt their dwelling. (GAAGA studio for architecture, 2019; Wilde, 2019)

GAAGA studio for architecture. (2019). *Gaaga | CiWoCo Amsterdam.* Gaaga.Nl. https://www.gaaga.nl/projecten/ciwoco-amsterdam
Wilde, A. (2019, August 31). *ARC19: CiWoCo 1.0, Amsterdam – GAAGA.* De Architect. https://www.dearchitect.nl/projecten/arc19-ciwoco-1-0-amsterdam-gaaga

Patch-22
Architect: Tom frantzen et al architecten
Apartments: 26
Status: Build
Year: 2016
Location: Amsterdam

Description:

Tom Frantzen believed in the future of flexible housing, so much that in 2009 he created together with his business partner Claus Oussoren a development firm, aimed at funding projects based around this principle. Patch-22 was their first project as a team, the tower is 30 meters tall and consists of 6 residential floors and offices on the plinth, behind the tower is a small row of ground-bound dwellings. (arc16: patch22 – Frantzen et al, 2016; Frantzen, 2016)

Patch-22 is a mostly wooden structure, the facade, columns, and beams are all made of cross-laminated timber, only the central core and the floor slabs are due to technical reasons made of concrete slabs. The core is placed decentrally in an open space, this allows a maximum of eight apartments to be located on each floor. (arc16: patch22 – Frantzen et al, 2016; Frantzen, 2016)

Photograph 3: Patch-22 SouthWestview (v.d. Burg, 2016)

ARC16: PATCH22 – FRANTZEN et al. (2016, September 8). De Architect. https://www.dearchitect.nl/projecten/arc16-patch22-frantzen-et-al-2

Frantzen, T. (2016). *The architect as developer.* Patch 22. https://patch22.nl/

Patch 22 | ARCAM. (2016). Arcam.Nl. https://www.arcam.nl/en/patch22-2/

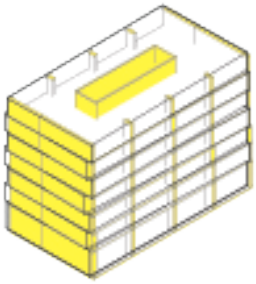


Illustration 14: The supporting structure in Patch-22 *(Own image)*

1. The supporting structure (which carries the building)
The structure of Patch-22 is solely placed around the core and in the facades. Because of this, the residents are entirely free to choose their interior layout. This is especially evident in the horizontal merging of multiple units. Many residents of the building have opted to buy two or three units and make a larger dwelling. While in the initial design phase it was also possible to merge units horizontally, due to the use of large concrete slabs this has now become technically challenging. (Frantzen, 2016; Patch 22 | ARCAM, 2016)

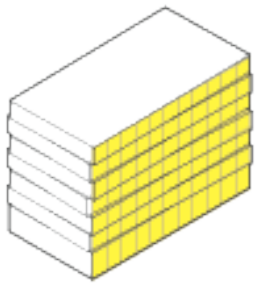


Illustration 15: The skin in Patch-22 *(Own image)*

2. The skin (which separates inside and outside)
Over the length of the Southern and Northern facades run large balconies, giving all units equal outdoor space. The windows have a width of three meters, in between each window is a small column, allowing interior walls to connect to the facade. These exterior columns dictate the grid on which residents can design their apartment. This is especially evident in the existing floorplans, all spaces are a multitude of 3 meters wide. (Frantzen, 2016)

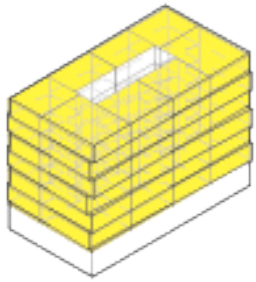


Illustration 16: The staging of space in Patch-22 *(Own image)*

3. The staging of the space (furniture, inner walls, and detailing of the dwelling)
The floorplan of Patch-22 consists of a large open space that can be divided up into 8 smaller sections. The decentrally placed circulation shaft gives residents the ability to combine units of varying sizes. This allows residents to create more interesting floorplans, tailored to their personal preferences. The only objects that restrict the freedom to design the interior are placed in the facade namely, the large wooden columns, and the 3-meter wide windows. (Frantzen, 2016; Patch 22 | ARCAM, 2016)

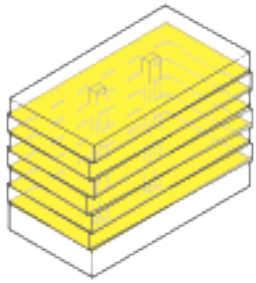


Illustration 17: The service elements in Patch-22 *(Own image)*

4. The service elements (shafts and installations)
Each apartment is outfitted with a heat exchanger situated above the balcony and is connected to a collective wood pellet burner for heat. Originally Tom Frantzen had designed an innovative floor system that would allow residents to easily swap in and out different technical systems, this floor was however never realized and instead replaced with concrete. Nonetheless, the elevated floor connects all eighth units to two installation shafts located in the circulation core allowing residents more freedom when designing their interior installations. (ARC16: PATCH22 – FRANTZEN et Al, 2016)

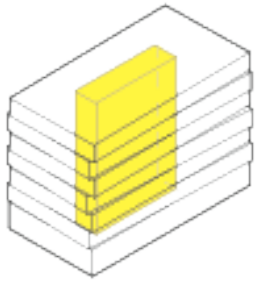


Illustration 18: The circulation in Patch-22 *(Own image)*

5. The circulation (stairs, hallways, and elevators)
The eight units are located around a central corridor core, which provides access to two sets of stairs and an elevator. Because residents can merge multiple units, they can choose which doors they want to keep as a front entrance. However, on some floors, where only a few dwellings remain, this does create very long and sterile corridors. Luckily this does not seem to be a restricting factor when designing their interior (Frantzen, 2016)

ARC16: PATCH22 – FRANTZEN et al. (2016, September 8). De Architect. https://www.dearchitect.nl/projecten/arc16-patch22-frantzen-et-al-2
Frantzen, T. (2016). *The architect as developer.* Patch 22. https://patch22.nl/
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The amateurs

First described by Li Edelkoort, the term 'amateur' is not meant to be derogatory, but rather shows that these people do not have a desire to specialize in one specific trade. While only described as a group very recently, these people have of course been around for a longer time. As described in the introduction, the amateur is an emerging group of people highly interested in good quality and personalization. (van der Haak et al., 2020) This description fits also very well with the audience targeted with the development of open buildings, people that have very specific needs, want to be able to change their mind, and desire high-quality products in their life.

Response

To analyze the satisfaction about the process of designing their own home within one of these projects, a questionnaire was performed. In total, 19 respondents gave their opinion about the open building design process. Out of these, 19 respondents, 6 live in Superlofts, 2 in CiWoCo, and 11 in Patch-22. Although none of these projects is more than 10 years old, 5 residents were not first-time owners of their dwelling. Of those 5, one ended up changing their apartment layout, the other 4 indicated that the apartment was still too new. In total 15 respondents changed their apartment in one way or another.

Changing the layout

For residents, there were two main reasons to change the layout of their apartment; the first, 'because the residence was delivered empty', and the other was a change in needs. While the first reason is self-evident, the second is very interesting. It shows that even within only 10 years residents can change their needs enough to adapt their residence. These changes were often minor but could have a large impact on the way residents use their apartments. In total 3 respondents chose to adapt their dwelling, the first respondent split a space into two, and added extra floorspace by closing a vide, the second respondent merged two rooms, expanding her living room, and changing her dwelling from a 4 to a 3 bedroom apartment, the third respondent bought the dwelling from a previous owner, and decided to completely change the layout of the apartment (they moved, for example, the kitchen).

What is interesting to note is that out of the 15 respondents that changed the layout of their apartment, 8 did not have contact with the architect of their building. Three of these respondents did however end up hiring an architect to design their floor plan.

The respondents were also asked about the possible reasons they would change their dwelling in the future. For most respondents, two reasons stood out: a change in employment and a change in the household. This shows that while architects often design with a clearly defined target group in mind, this target audience is far from well defined, and will constantly change their needs and lifestyle. A flexible open building would allow for these unforeseen changes.

Priorities

Fifteen of the respondents provided in the questionnaire the most important reasons for them to change the layout of their apartment. Respondents were asked to rate a series of topics from 1 to 5 (1 being not important and 5 being very important). To a large proportion of the respondents the ability to change the size of their apartment (86.6% rated it a 4 or higher) and the ability to change the size of their rooms (80% rated it a 4 or higher) result essential. This shows that, while not always available in the projects analyzed in this paper, the option to adapt the apartment on a large scale is still very important to these residents.

73.3% (rated a 4 or higher) of respondents noted that they would like their dwelling to be easily adaptable, while only 26.7% (rated a 4 or higher) of respondents thought it was important

v.d. Haak, B., Vermeulen, B., & Wiering, F. (2020, April 5). *Virus vergezichten.* VPRO. https://www.vpro.nl/programmas/tegenlicht/kijk/afleveringen/2019-2020/virus-vergezichten.html

to change their dwelling without professional help. This shows that while these homeowners do want their dwelling to adapt with them as their needs change, they are not afraid to ask a professional for help. This is also reflected in their need to change any technical systems: about 60% of respondents found it important to change the technical systems in their dwelling, something that is commonly left to professionals to adapt.

The outdoor space (20% rated a 4 or higher), as well as the facade (26.7% rated a 4 or higher), were not regarded as important factors while changing the layout. Important to note that all respondents live in buildings whose facades could be considered architectural and are not able to be changed by the resident, and outdoor spaces are all limited to private balconies, or communal gardens. This group of respondents likely chose this project because the facade and outdoor space offered already fit their needs.

Price did not seem to be indicative of changing the dwelling. Only 60% rated price as an important (rated a 4 or higher) factor when changing the layout of their dwelling. This is most likely due to the high initial startup costs combined with the location of the dwelling.

Interviews

To delve more into the wishes of the respondents, 5 respondents were interviewed to provide a bit more context.

Interviewee 1: Patch-22

The first interviewee works in the field of architecture, and greatly appreciated the different elements that allowed for flexibility. He loved the fact they could completely design their apartment without having to make many concessions. And while it was never called an open building during the development phase, this was one of the more important factors while purchasing this apartment. The interviewee appreciated being able to merge multiple units: this allowed him to create a more personal dwelling, but also generated more diversity in apartment sizes within the building. He admits that while the original building could be adapted to changing needs very easily while designing their layout, they had made some choices that probably will make it hard for future residents to change some parts of the design.

Interviewee 2: Superlofts

The second interviewee designed their apartment completely with his wife, who is a designer. This made it a lot easier to design the basic layout, and picking the materials they wanted. However, they noticed that sometimes they lacked certain architectural expertise. This was especially evident during the construction phase when they would constantly need to check in on the constructor and see if everything was going according to plan. He concludes that in hindsight it would maybe have been better to hire a project manager, however, because of the cost, they had decided not to.

"It is truly like living in your own head, it really becomes the way you once drew it"

Interviewee 3: Superlofts

Interviewee three got involved in the building relatively early on, this gave them more time to think about the apartment that they wanted. While they initially decided not to hire an architect, they soon decided to get in contact with Marc Koehler Architects, who was able to solve some key issues they had been struggling with within their design. Like interviewee 2, she mentions that the detailing and construction phase was the most complex, in an instant something might go sideways. They had initially expected MKA to help them in the construction phase as well, however, they soon found out they still had to do daily checkups. For them this was not a very big issue since they used to live relatively close; however for people further away, they would recommend a project manager.

Interviewee 4: CiWoCo

Interviewee four had bought the apartment from a previous owner, who had designed the apartment relatively close to their wishes. While they did shortly consider merging two of the smaller bedrooms, in the end, they did prefer to have the extra room. But while the idea of possibly changing their apartment in the future was nice, it was not a determining factor while purchasing the dwelling.

Interviewee 5: Patch-22

The fifth interviewee is himself an interior builder, so he was aware of the possible pitfalls when buying this apartment. But the ability to design their layout was an important reason while buying this apartment. He was unpleasantly surprised when he got the news that the original floor would no longer be installed, and the constructor had opted for a less modular system; this type of floor had in fact been one of the indicative aspects to choose this particular project. However, he was happy they only had to worry about their layout, and not about the communal parts of the building, like for instance the facade, which would, according to him, have become too messy of a process. While not necessary at the moment, being able to shed a third of their apartment in the future was also a nice added benefit.

"Everyone gets an empty canvas, and everyone makes something completely different with it, one starts their design with a set of decadent Moroccan doors, the other keeps everything sterile and white."

Conclusion

From the questionnaire and the interviews, can be seen how keen people are on designing their dwelling. While it does produce some small problems, by taking the process out of the hands of a professional architect, residents were always able to overcome these and create in their eyes the perfect residence. However because these decisions are taken by less skilled designers, these choices can sometimes deteriorate the flexibility of the design. Paired with a chaotic construction process designing their dwelling, can sometimes get out of hand for the amateur quickly. In some cases, it can be advised to involve a project manager that could keep an eye on these kinds of issues.

Conclusions

This paper aimed to answer the question; 'How can the ideas of the flexible housing movement be used to facilitate the amateur?' For that, a series of sub-questions had to be answered first. The first set related to the historical context of the flexible housing movement, 'What are the ideas of the flexible housing movement?' and 'How did the ideas of the flexible housing movement develop over the last 60 years?'. The ideas as proposed by Habraken in the early sixties revolving around flexible design have hardly changed over the last sixty years. However different publishings posed different ways to think about flexibility and how it can transform architecture. The shearing layers (Brand, 1994), for example, look at the different lifespans of architectural elements, while the elements of Bernard Leupen (2002), give residents the possibility to adapt their dwelling to changing needs.

The second set of sub-questions look at the modern interpretation of the flexible housing movement, 'How have the ideas of the flexible housing movement been applied in the last 10 years?' 'How do the different applications of the flexible housing movement allow for flexibility?'. The three case studies analyzed in this paper all had slightly different approaches to flexible housing, by analyzing them according to the elements of Bernard Leupen (2002) these differences were made clear. It is important to learn from these existing projects and their differences, so an improved hybrid solution can be created.

The third set of questions was aimed at the residents of flexible housing, 'Who is the amateur?', 'Which parts of their residence do residents want to be flexible?', and 'How do residents use this flexibility after the project has been completed?'. Utilizing the questionnaire and a series of interviews, a broad insight could be established about the aspects of the design the residents had considered as important or not. Residents wanted to be able to change the size of both their dwelling and the individual rooms. However, residents are not afraid to ask for help from a professional, if it results in a better product.

From these conclusions, a set of recommendations can be constructed, which will be discussed in the next chapter.

Brand, S. (1994a). *How Buildings Learn: What Happens After They're Built* (Reprint ed.). Penguin Books.\
Leupen, B. (2002). *Kader en generieke ruimte.* Uitgeverij 010.

Recommendations

The most important recommendation that should be taken from this research paper is to consider the many layers of a building, as proposed by John Habraken (levels of influence), Frank Duffy ("Shell, Services, Scenery, and Sets" or "Shearing layers") and Bernard Leupen (The supporting structure, the skin, the staging of the space, the service elements and the circulation), as they are essential while designing for an extended lifespan.

Site Involve future residents early in the process, this can create a stronger community in the long run.

Structure The structure will outlive most other parts of the designed building, for this reason, it is important to design open and flexible. The structure can strongly dictate the future use of the space.

Skin While less permanent compared to the structure the layout of the facade is very important to the infill of the dwelling, for this reason, it is important to have a good grip on the dimensions of the openable and transparent elements.

Circulation Not unlike the structure and the skin, the circulation can be freeing and restricting the choices a resident can make. Placing a circulation dictates where residents enter their dwelling, giving them multiple access points, opens up their possibilities while designing their dwelling.

Services The placement of services is important for flexibility, shafts are necessary for vertical connections, however, they are a limiting factor when placed inconveniently in the floor plan. Added systems to included services in floor or wall space can free these limitations.

Space plan Even though in the process of open building the architect has very limited input on the space plan while designing the building it is important to consider the many different possibilities the design would allow.

Stuff Like the space plan, the architect has very little input in the stuff placed within the dwelling, but it is very important to consider the possibilities and limitations the design allows.

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Appendix - Answers to the questionaire

Question	In which building do you live	Are you the first owner of the residence?	Were you aware this is an openbuilding when you bought your residence?
Answer 1	Patch-22 - Johan van Hasseltkade	Yes	het is nooit zo genoemd tijdens de verkoop / bouw
Answer 2	Superlofts - Houthavenkade	Yes	Yes
Answer 3	Patch-22 - Johan van Hasseltkade	Yes	het is nooit zo genoemd tijdens de verkoop / bouw
Answer 4	Patch-22 - Johan van Hasseltkade	Yes	het is nooit zo genoemd tijdens de verkoop / bouw
Answer 5	Haparandaweg	Yes	Yes
Answer 6	Superlofts - Houthavenkade	Yes	Yes
Answer 7	Patch-22 - Johan van Hasseltkade	Yes	No
Answer 8	Superlofts - Houthavenkade	Yes	Yes
Answer 9	Patch-22 - Johan van Hasseltkade	Yes	No
Answer 10	Superlofts - Houthavenkade	Yes	Yes
Answer 11	Superlofts - Houthavenkade	Yes	Yes
Answer 12	Patch-22 - Johan van Hasseltkade	Yes	No
Answer 13	CiWoCo - Ridderspoorweg	Yes	het project is geïnitieerd door een bouwgroep samen met GAAGA. Het flexibele en co ownership was van begin af aan onderdeel van het project. De term openbuilding was niet direct bekend.
Answer 14	Patch-22 - Johan van Hasseltkade	Yes	Yes
Answer 15	Patch-22 - Johan van Hasseltkade	No, I bought the residence from a previous owner	Yes
Answer 16	Patch-22 - Johan van Hasseltkade	No, I bought the residence from a previous owner	Yes
Answer 17	Patch-22 - Johan van Hasseltkade	No, I bought the residence from a previous owner	No
Answer 18	CiWoCo - Ridderspoorweg	No, I bought the residence from a previous owner	Yes
Answer 19	Patch-22 - Johan van Hasseltkade	No, I bought the residence from a previous owner	Yes

Appendix - Answers to the questionaire

Question	Were you aware you live in an openbuilding before this questionnaire?	Did you change your residence layout in any way?
Answer 1	omdat ik de collegas v open building ken	het is nog te nieuw
Answer 2	Yes	Yes
Answer 3	omdat ik de collegas v open building ken	het is nog te nieuw
Answer 4	omdat ik de collegas v open building ken	het is nog te nieuw
Answer 5	Yes	Yes
Answer 6	Yes	Yes
Answer 7	No	Casco appartement, de indeling is onze keuze. De architect en ontwikkelaar hebben hier geen invloed op gehad.
Answer 8	Yes	No
Answer 9	No	Yes
Answer 10	Yes	Yes
Answer 11	Yes	Yes
Answer 12	No	Wij hebben een casco loft gekocht
Answer 13	No	Yes
Answer 14	Yes	Yes
Answer 15	Yes	No
Answer 16	Yes	No
Answer 17	No	No
Answer 18	Yes	No
Answer 19	Yes	Yes

Appendix - Answers to the questionaire

Question	Please describe what you have changed to the layout of your residence	Did you have contact with the architect of your residence when designing your layout?	Did you hire an architect to design your floorplan?
Answer 1	nog niets	No	Yes
Answer 2	Het was een cpo-project en werd compleet compleet casco opgeleverd. We hebben alles zelf ingebouwd met behulp can een aannnemer. Het ontwerp is gedaan door mijn schoonvader.	Yes	No
Answer 3	nog niets	No	Yes
Answer 4	nog niets	No	Yes
Answer 5	We totally designed our interior. We were able to make our oen house.	Yes	My wife is a designer herself.
Answer 6	Closed an area off by adding sliding doors. Also put in extra floorpiece to create a vide of 14m2 extra.	Yes	Yes
Answer 7	Het was een lege doos, geen enkele wand etc. bestond. Kortom alles is gewijzigd want niets bestond.	No	Yes
Answer 8			
Answer 9	Het was casco dus ik heb de binnenruimte zelf ontworpen	Yes	No
Answer 10	It was completely empty	No	No
Answer 11	De woningen waren casco. Wij hebben er een tussenvloer in laten maken die aan weerszijden van de woning een slaapkamer biedt en in het midden een open vide met onze werkplekken. Beneden is de leefetage met woonkamer aan het balkon en keuken aan de voorzijde.	Yes	Yes
Answer 12	Hebben we niet	No	No
Answer 13	Ik heb een slaapkamer bij de woonkamer gevoegd. Daardoor is de woning van een 4 kamer- naar een 3 kamerappartement gegaan. Daarnaast diverse kleine aanpassingen aan de indeling, zoals een open verbinding tussen slaap- en woonkamer.	Yes	in direct contact met hoofdarchitect (GAAGA) bepaald
Answer 14	Completely new design within casco	Yes	Yes
Answer 15			
Answer 16			
Answer 17			
Answer 18			
Answer 19	Mde gehele indeling/kamers. Plek keuken etc	No	Yes

Appendix - Answers to the questionaire

Question	Size of the residence (possibility of merging and/or spliting multiple units)	Size of the rooms (possibility of merging and/or splitting multiple rooms)	Ease of adaptability	Ability to change technical systems (plumbing, ventilation, electricity)	Ability to change the residence without professional help
Answer 1	4	3	4	4	4
Answer 2	5	5	4	5	2
Answer 3	4	3	4	4	4
Answer 4	4	3	4	4	4
Answer 5	5	5	4	3	2
Answer 6	4	4	3	2	1
Answer 7	4	4	1	3	1
Answer 8					
Answer 9	5	5	4	3	3
Answer 10	5	5	5	5	5
Answer 11	4	4	5	4	2
Answer 12	4	4	3	1	1
Answer 13	5	5	3	2	3
Answer 14	4	4	5	5	3
Answer 15					
Answer 16					
Answer 17					
Answer 18					
Answer 19	3	5	4	4	3

Appendix - Answers to the questionaire

Question	Ability to change the facade	Ability to change the outdoor space	Price	What would be other important aspects that could influence your decision to change the layout of your residence?
Answer 1	4	5	3	een verandering in huishouden of werk
Answer 2	1	1	5	Creating our own unique loft was by far the most important aspect. That you can play with the height of 5m and create unique spaces. Also we couldnt change the facade or outdoor space as we have a balcony and a shared roofterrace.
Answer 3	4	5	3	een verandering in huishouden of werk
Answer 4	4	5	3	een verandering in huishouden of werk
Answer 5	2	2	3	To create a working space.
Answer 6	4	1	4	
Answer 7	1	1	3	Wijziging in samenstelling gezin of gebruik.
Answer 8				
Answer 9	2	3	3	Als er problemen zouden rijzen inde uitvoering of nadat ik er was gaan wonen
Answer 10	3	3	5	
Answer 11	2	2	4	De ontwikkeling van ons gezin, de behoeftes van kinderen
Answer 12	1	1	4	Splitsen
Answer 13	3	3	5	Facade en outdoor space konden niet gewijzigd worden op individueel woning niveau.
Answer 14	1	1	4	
Answer 15				
Answer 16				
Answer 17				
Answer 18				
Answer 19	1	1	4	

Appendix - Answers to the questionaire

Question	Would you like to change anything to your residence layout in the future in any way?	Please describe what you would like to change to the layout of your residence
Answer 1	yes	Vanwege covid toch meer privacy intern, we hebben nu een open plattegrond
Answer 2	Probably when kids get older	Maybe we would create larger rooms and more closed off space.
Answer 3	yes	Vanwege covid toch meer privacy intern, we hebben nu een open plattegrond
Answer 4	yes	Vanwege covid toch meer privacy intern, we hebben nu een open plattegrond
Answer 5	No	
Answer 6	yes	Not sure yet. Maybe creating an extra room for when our daughter gets older.
Answer 7	No	
Answer 8	yes	Add a room
Answer 9	No	
Answer 10	No	
Answer 11	We hebben de optie open gehouden om de tussenvloer uit te breiden met een extra kamer, maar voorlopig hebben we die behoefte niet.	Zie vorige antwoord
Answer 12	yes	Splitsen in meerdere
Answer 13	yes	Indien mogelijk zou ik ooit de woning willen uitbreiden door een kamer van het naastgelegen appartement bij mijn woning te trekken.
Answer 14	No	
Answer 15	No	
Answer 16	No	
Answer 17	yes	Extra room
Answer 18	No	
Answer 19	No	