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Selling qualitative architecture in a quantitative way

Examination of Attefallshus

Master of Science Thesis in the Master Degree Programme, Architecture and Urban Design

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Abstract

In July 2014, proposition 2013/14:127 was accepted and the Plan and Construction Law was adjusted to accept "Attefallshus", a 25m² complementary building that can be built without a building permit and outside plan regulations, named after the then Civil and Housing Minister of Sweden, Stefan Attefall. While architects discussed whether the change of law was right or not, the actors on the housing market took action. The very same day as the law was approved, there was Attefallshus available on the market.

One of the big concerns among architects has been the risk of a low architectural standard for the Attefallshus built, at the same time very few customer could afford to hire an architect. The market offers mostly cheap building kits or expensive turnkey houses and it is unclear if what is on the market is what the customers actually want or if they simply purchase what is available. Also, it is unclear if customers are prepared for houses with a higher architectural value and if it would be possible to sell such houses in a larger scale.

In order to achieve an understanding of the market, an extensive data collection has been performed including a literature review, studies of built examples, market mapping, interviews with housing companies, customer surveys, sketch work studies and photo studies.

From this study it has been concluded that the market for Attefallshus has a budget segment and a premium segment, but is missing a middle segment. Ca 30% of the customers taking part of a survey were positive to paying for Attefallshus corresponding to a middle segment product, and this Thesis has explored what that product could be. Further, it has also explored the possibilities to create a tool for selling these products.

Attefallshus can be made with an increased architectural standard and at the same time satisfy the customers. Customer satisfaction is to a large extent connected to the freedom of choice, even if choosing from a set range of alternatives. The Thesis has drawn the conclusion that Attefallshus can be sold in a web tool where the customer themselves design their house. The tool has however limitations, and cannot create Attefallshus that automatically complements the existing house, this can only be controlled by the will of the customer.

Further, the analysis of the results has been the starting point for the design criteria. The knowledge gained in the thesis work has been utilized in a design proposal of an building system for Attefallshus, designed as an IKEA product. The product has been design both to suit customer demands, market pre-conditions and the IKEA philosophy.

Keywords: Attefallshus, housing, complementary building, customer relations, design tool, market, architectural standard, building system, SIP, IKEA

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1. Introduction

The research is carried out in the context of Architecture and Urban Design (MPARC) at Chalmers University of Technology in Gothenburg, Department of Architecture, Sweden. MPARC is a two year master program, with “emphasizes an exploratory orientation and a research by design approach in order to unfold the professional profile, skill and scope of the design professions”.

1.1. The Author



With working life experience from the construction industry, Magnus Pettersson has combined work and education over the last seven years.

The academic career started in 2008 with a *Technical Base Year*, followed by a the bachelor program *Architecture and Engineering*, half year courses in *Business Economics* and the two master’s programs *Entrepreneurship and Business Design* and *Architecture and Urban Design*.

Parallel with the education Magnus has been working with construction supplies retailing, graphic design, emergency housing, board work in professional football and agriculture innovations.

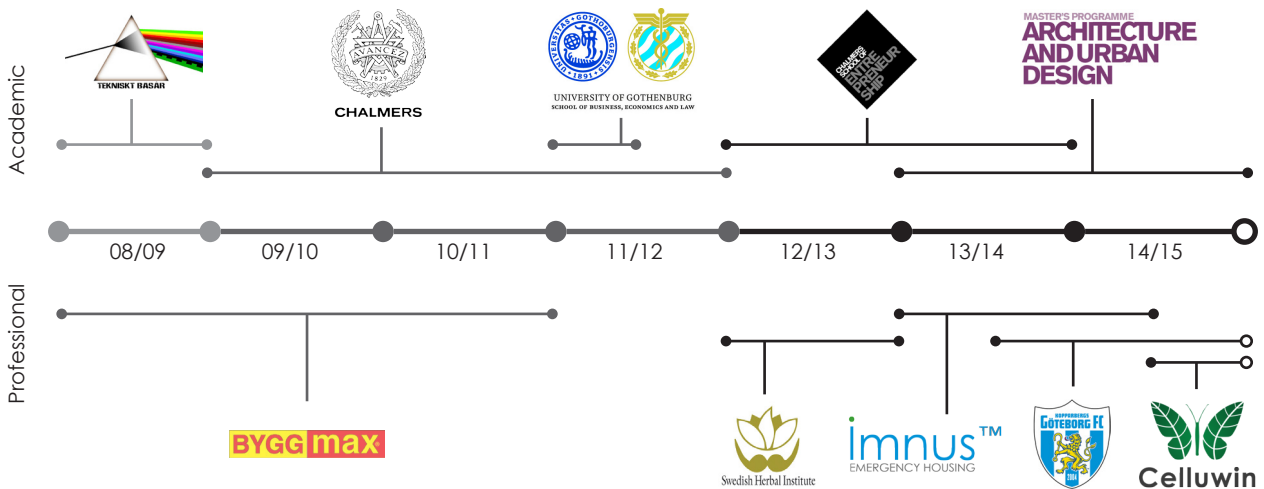


Figure 1. Academic and professional life time line 2008-2015

The combination of academic and professional experiences has created a somewhat specialized interest in the dynamics between architecture and business design, which is reflected in this thesis. Founding and running the companies Imnus and Celluwin has brought the importance of customer relations into the personal perspective on the relations between architects and their customers.

1.2. Background

In July 2014, proposition 2013/14:127 was accepted and the Plan and Construction Law was adjusted to accept "Attefallshus", a 25m² complementary building that can be built without a building permit and outside plan regulations, named after the then Civil and Housing Minister of Sweden, Stefan Attefall.

The Attefallshus has been much debated, foremost among architects. It has been discussed how much a homeowner should be entitled to build, if the homeowner can be relied upon to create qualitative and aesthetically appealing architecture and if the circumvention of the plan regulation could create negative effects on the existing building stock and the people living in it.

While architects discussed whether the change of law was right or not, the actors on the housing market took action. The very same day as the law was approved, there was Attefallshus available on the market. These are most commonly cabin-alike houses constructed in wood or timber, with a clear focus on low price.

1.3. Purpose

The purpose of this report is first, to examine if the relations between the housing market and its customers, if Attefallshus available on the market is really what people are interested in purchasing. Second, if there are room on the market for other alternatives where customer needs and wants can be combined with qualitative architecture. Last, to create a product prototype of how Attefallshus could be sold.

1.4. Research questions for pre-study

Is the available Attefallshus' on the market what customers really want?

Can architecture for Attefallshus be qualitative and at the same time as it meets the customer demands?

Is it possible to sell Attefallshus through a tool where the customers gives input and receive proposals?

1.5. Delimitations

The research method of using interviews, own experiences and qualitative examples as design references for the study yields data that is subjective.

Customer surveys will be carried out targeted towards existing home owners that are likely to build an Attefallshus, which risks lowering the statistical significant of the surveys both in terms of excluding potential future home owners that could have different views on the questions in the survey and potentially holds an over-representation of people who are likely to build themselves and that prioritize low price.

Definitions of architectural quality will be made, which in itself excludes perspectives of architectural quality not brought up in the definitions made.

Interpretations of interviews, market research and customers surveys will be translated into own sketch work, where the authors own experiences and competence could affect the results.

1.6. Project time line

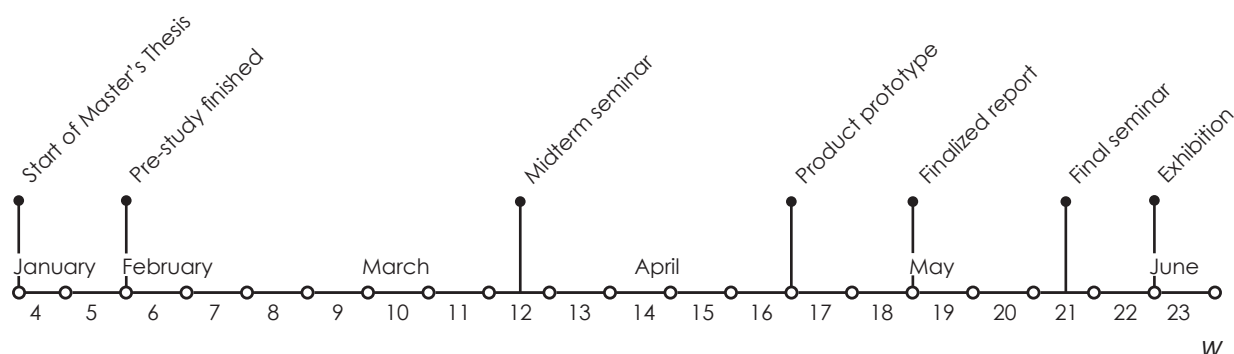


Figure 2. Project milestones

Week	Activity
4	Pre-study: Literature studies
5	Pre-study: Literature studies
6	Market mapping and Customer survey
7	Sketch study and Photo study
8	Study of small scale housing
9	Drawing Attefallshus after desired customer values
10	Interviews of housing companies and start designing after desired customer values
11	Summary of results and digital presentation for midterm seminar
12	Midterm seminar
13	Summary of results and seminar feedback
14	Setting design criteria
15	Sketch work
16	Creating product prototype
17	Creating presentation material
18	Finalizing report
19	Finalizing designs
20	Digital presentation for final seminar
21	Final seminar
22	Preparing final presentation and exhibition
23	Final presentation and exhibition

2. Method

2.1. Research strategy

Mainly, a qualitative method has been used for the study, for example by examining acknowledged examples of architecture and by focusing on why- and how-questions (Andersen, 1998) in interviews. The thesis also has elements of quantitative research in form of customer surveys.

2.2. Research process

The thesis work has had the aim of balancing a traditional research process as described in figure 3 with a architectural design process as well as interaction with customers and actors on the housing market. This aim is a result of an ambition to ensure academic height.

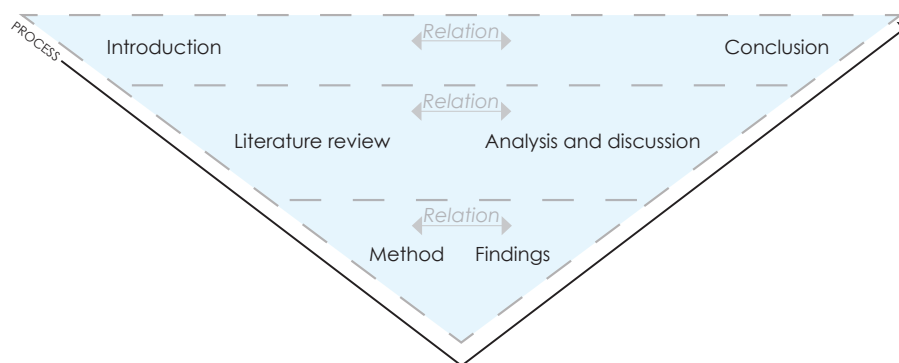


figure 3. Research process, Helle Neergard, Aarhus University

2.2.1. Design process

The design process has three main parallel processes:

- Drawing architectural designs of Attefallshus based on customer wants and needs.
- Market research to get a clear picture of the market, customers needs and suppliers strategies.
- A study of the built environment, both in terms of acknowledges examples as of existing examples in the context examined.

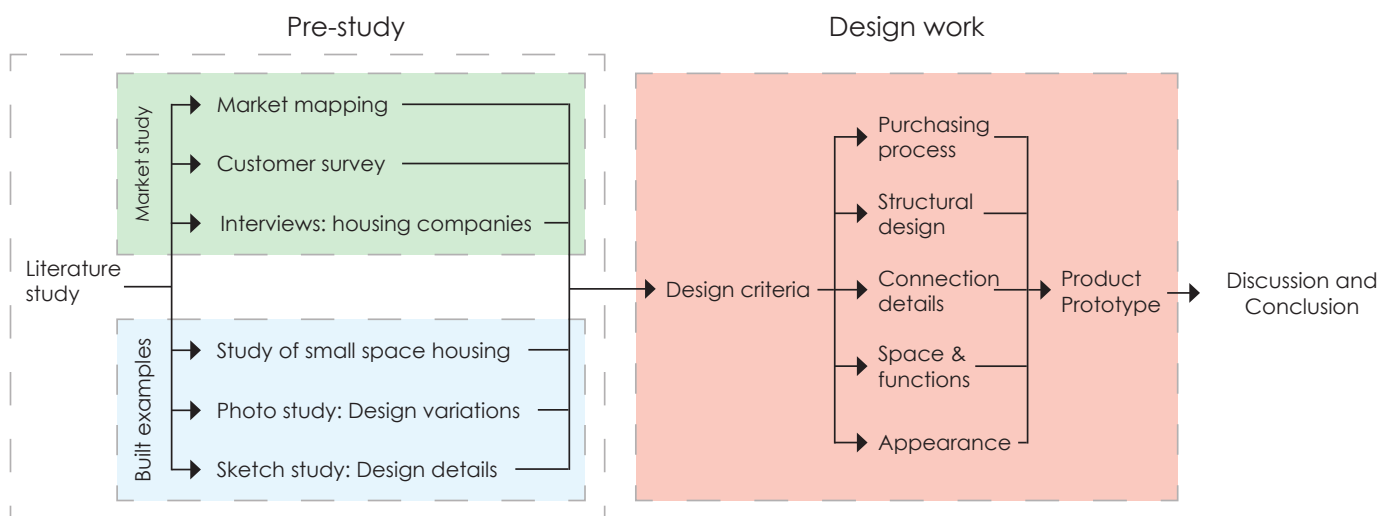


figure 4. Design process

2.3. Data collection

2.3.1. Literature review

A literature review has been performed. The author started with reading articles, reports and books about the different views of knowledge and how to manage it, in order to formulate theory as a foundation for analyzing the results of the interviews. In short, the literature study aimed to get an overview of previous research in the area of knowledge capture in startups or in companies comparable to startups.

2.3.2. Study of built examples

A two part study of existing architectural examples will be made, both a study of acknowledged architecture within small space and flexible housing and a photo study of housing in the context of this thesis.

2.3.3. Market research

There are a lot of alternatives available on the market; for example: Bygghemma.se / Skånska Byggvaror / BYGGmax / Willab Garden / Easy-house / Jabo / JM / HusochStuga.se / Kenjo / Jörnträhus / Bostadslyftet / Sjöbodarna / Max-Hus / etc. A market mapping of the different alternatives on the market will be performed to give an overview.

2.3.4. Interviews

Multiple interviews with housing companies will be done to give perspective to how the market works in reality and how the suppliers view their customers and what products they offer and why. The interviews will be conducted in a semi-structured interviewing method where the interviewer has an interview guide with a list of questions (Bryman and Bell, 2011). Questions that not in the guide can be asked (follow up questions), but in general similar wording will be used in the different interviews to ensure the quality.

2.3.5. Customer survey

To get a clear view of whether people interested in building Attefallshus, how would they choose to build it, how much would they be willing to pay for what, etc., a customer survey will be performed to understand customers needs and wants.

2.3.6. Sketch work

In the pre-study, a sketch study of architectural design details will be connected to map the variations in the existing building stock.

With a starting point in design criteria determined with the pre-study as a basis, designs of a product prototype for selling Attefallshus will be produced to try to capture the possibilities of the market into and thereby create qualitative architecture that people are prepared to pay for.

2.4. Quality of conducted research

The quality of qualitative research can be assessed by the factors of credibility, transferability, dependability, and confirmability, often concluded as the trustworthiness of the research (Bryman & Bell, 2011).

2.4.1. Creditability

The topics of the thesis can be viewed in very different ways (Bryman & Bell, 2011), especially since expressions of the “architecture vocabulary” can be interpreted very differently. To ensure creditability the work communication with customer has been conducted in iterations and multiple interviews has been done to get a clear view of the views of the different parties.

2.4.2. Transferability

Since different word, expressions, etc. can mean different things in different social contexts (Bryman & Bell, 2011), visual communication has been used as a complement to text in order to transfer findings between contexts.

2.4.3. Dependability

The reliability of research indicates to what degree a study can be replicated and that the observations made in the study is clear (Bryman & Bell, 2011). To secure the dependability, the work has been documented actively to be able to remember why certain conclusions were made.

2.4.4. Confirmability

The researchers objectivity in relation to what is being studied needs to be secured (Bryman & Bell, 2011), which can be a risk when performing research in architecture which is a relative science with an industry that a long tradition of debating what is right and wrong. To ensure objectivity, the results of the research has continuously been discussed with the tutor.

3. Theory

3.1. Attefallshus

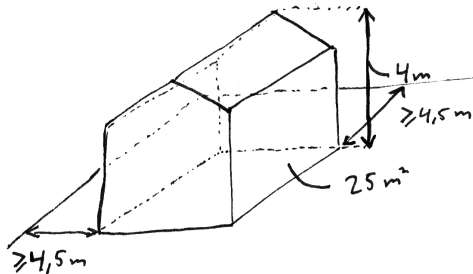


figure 5. Illustration of building rules

In June 2014, the Swedish government decided to change the Plan- and building law (2010:900) to allow Attefallshus. Attefallshus is a complementary building that can be built without a building permit and outside plan regulations. The building can be a maximum of 25 m² and have a roof height of 4 m, and if placed more than 4,5 m from site boundary, no permission from the owner of neighboring site is needed (Göteborgs Stad, 2015).

The difference from the previously allowed “Friggebod” (complementary building of maximum 15 m²) is that the Attefallshus is allowed to live in, and can be connected to the water and sewer systems. The main reason to make this change was to “simplify the rules to that the requirement of building permit is not demanded to a larger extent than what is motivated from the societal need of securing that buildings are developed in a suitable and sustainable way” (Swedish Ministry of social affairs, 2014).

Both critical and positive voices has been raised as a response to the change in law. Critical voices that point out the risk of a poor aesthetic addition to the existing building stock that could have a negative impact on neighborhoods. (Rosenhall & Rupert, 2014). Also the risk quarrel between neighbors has been addressed. Positive voices on the other hand, mean that the Attefallshus could densify the villa suburbs and increase the base and support for communal transport, local stores and activities (Wrede & Issit, 2014).

3.2. Assumed use of Attefallshus

How the new Attefallshus will be used has been widely debated. One of the arguments of changing the Plan- and Building law was that “housing for students and young people will increase which is good, as in many places in the country have a great shortage of such housing” (Swedish Ministry of social affairs, 2014). But it has also been argued that the new rules will create a legal “grey area” which will be difficult to interpret and create neighbor conflicts at the scale of “war zones” (Rosenhall & Rupert, 2014). A possible effect of this could be that homeowners are discouraged from using their Attefallshus as housing, but that they instead used the same way as a garden shed, which would be less disruptive to neighbors.

Also, the rules for letting private housing argues that a majority of the house must used by the owner to allow the standard deduction of SEK 40 000. So if the Attefallshuset have been built only to be rented out to a third party, it will be seen as business property and taxed accordingly (TT, 2014). Daniel liljeberg, chief economist at the organization “Villaägarna” said that it “spontaneously does not sound so good. Under such circumstances, the interest will decrease. People generally do not want to keep on with business”. Thus, it can be argued that the if the primary use of Attefallshus will be housing, it will still be used by members of the owner family rather than be rented out.

3.3. BBR - Building regulations

Attefallshus that will be used as housing must follow Swedish building regulations (BBR) (Swedish Ministry of social affairs, 2014). The regulations for housing under 35m² was changed 1st July 2014 (Boverket, 2014) with changes shown in figure 6. below.

		FUNCTION			
Rules and standard		Kitchen	Storage	Social areas + sleep/rest	Dining + work at home
OLD	BBR 20 3:223 Housing of max. 55 m ²				
	SS 91 42 21 House < 40 m ² , 1 pers.				
NEW	BBR xx BFS 2014:xx 3:224 Housing of max. 35 m ²				
	SS 91 42 21				

table 1. Change of regulation in BBR 21

3.4. Architectural quality in compact living

There are many examples of “small scale housing” and compact living, to the point where it can be considered to be established concepts. However, these concept are very much relevant when looking at Attefallshus, since they are a clear example of housing under 25 m².

3.4.1. Reference 1

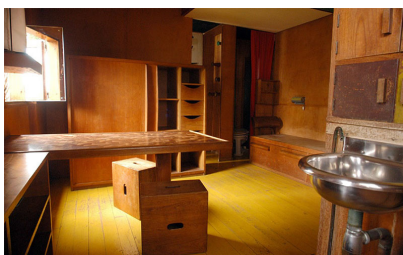


figure 7. Le Cabanon interior

Name: Le Cabanon
 Architect: Le Corbuiser
 Built: 1952
 Location: Cap Martin, France
 Size: 13,4 m²

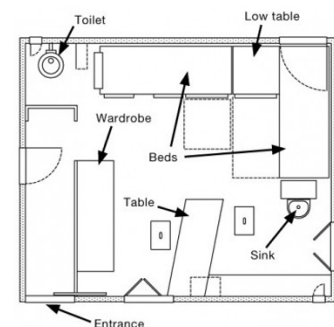


figure 6. Le Cabanon floor plan



figure 8. Le Cabanon exterior

The house was designed by the world famous Le Corbuiser, a wooden structure drawn after his own “system of proportions”; Le Modulor. The house consist of one single building that measures 3.66 x 3.66 m and has a ceiling height of 2.26 m.

Built 1951-52, the house contained a small sleeping alcove, a desk and a bathroom, but no kitchen. It was prefabricated in Corsica and assembled on site, overlooking the Mediterranean. Near the house, a small studio was also built. The last years of the life, Le Corbuiser spent much time in the house. Also, he drowned in August 1965 in the sea below the house.

3.4.2. Reference 2



figure 10. Lådan interior

Name: Lådan (The Box)
Architect: Ralph Erskine
Built: 1942
1989 (rebuilt)
Location: Huddinge, Sweden
Lovön, Sweden
Size: 22 m²

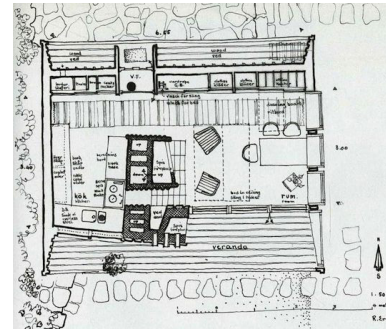


figure 9. Lådan floor plan



figure 11. Lådan exterior

The house was drawn and built by the Swedish / British architect Ralph Erskine, as a temporary house for him and his family. It was a low cost construction of recycled materials, measuring 3 x 3.6 m.

The house functioned as both family house and studio, with great ambition for each space. It was the families house for four years and thereafter worked as a summer house.

3.4.3. Qualities in reference buildings

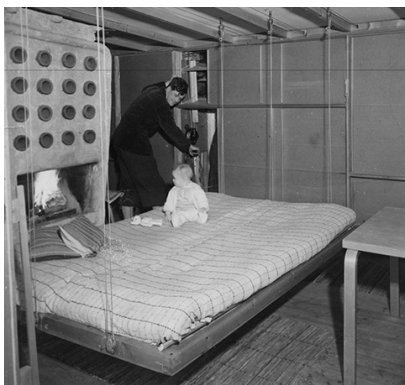


figure 12. Lådan double bed

The reference chosen are both examples that are well known, almost iconic, as examples of compact living. They are both famous for their multi-use of spaces, where lack of internal division more or less creates one big room.

Both references has great attention to detail, not seldom with a palpable sense of ingenuity. Ralph Erskine had a double bed hung in ropes from the ceiling as shown in figure 13, hoisted up during day time to leave space for other activities. The bed could also be angled in the middle, turning into a hanging couch. Le Corbusier had a tiltable mirror as an interior shutter as shown in figure 14, making it possible to direct the sunlight into different areas of the house.



figure 13. Le Cabanon tiltable window

These gadget-like solutions aside, the houses share a great level off detailing, with meticulously planned functions and storage. Of course, none of these houses live up to present building standard, but raises the question of what is really needed in a house to make it a home.

3.5. Flexibility in standard solutions

Since there is a clear, ubiquitous, focus on price, standard solutions is something almost unavoidable. Therefore, the approach of having flexibility in the form of choosing from a set range of alternatives is a compromise that offer the freedom of choice but in a controlled framework.

3.5.1. Example 1: Egedalsvænge



In the project Egedalsvænge, the Danish Architect firm Rubow Arkitekter works with “user driven product development”. The 70s public housing building has been renovated, with a extension of the facade where the tenants themselves could choose between different standard solutions. A customer study has been used to develop a catalogue of individual options regarding bay windows, French windows, balconies and windows.

The result is a unique facade shaped by the choices of the people living in the house, where the individual base their choices on interior qualities, but with a possibly unawareness of the impact on the exterior.

figure 14. Egedalsvænge facade

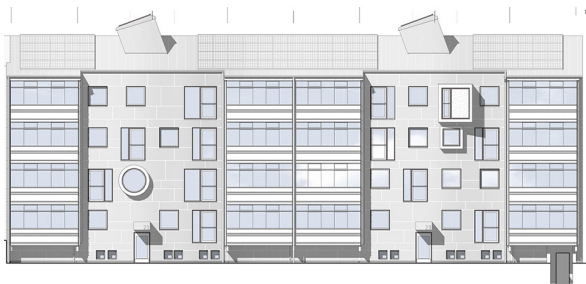


figure 15. Egedalsvænge facade



figure 16. Egedalsvænge facade



figure 17. Egedalsvænge construction process

In the project Egedalsvænge, Rubow Arkitekter shows a process of raising housing standards of public housing where they have succeeded to create modern architecture as well as improving the social, physical and environmental performance of the house.

The customer interaction gives the individual the possibility to affect their apartments in a very direct way, that is still controlled by the options given. An almost “IKEA”-like way to achieve qualitative design in a standardized process.

3.5.2. Example 2: A-hus Husbyggaren

The house supplier A-hus has developed a web tool, where the customers themselves can make choices out of selection of standard solutions. The process has six main steps:



figure 18. Husbyggaren four step process

1. Choose “base” house - Choose from a range of houses, with 1, 1^{1/2} and 2 stories.
2. Choose and adjust floor plan - Individualize the floor plan after own needs
3. Exterior adjustments - Choose panel, roofing, gutter and downpipes, windows and front door
4. Interior adjustments - Choose everything from flooring and tiling to appliances and fireplace
5. Kitchen - Choose among different cabinets, counter tops, etc.
6. Garage - A complementing garage or carport can be added, matching the house.



figure 19. Husbyggaren variations

A test run of the web tool gives the impression of a large set of choices, even though the variations are rather small in practice. Though, as shown in figure x above, the communication of the result of the customers choices are extremely clear and it is easy to “see what you get”. The web tool has an palpable simplicity and the overview given makes it easy to understand the customer benefits in using such a tool.

3.6. Immaterial properties of architecture

Architecture is traditionally hard to protect in a legal sense, since it is in many ways a part of the public domain and is based on a tradition of repeating and interpreting. Architectural drawings are protected by copyright (Ministry of Justice L3, 1960) and have on two occasions been legally tried (NJA 1998 s. 563 and NJA 2004 s. 149), although the difficulty is always to secure the significant parts of the work. Also, the “knowledge area” of architecture is to a large extent characterized by functionality and sustainability, which are not included in copyright or design patent law (Hedenquist, 2009). Technical elements of architecture, e.g. an innovative joist connection or a glass shading technology, can be protected by patent but are very often insignificant for the architecture itself. The aesthetics of a building can be protected by design patents which, however, is a weak legal protection (Hedenquist, 2009).

4. Results

4.1. The market landscape

When looking at the market for Attefallshus, there is three main alternatives for customers: 1. Loose timber, to build your own Attefallshus, 2. Building kit, to assembled yourself or via a contractor or 3. Turnkey house. Since the variations when building a house in loose timber are very significantly, it is hard to achieve a market mapping of significants. Therefore, the mapping only focuses on a range of building kits and turnkey houses.

4.1.1. Building kits

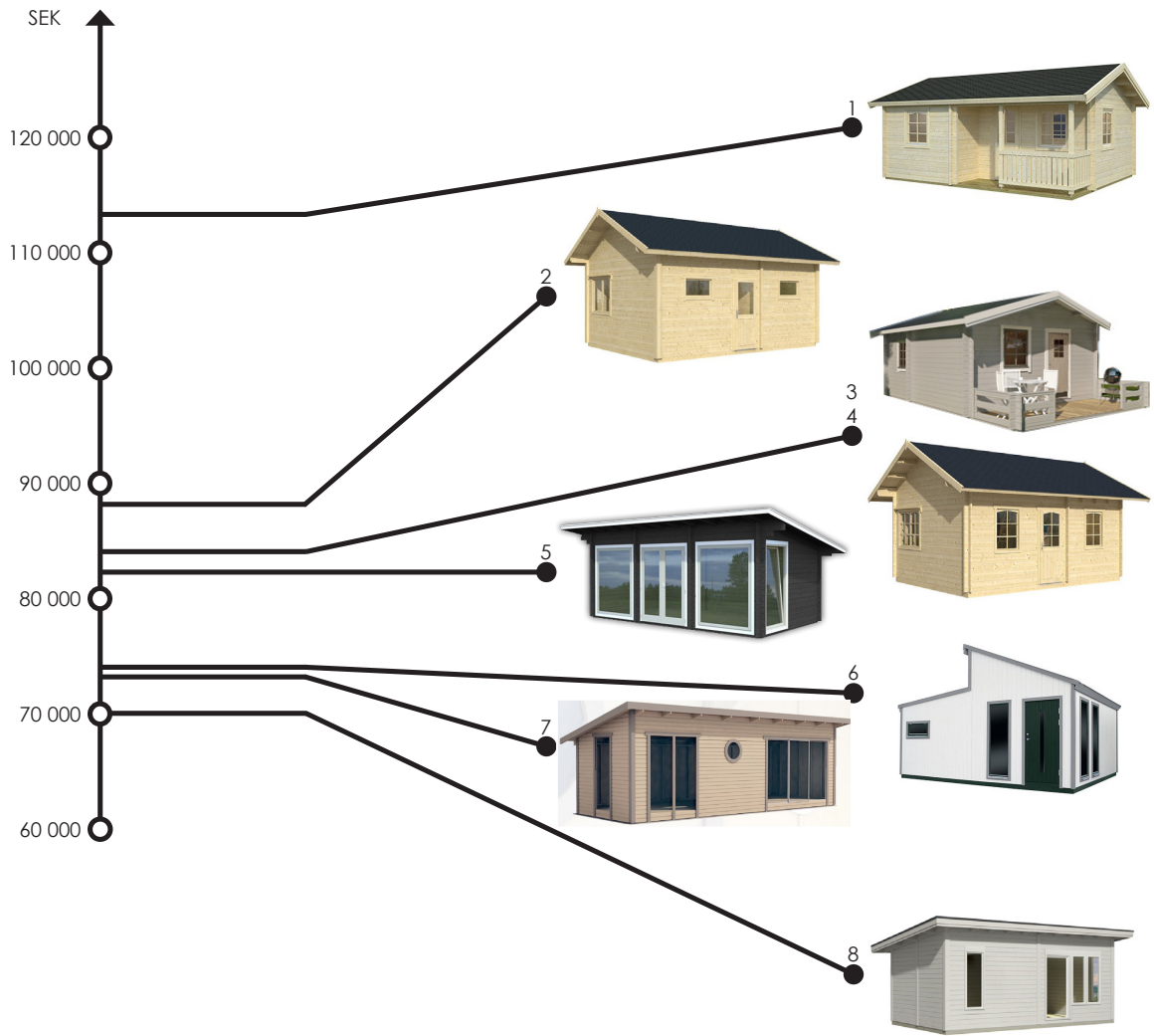


figure 20. Building kits on the market

#	Supplier	m2	Construction	Painted	Insulated	Roof cover	Price
1	Skånska byggvaror	25	Logs	No	No	Yes	113 000
2	Byggmax	25	Logs	No	No	No	88 900
3	Hus och Stuga	22	Logs	No	No	No	84 000
4	Jabo	25	Logs	No	No	No	83 900
5	Skånska byggvaror	21	Logs	No	No	Yes	82 400
6	Jabo	24	Timber	Yes	No	No	73 900
7	JM Stugor	25	Timber	No	No	No	72 400
8	Bauhaus	25	Timber	No	No	No	70 000

table 2. Building kits on the market

One trend in the scanning process is that the lower span of building kits is pent roof houses in constructed in timber frames and that the upper span is more cabin like log houses. The pent roof houses have full height windows and a more “modern” approach, style like very similar to houses of the late 1990s and early 2000s. The cabins have a very “traditional” approach, style like almost like alpine chalets. Some alternations exist, but in general this segment of the market is remarkably homogeneous.

4.1.2. Turnkey houses

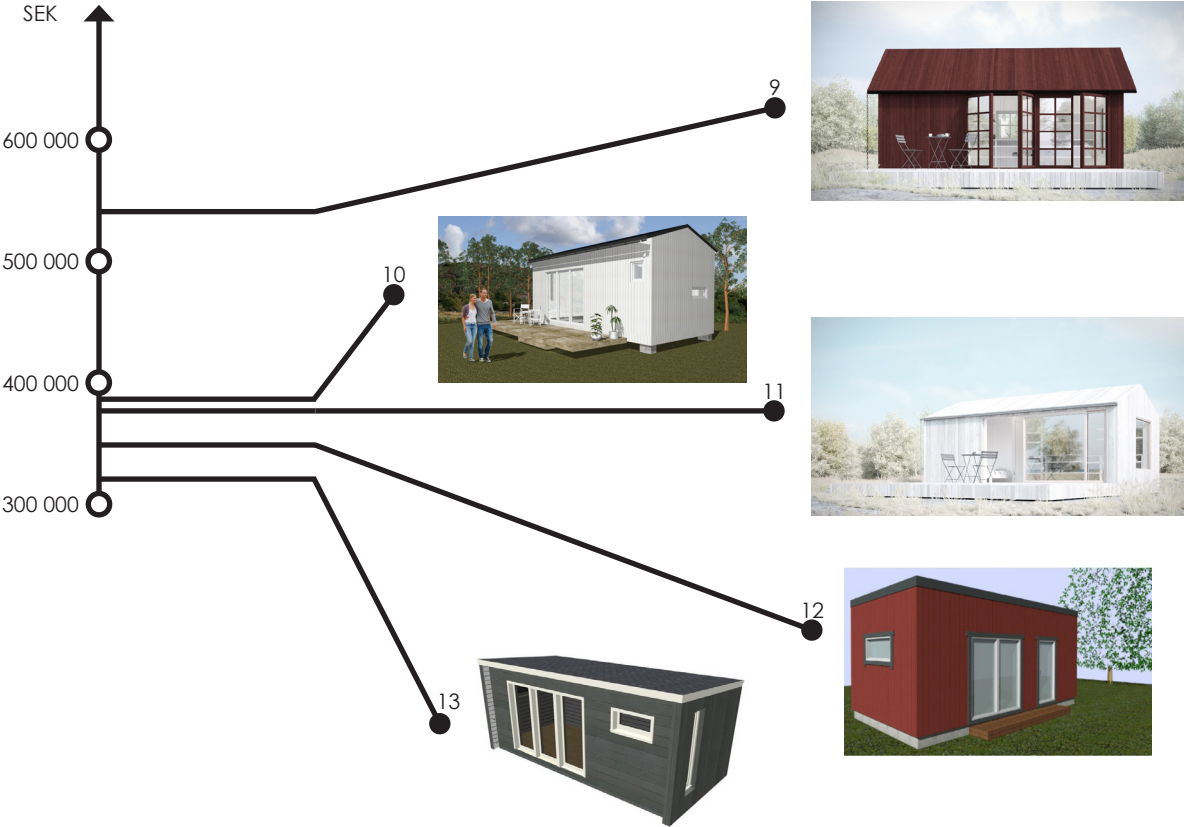


figure 21. Turnkey houses on the market

#	Supplier	m2	Construction	Painted	Insulated	Roof cover	Price
9	Sommarnöjen	25	Timber	Yes	Yes	Yes	533400
10	Bostadslyftet	25	Timber	Yes	Yes	Yes	395000
11	Sommarnöjen	25	Timber	Yes	Yes	Yes	388600
12	Sjöbodarna	25	Timber	Yes	Yes	Yes	352000
13	Enkelrum	25	Timber	Yes	Yes	Yes	315000

table 3. Turnkey houses on the market

The alternatives of turnkey houses for Attefallshus is rather few, possibly due to the immature market. There are one supplier, “Sommarnöjen”, that has taken a premium approach with stylish renderings and full service descriptions. The competing alternatives found are more simple, and style like looks almost site huts found on construction sites.

In general, turnkey houses seem to not have the same market share or status for Attefallshus as for regular housing, possible due to that a 25 m2 building is more realistic to build yourself.

4.2. Customer survey

The first survey was carried out to get a basic understanding of what customers prioritize when potentially purchasing an Attefallshus. The survey was carried out at Byggmax, one of Sweden's largest construction supply stores with a high degree of private customers, with 25 participants. Byggmax has a focus on low price and "do it yourself", which may cause the results of the survey over focused on low price.

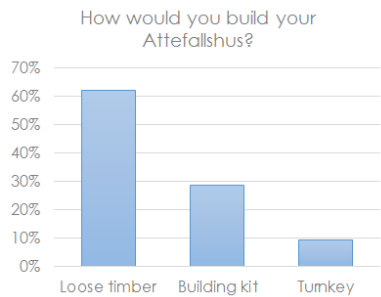


figure 22. Building method

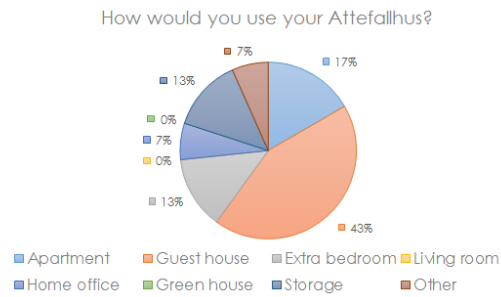


figure 23. Use

It was clearly shown that most people in the survey would build their own Attefallshus and the primary use would be to use it as a house to live in, most commonly as a guest house, but "own apartment" was second most common and "extra bedroom" was third. The three alternatives stood for ca 70% of the answers.

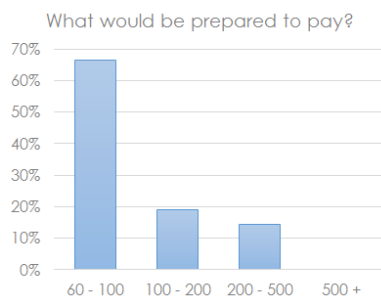


figure 24. Price

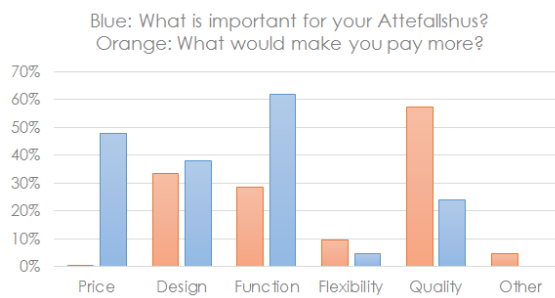


figure 25. Value

The most important thing for people in the survey is function, even if low price is essential. Though, being in a store with a low price store, the fact that 30% would be prepared to pay over 100 000 SEK is slightly surprising. The main thing that could make people spend more on their Attefallshus is quality materials, followed by design.

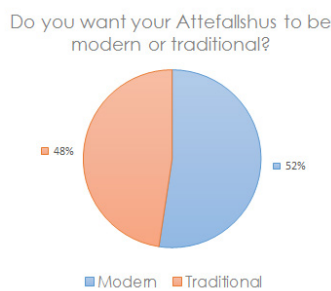


figure 26. Modernity

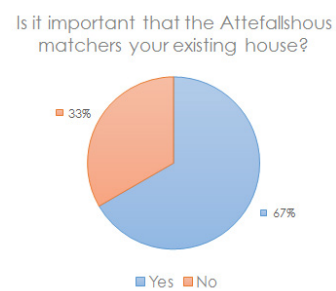


figure 27. Match

Last, it was an almost tie result on whether the Attefallshus should be modern or traditional, but a majority prefer it to match their existing house.

4.3. Customer approach – Interview findings

Similar to the market for very new market for Attefallshus, the Swedish housing is a well established market that offer the same span of products, from loose timber to turnkey. To understand the market for Attefallshus better, multiple interviews have been done with housing companies to find out their views on customers and competing companies.



figure 28. House "Tor" by Älvsbyhus

Älvsbyhus is the market leader (single brand), and offers module based houses. The modules are constructed in a factory and put together on site, where also flooring, wallpapers, etc. are done. They bring forward low price and the feeling of security as why their customers choose them, which is clearly shown in their selling process which starts with making a "what can we afford"-calculation. Älvsbyhus was not at all interested in talking about architectural qualities or aesthetics, but rather defensively stated that

their customers want "houses that look like houses" and not that "strange houses architects make that no one understands". They do not look at the competition as they are market leading (in turnover): "we make a great profit each year, no matter how the others are doing". The typical customer of Älvsbyhus is a first time house owner or first time house builder, that do not have a lot of money. They said themselves that customers do not return for a second or third house, but had no real ideas about why they do not return or what customers could be prepared to pay for when not talking about lowest price possible.



figure 29. House "Trubaduren 99" by Väst kust Villan

Väst kust Villan could when asked, not tell they did different in comparison to their competition or why customers should choose them over another housing company. Though, they say took pride in not offering module houses which they thought was "low standard". They believe in good customer relations and often alternate their building block houses to suit the customer's desire. They say their houses as qualitative both in construction and interior material and had few customization options for the house as

it was "not necessary" when having a good basic product. But why their customers chose their houses was unclear; "everybody want different things", "most people have problems with the 15% down payment" and "it is harder to find a site to build on than to find a house" was some of the comments when asked about customer relations. Väst kust Villan do not look at their competition.

SmålandsVillan



figure 30. House "Tingsryd" by SmålandsVillan

SmålandsVillan is together with their associate company Eksjöhus the largest housing group (BWG Homes) in Sweden, and offers module houses that built totally in a factory and is delivered in two parts. They see themselves as an active player on the market that their competition keeps their eyes on. Their main category of customers are first time house builders and customer that has previously built loose timber houses themselves and now want a smoother process. The last years more and more customers come back for

their second house, which is believed to be due to the extremely fast building process of assembling the two modules. Their customers focus mainly on price and they make money by selling volumes rather than having high margins. The customers they loose are often the ones that want to be able to customize the house in different ways, which is seldom possible. SmålandsVillan thinks that you know "exactly what you get" and the fact that the house is built in an almost fully controlled process makes it easier to make it energy efficient, with 35kWh/m²/year guaranteed (down to 28 kWh/m²/year measured) which is value that is easy to communicate to customers.

All three companies gives a description of the market as the illustration in figure 8, where the large amount of customers is in the base of the pyramid. Low price is prioritized among all existing companies on the market, and there is no real belief that a premium segment could exist, it is argued that customers with higher ambitions hire an architect instead of purchasing a pre-designed house.

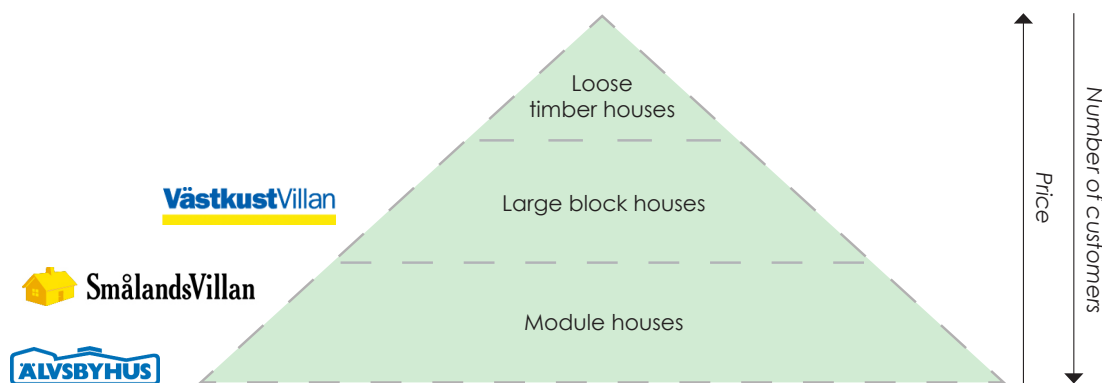


figure 31. Illustration of market segments

Even though the market is highly competitive and most actors are doing the same thing; "most housing companies are constantly for sale", no one has attempted to change strategy. Targeting a premium segment in this market would need heavy investments as well as courage, where the first is not something everyone has the possibility to do and the later is something unusual in "one of the most conservative markets existing".

4.4. Sketch study: Design details of Swedish villa housing

As shown in “Customer survey”, a majority of house owners would like their Attefallshus to match their existing house. This in combination with the thesis research question “Is it possible to sell Attefallshus through a tool where the customers gives input and receive proposals?”, makes it necessary to examine the possibilities of creating a tool that allows the user to match their Attefallshus with their own house.

Though, making a tool that allows this function, there is a question of which design parameters that can be used to create the match. Either, the user puts in data and the tool makes the match, or the customer does the match by choosing from a set of alternatives. Regardless, possible parameters need to be studied, in terms of exterior design details of Swedish housing. The parameters need to be organized in some way, and the author of the thesis has chosen to organize them according to style of the decades between the 1890s - 2000s.

4.4.1. Roof types

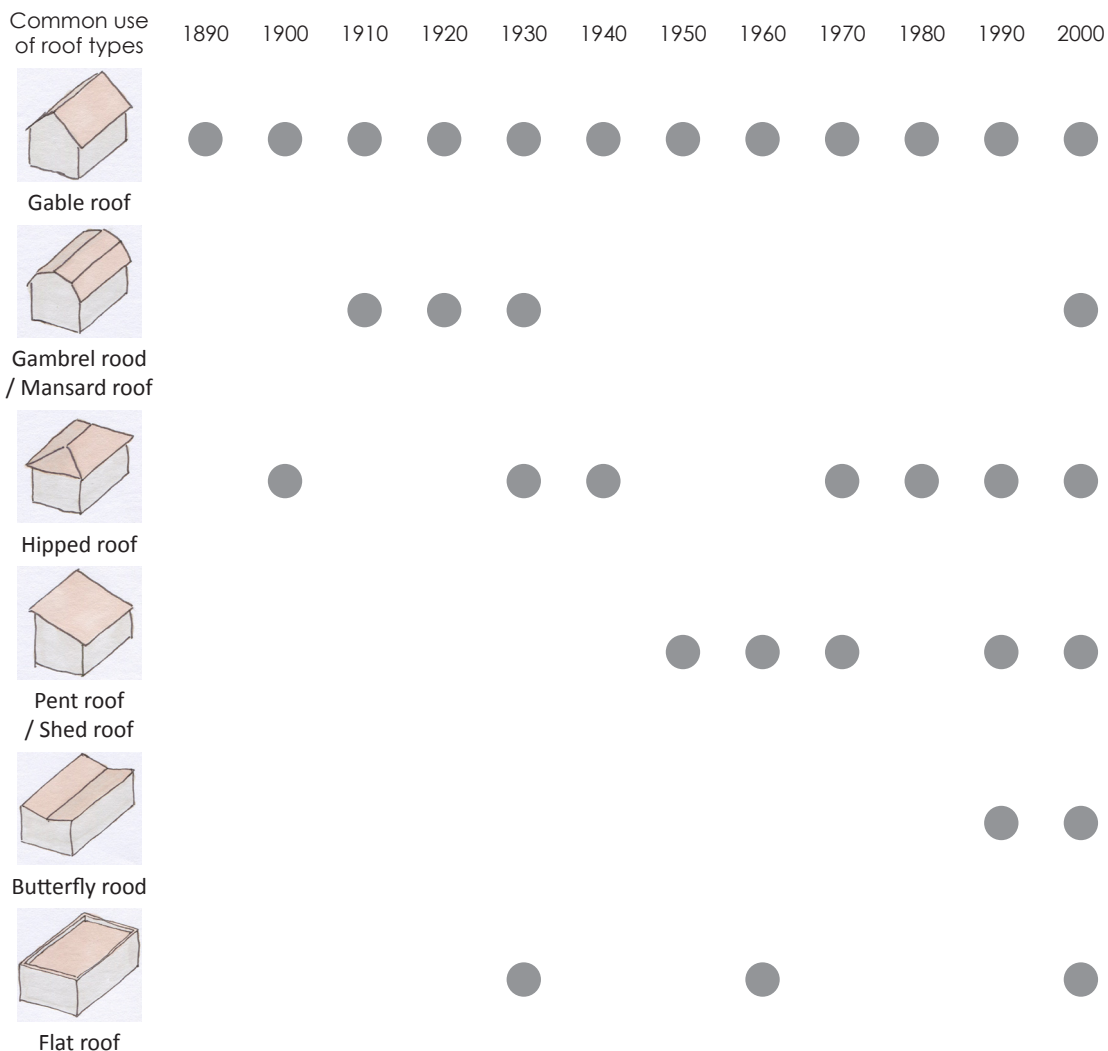


table 4. Table of roof types

What we can see is that the traditional gable roof is dominant throughout the decades and can also be considered to be the most common one in Swedish housing. Pent roofs entered in the 50s and are today very common, often with a level offset or in form of butterfly roofs. The fact that so many different roof types became common during the 1990s and 2000s, is said to be due to the broad impact of “catalogue houses”, turnkey houses produced by housing companies like the ones interviewed in this thesis, where customers have a higher impact on the design (Björk, Nording and Reppen, 2009).

4.4.2. Windows

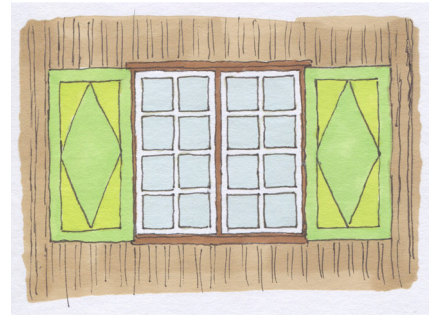
1890



1900



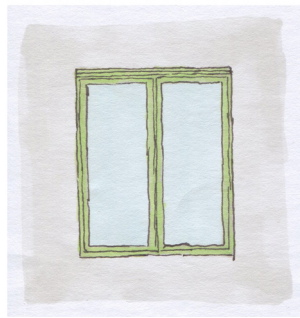
1910



1920



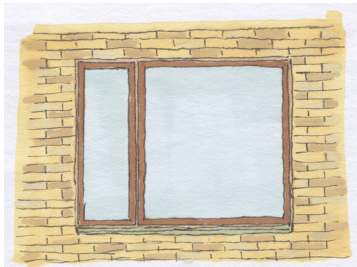
1930



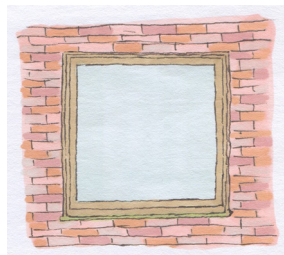
1940



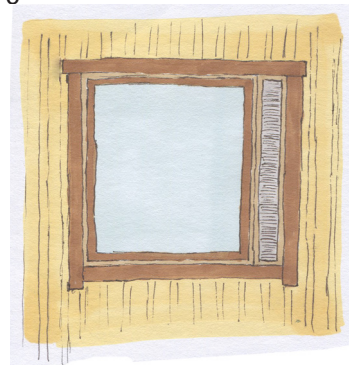
1950



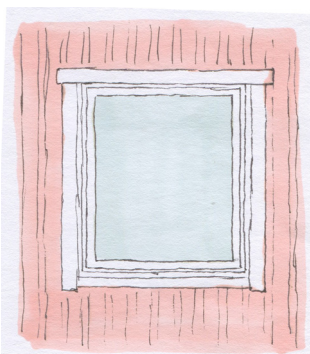
1960



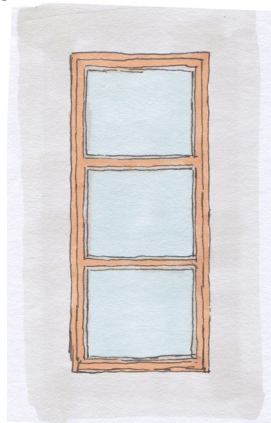
1970



1980



1990



2000

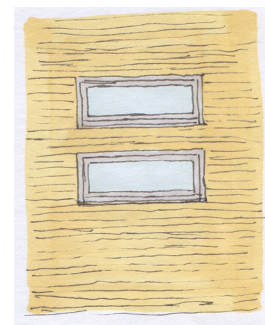


table 5. Table of window settings

What we can see is that there are large variations across the decades and that the styles are significantly different regarding proportions, lining boards, crossbars and colors.

4.4.3. Door handles

	Outdoor	Indoor	Outdoor	Indoor
1890				
1910				
1930				
1950				
1970				
1990				

table 6. Table of door handles

What can be seen when studying door handles, is that even a detail such small as a door handle can both be significant for a style, but also that the design of handles vary a lot over the decades.

4.5. Photography study: Design variations in Swedish villa neighborhoods

If we try to categorize different design parameters of Swedish villa housing as in the sketch study above, the idea of categorized relies on that the houses built in the different decades actually have the design details that are significant for the decade when they were built. The easiest way to study this is to look at existing neighborhoods where a number of houses are built at the same time. Therefore, four different neighborhoods in Gothenburg has been examined.

Neighborhood 1



figure 32. Houses on Sankt Olofsgatan

Neighborhood 2



figure 33. Houses on Visthusgatan



figure 34. Houses on Visthusgatan

Neighborhood 3



figure 35. Houses on Sommersgatan



figure 36. Houses on Slånåbärsvägen



figure 37. Houses on Stenåldersgatan

Neighborhood 4



figure 38. Houses on Toredalsgatan

What we clearly can see is that even though the main constructions as roofing and placement of windows most often have remain intact, the facade materials, panelings, colors and design details of the houses have gone from homogeneous when built to almost completely heterogeneous today.

5. Analysis

5.1. Market analysis

The first and foremost perspective on the market for Attefallshus is price, which is often argued to be the single most important factor for customers. In the customer survey performed, price was indeed important; in fact 48% of thought it was “an important factor when purchasing an Attefallshus” and 67% choose the lowest price range when asked how much they were prepared to pay. Price is also an important factor for customers on the regular housing market at large as well. Representatives for the turnkey housing companies describes the market as a pyramid where the large quantities of customer prioritize price. Among other qualities, “function” and “qualitative materials” are considered worth paying for, while things as “flexibility” is not interesting. As a general impression, abstract expressions such as flexibility or spatiality is not prioritized since they are to intangible. To a large extent, customers seem to purchase what is offered on the market and the market offers what they themselves think is what customers want. What is promoted are tangible benefits such as “low price” and “solid wood frame”. Housing companies interviewees openly admits that they do not spend time at learning what customer wants, but rather looks at what their competition is doing.

An interesting perspective is to look at the market for Attefallshus in relation to the market for regular housing, which is a more mature market. What is most clear is the difference in segments, where the regular housing market has three main segments where the market for Attefallshus only have two as illustrated in the figure below.

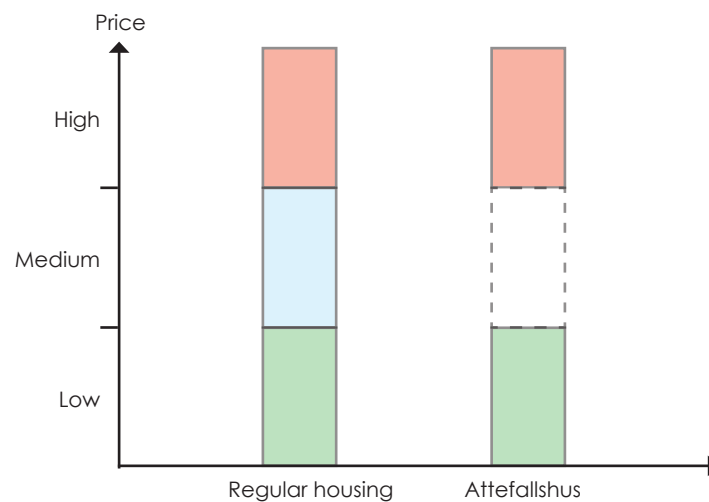


figure 39. Market segments

The segments of the regular housing market are low price segment (module houses), medium price segment (large block houses) and high price segment (loose timber houses), while the segments on the Attefallshus-market is low price segment (loose timber and building kits) and high price segment (turnkey houses). A noticeable difference is that for regular housing, the more that can be pre-built in a factory the cheaper it gets, while for Attefallshus it is the other way around. This is due to the fact that in all three segments of regular housing discussed in this thesis, the work labor is included in the price. For the low price segment of Attefallshus, the houses are built by the home owner themselves. For the high price segment of Attefallshus, labor cost is included.

This opens up for the reasoning that there are room for a medium price segment for Attefallshus, where the house is built in a factory but built by the house owner. This would open up for large scale production at low prices and would complement the existing alternatives on the market, attracting customer that are not skilled in carpentry but do not want to pay for a turnkey house.

5.2. Communication of architectural value

In both the customer survey and interviews with housing companies, architectural values were down prioritized. A plausible reason for this is the abstract nature of terms like “flexibility” which has such loose and varied definitions that most people does not simply understand the terms in an architectural context.

It is often argued that price is the only important for most customers, but in fact price is one of few concrete parameters when talking about housing, which is shown in the results of this thesis. Another concrete parameter; “quality materials” is something that customers in the customer survey are willing to pay for. This could be explained with the fact that people in general understand the difference between a high quality and a low quality material in the same way they understand the difference between a high price and a low price. However, the difference between a high degree of flexibility and a low degree of flexibility is not something that people in general understand, and therefore the willingness to pay for it does not exist.

If architectural value could be communicated in a more understandable way, it is reasonable that the willingness to pay increases for those values. As an example, very few were prepared to pay extra for ecological food 20 years ago. In 2003 - 2013 the market for ecological food has had an annual growth of double digits (Björklund, 2013), as the awareness and understanding of the importance of ecological food has vastly increased.

5.3. How to sell architecture

5.3.1. Market strategy

Relating to 5.1, there are further analysis to make even if choosing to create medium price Attefallshus “where the house is built in a factory but built by the house owner”. Products in such a segment could vary from simple structural components that require a lot of complementary work to completed elements with finished interior and exterior.

Due to the palpable focus on price, a strategy such as car companies pursue, with a low price base units to cover “break even” and “add-ons” to generate profit, would be recommended. This would create a product with a low price for those who seek it, but with a variety of choices for those who wants a more “premium” product.

5.3.2. Adaptation to existing building stock

What can be seen from the pre-study is that a lot of customers wish to “match” their Attefallshus to their existing house, but that it is very hard to systematize designs of Attefallshus to automatically match existing houses. House owners re-build and renovate their houses with little regard of the original style of their houses and the building traditions of the time it was build it, which creates very “shattered” styles with influences from many different decades and trends. Since the matching process cannot be systematized, any ambition to create matching Attefallshus must rely on the house owner themselves to make the match and thereby is also the quality of the match.

5.3.3. The feeling of choosing for yourself

An observation from the pre-study is the mental ownership of “good taste” when it comes to housing. In the same way that all people claim to have a sense of humor (but not all people are funny), people seem to have an opinion of what is both good aesthetics and good architecture when discussing housing. This mental claim is important to understand as an architect, since it is important for customers to “get what they want”, even if they do not know what it is they want. In the market strategy proposed in 5.3.1, this could be represented as having a set range of choices, to allow customers to choose but control the possible outcomes of those choices.

5.3.4. The importance of communicating value

As discussed in 5.2, architectural value can be hard to communicate compared to e.g. low price. Looking at housing companies that focuses at low price, they understand their customers extremely well and “reach them” in the right way. If trying to sell architectural qualities, the understanding of customers and the way of reaching them becomes very important. Therefor, “educating” the customers in terms of offering guidance, planning help and information folders could create a greater understanding of values and greater willingness to pay.

5.3.5. How to protect architecture

Architecture as such is hard to protect, much due to that it is often considered to be a part of the public space. Looking at housing companies, the foremost protection of market position seems to be their manufacturing processes and market position (most clearly exemplified in their customer relationships). To create strong immaterial rights for architectural work is hard, the most probable way is to create construction details or similar that could be patented or draw very specific designs that could be protected via design patents.

As an actor in the market for Attefallshus, branding could be the most important factor; creating products that clearly is a part of a concept specific for the housing brand. The strength in reaching the point where customers tells their family and friends that they bought a “BRANDNAME®-house” should not be underestimated.

6. Design criteria

6.1. Input from Pre-Study

What should be designed is mid-priced houses, where the house components are built in a factory but built by the customer. The customer chooses from a set range of components that fit together in a way that becomes qualitative and get guidance from educated staff or other source to ensure architectural qualities. The building components should range from simple and cheap elements to advanced and expensive. The customer feels that they themselves choose how their house will appear and make any potential match to existing houses themselves. The houses should be made into a unique concept, protected through a smart system of putting the house together and the strength in the brand.

A suitable fit for these criteria from the pre-study is IKEA products. IKEA excel at customer friendliness, market strategy and positioning, brand and product concepts and the ability to offer a set range of qualitative designs where the customer feels like they choose themselves. Therefore, the design criteria from the pre-study shall be matches with the IKEA philosophy to generate an IKEA product in the form of Attefallshus.

6.2. IKEA

6.2.1. The IKEA design approach

“Every IKEA product has a story to tell. And like every good story, it starts with a great idea. What’s ours? We want to make everyday life at home better.”

IKEA has a focus on their five cornerstones; form, function, quality, sustainability and a low price. They claim that the balance among those five is a precondition when starting their design process, and also what keeps them innovative and unique.

6.2.2. BoKlok

BoKlok is a housing concept developed by IKEA in collaboration with the construction company Skanska. It is based on mass produced row houses and apartment buildings with the ambition that everyone should be able to afford it.

“It is not a home in flat packages but it is large volumes and reasonable prices”

The houses are marketed by IKEA as part of the IKEA concept, but is more a house adapted to be filled with IKEA products. It is based on designs by Skanska and equipped with an IKEA interior. BoKlok themselves claim that “BoKlok is sold at IKEA and is as close to a home in flat packages that is possible”, which could be debated.

Attefallshus created in this thesis shall have a higher ambition to follow the IKEA-concept, it will not be “as close to a home in flat packages that is possible”, it will be a home in actual flat packages.

6.3. Design criteria for product prototype

6.3.1. Purchasing process

A house could be complicated to purchase, even if you have a lot of experience of living in them. Planning a home, especially one as small as 25m², takes more basic knowledge than what most think. The same applies for kitchens, it can be harder than you think to plan a kitchen. IKEA has an established, well working process for purchasing kitchens. Making an Attefallshus that is an IKEA product, the methodology for the purchasing process for kitchens seems reasonable to follow.

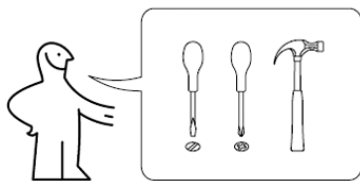
- *The house should be as simple to purchase as an IKEA kitchen*
- *There should be guidance available in the purchasing process*

6.3.2. Structural design

The structural system chosen should foremost be easy to assemble, second offer a variety of choices without having a negative impact on the quality of the product. It should enable various designs and sizes of the house, with a set number of building components.

- *The customers should be able to assemble it themselves*
- *Constructional system that enables ready built wall panels*
- *Multiple sizes of houses can be built*
- *Possibility to change roof type*

6.3.3. Detail connections



Every assembly of an IKEA product comes with the relief of having IKEA's assembly man there to guide you on your journey. The classic Allen key is often enough to enable you to put together your furniture all by yourself. This simplicity is one of IKEA's foremost values.

- *Should be able to put together with an Allen key*

6.3.4. Spaces and functions

The building law permitting Attefallshus clearly states that when used as housing, it is required that the Attefallshus follows Swedish building Regulations. Therefore, the ambition is to create fully functional examples of housing on 25m², that can be used in multiple ways and that can be rebuilt for disabled access.

- *At least three different floor plan possibilities*
- *Follow Swedish Building Regulations (BBR)*
- *Able to re-build for disabled access*

6.3.5. Appearance

IKEA kitchens offers the luxury of various choices for cabinets and fronts, which are all cross compatible. The same principle should be applied for the Attefallshus, with cross compatible interior and exterior panels that the customer themselves choose.

- *The customer themselves controls how much it matches their existing house*
- *A set range of choices for interior material and color*
- *A set range of choices for exterior material and color*

7. Design development

7.1. Purchasing process

How you purchase IKEA kitchen today:



1. Inspirational kitchen display



2. Advice from kitchen dep. staff



3. Complementary products

IKEA today has a well functioning purchasing process with three main steps; first you walk through a series of inspirational displays, second you arrive at the “advisory desk” where you get free guidance and help to plan your kitchen and third you exit through the display of complementary products.

How you could purchase IKEA Attefallshus in the same way:



1. Inspirational house display



2. Advice from house dep. staff



3. Complementary products

IKEA Attefallshus could be sold in more or less the same way, with inspirational designs of 25m² homes (easily fitted into a IKEA store), guidance from staff with architectural training and complementary products. To a large extent, complementary products for Attefallshus already exist at IKEA, such as flooring, kitchens, bathrooms interior and compact living furniture. IKEA could give a discount of e.g. kitchens when purchasing an Attefallshus and the concept could include everything up to the point where the customers could place an order for a complete 25m² home, fully furnished with all interior functions included.

7.2. Structural design

7.2.1. Basic structural system

Creating an IKEA product, there are different structural systems to be considered. All four considered in this thesis are all established systems with similar structural functions in terms of load bearing, moist protection and insulation. What differs is how much of the construction that is made in a factory vs. how much is done on site.

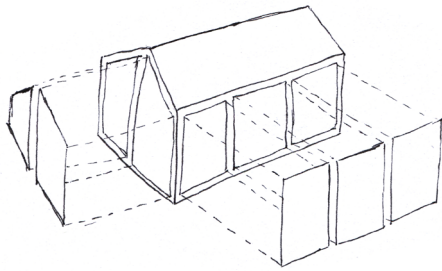


figure 40. Framework construction

1. Framework construction assembled on site
Frame with roofing build on site and non-load bearing elements fitted into the frame

+	-
Easy handling of panels	Require craftsmanship
Control over outcome	Extensive frame construction on site
Less demands on panels	

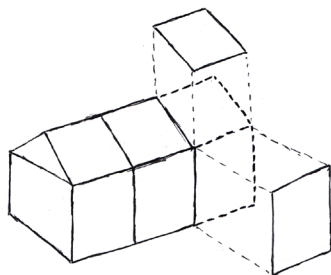


figure 41. Panel construction

2. Small wall and roof panels assembled on site
Load bearing elements assembled directly into each other without a frame

+	-
Customer do all labor	Low control over outcome
High degree of freedom	Many joints
Unique consumer product	High demand on panels

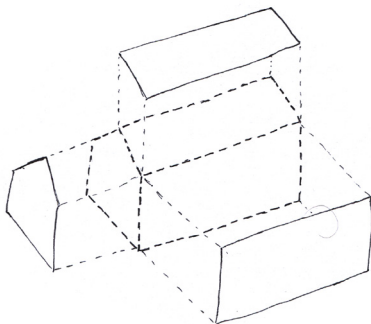


figure 42. Panel construction

3. Large wall and roof panels assembled on site
Large load bearing elements assembled directly into each other without a frame

+	-
Low assembly time	Labor & logistics costs
Few joints	Requires mobile crane

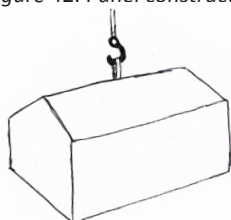


figure 43. Pre-built module

4. Finished turnkey house assembled in factory
One single module lifted onto site

+	-
Total control over outcome	Labor & logistics costs
Easy to ensure quality	Small degree of freedom
No assembly time	Product already exists

Which structural system that would fit the IKEA Attefallshus best is the one most compatible with how current IKEA products are being built. Require a lot of framework construction on site (1.) is not at all in line with the IKEA concept and having a finished house (4.) lifted on site would fit the IKEA concept as bad as BoKlok. Large wall and roof panels (3.) cannot be assembled without a crane and therefore can not be handled by the customers themselves. The structural system most compatible with the IKEA concept is to have small panels (2.) put together by the customers themselves, to the point where the panels actually could be sold directly in the IKEA store and brought home on a car trailer.



figure 44. SIP panels principle

7.2.2. Structural insulated panel, SIP

Building with wall and roof panels, there are existing techniques. Therefore, a technique called SIP (structural insulated panel) has been chosen and this thesis will not focus on developing on detail solution, but simple use established methods for “SIPs”.

SIPs are a composite building material. Consisting of an of rigid core with insulating properties, sandwiched between two layers of load bearing board. The board can be many different materials (commonly uses are plywood, cement, sheet metal and oriented strand board (OSB)) and for the core, extruded polystyrene foam (XPS), expanded polystyrene foam (EPS), or similar materials are most often used.

Structurally, SIPs are comparable to and I-beam or I-column, where the sheathing works as flanges and the core as a web. The SIPs “take care” of several property requirements of conventional building, such as studs and joists, insulation, vapor and air barrier.

In the context of IKEA Attefallshus, the SIP Panels will be of the type with OSB sheathing and EPS core. OSB is a fairly inexpensive, yet strong board. For the small spans of an Attefallshus the OSB will have more than enough structural strength.

EPS has generally lower strength and water vapor diffusion resistance than XPS (but still enough to fulfill building regulations), but have the same thermal conductivity, the same heat capacity, is more inexpensive and above all, around half the weight. This will be of great importance in the assembly process.

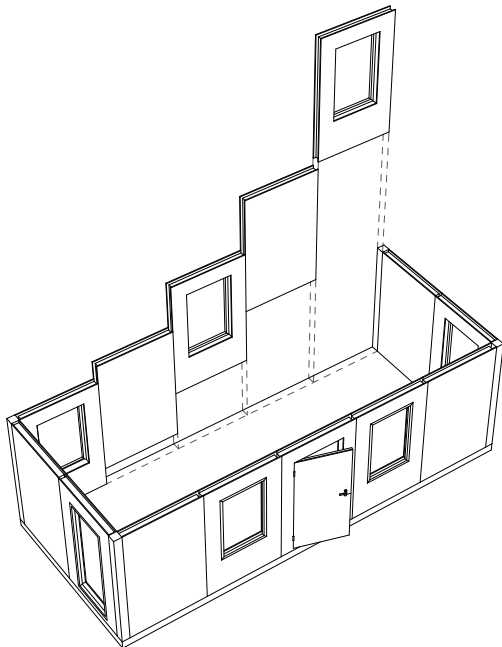


figure 45. Panel principle

7.2.3. Foundation

The foundation is in one way the most advanced part of the Attefallshus. First, the different conditions on site means different requirements. Creating a generic foundation that suits all types of terrain, soil conditions and frost lines would be complicated and expensive. Second, since all panels are constructed off site, all water, plumbing and electricity will need to run in the foundation and the inner walls. This demands a high degree of flexibility, which can not be achieved by a pre-constructed foundation.

The foundation of the IKEA Attefallshus will therefore be constructed by the customers themselves with measurement requirements from IKEA (available at IKEA stores and website in a real scenario).

7.2.4. Walls

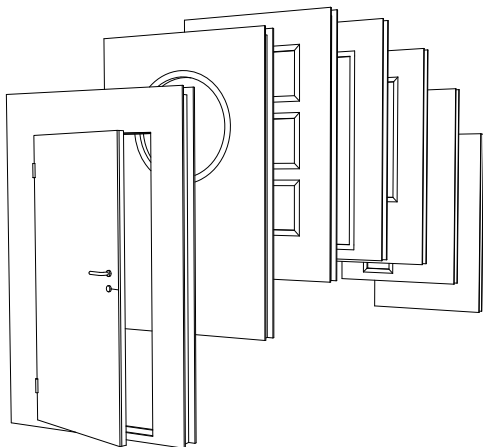
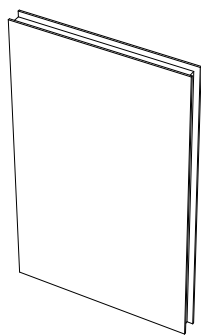


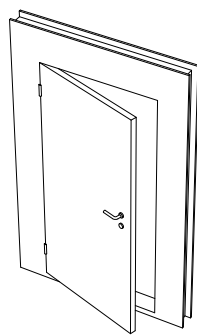
figure 46. Wall panels

Being an IKEA product, the feeling of having various choices as a customer is important. All wall panels should be the same measurements, but could easily vary in design regarding doors and windows where the choose among different interior and exterior claddings.

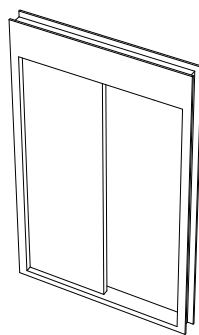
It should also be possible to select panels without any cladding and do that part yourself, to suit all kind of customers, ranging from "Do It Yourself" to "all included". Also, if having the option of no cladding, the customers that wished claddings that are hard to apply to the panels (e.g. plaster facade, that is brittle and therefor not realistic to use on the panels) can apply it themselves.



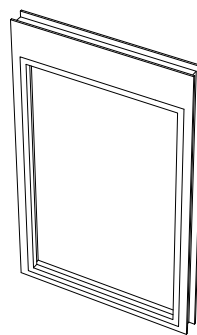
Basic wall panel



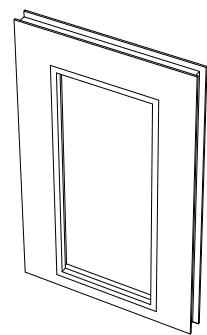
Panel with door
100 x 210 cm



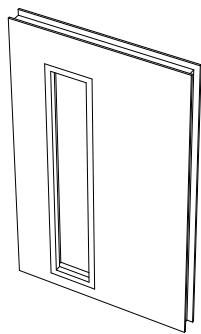
Panel with sliding
door 140 x 210 cm



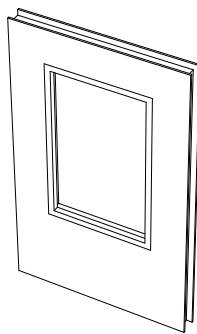
Panel with window
140 x 210 cm



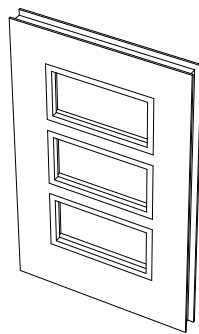
Panel with window
90 x 210 cm



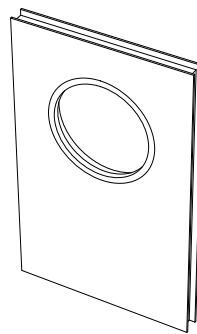
Panel with window
40 x 210 cm



Panel with window
90 x 140 cm



Panel with windows
3 * 90 x 50 cm



Panel with window
Ø90 cm

For front door choices the four most basic front doors at building material suppliers has been used.



Door without window



Door with lunette
window



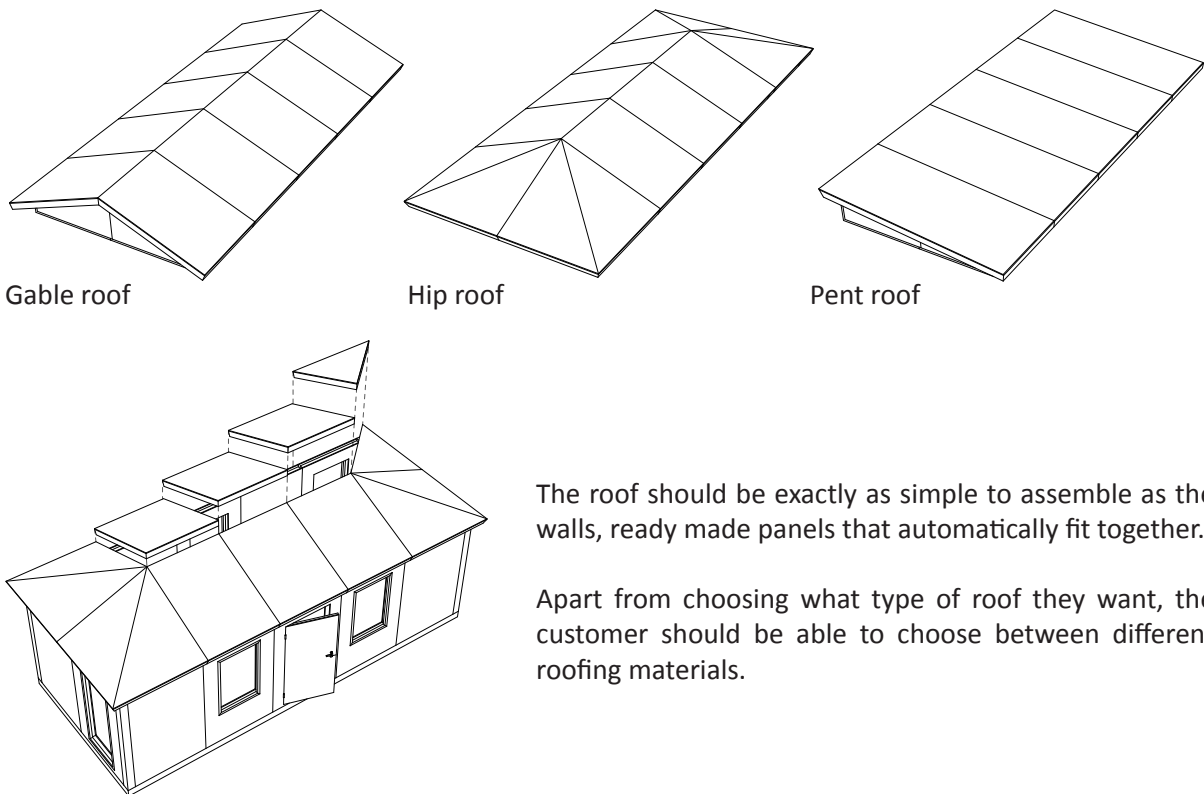
Door with rectangular
window



Door with rectangular
window

7.2.5. Roofing

The three most common roof types in the Pre-Study was gable roofs, hip roofs and pent roofs. Therefore, these three roof types has been made a part of the IKEA Attefallshus concept.



The roof should be exactly as simple to assemble as the walls, ready made panels that automatically fit together.

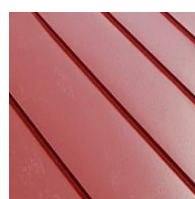
Apart from choosing what type of roof they want, the customer should be able to choose between different roofing materials.

figure 47. Roof principle

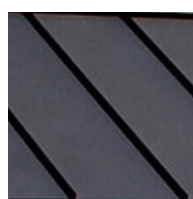
All roof panels should come with the roofing material mounted on the panel, which means no after assembly work for the customer. Therefore the lowest roof angle used, will dictate which materials are possible to use. The pent roof will be almost flat, so all roofing material that demand a higher angle than 6° will not be used.



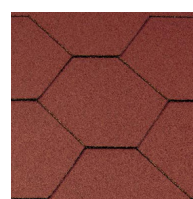
Tin roof
zinc, grey,
 $>6^\circ$



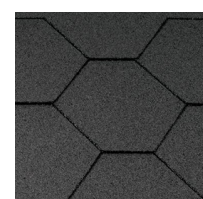
Tin roof
steel, red,
 $>6^\circ$



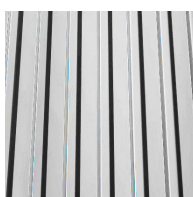
Tin roof
steel, black,
 $>6^\circ$



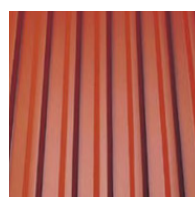
Asphalt roof
shingels, red,
 $>6^\circ$



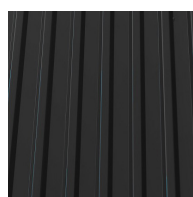
Asphalt roof
shingels, black,
 $>6^\circ$



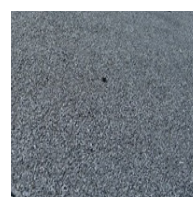
Tin roof TR20
zinc, grey,
 $>6^\circ$



Tin roof TR20
steel, red,
 $>6^\circ$



Tin roof TR20
steel, black,
 $>6^\circ$



Asphalt roof
grey,
 $>3^\circ$

If the customer wants you want roof tiles or another roofing material, they can simply choose the grey asphalt roof and put roof laths directly on it.

7.3. Detail connections

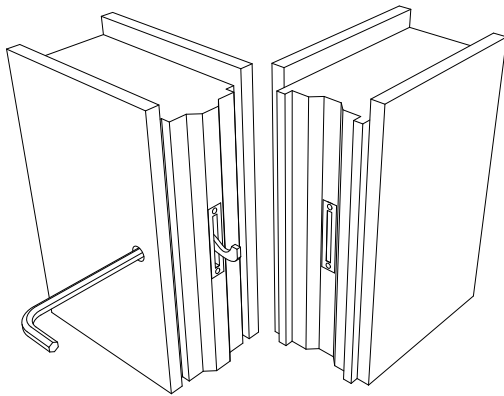


figure 48. SIP construction detail

There are many techniques for joining SIP panels. The most relevant for this thesis is hook systems. These are often “hooked” together with the suppliers own “special tool”, which could as easily be replaced with an Allen key. Therefore, an own construction of a hook system has been made as displayed in figure X. to the left. Nothing says IKEA like an Allen key.

SIP board is such an established system, that the author of this thesis has chosen not to reinvent construction details since there are lots of solutions currently being used. In figure X below construction details for multi story SIP panel houses is displayed, to display on the basic construction scheme.

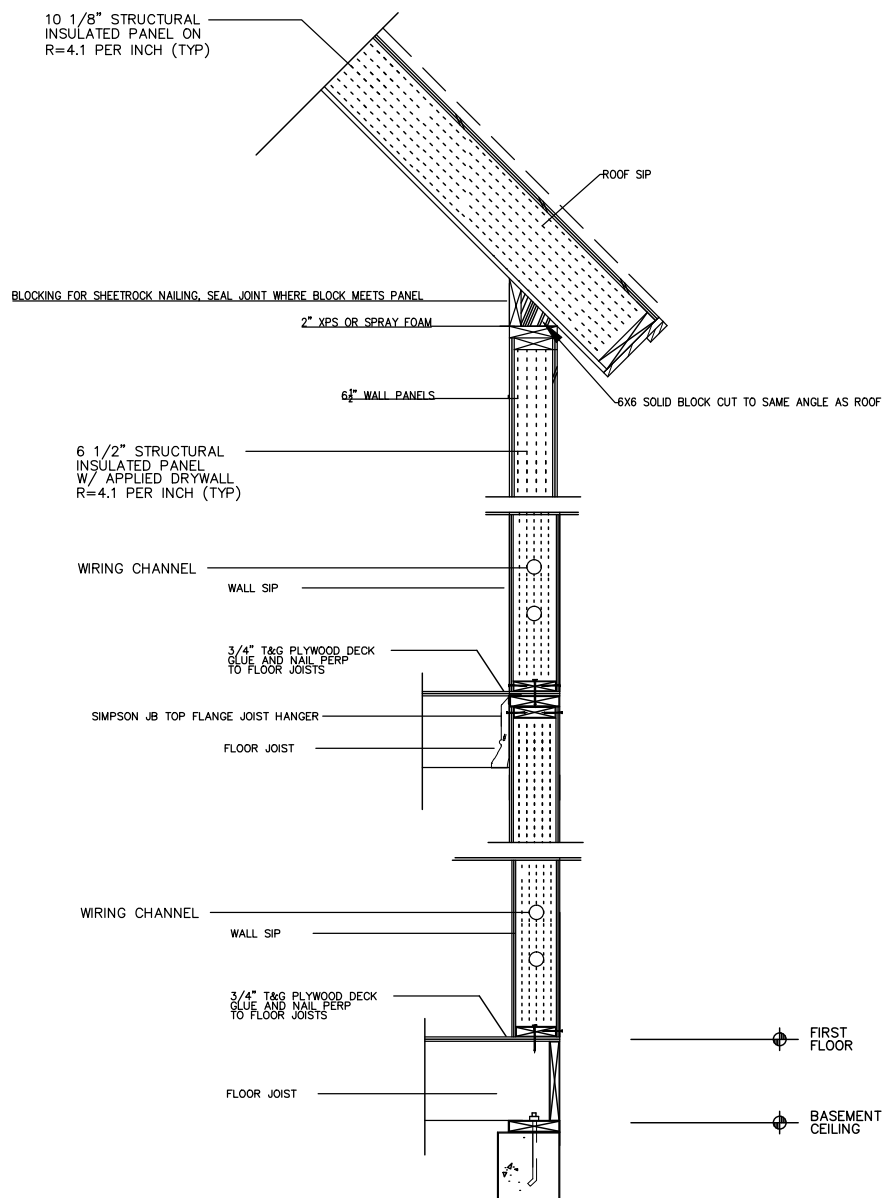
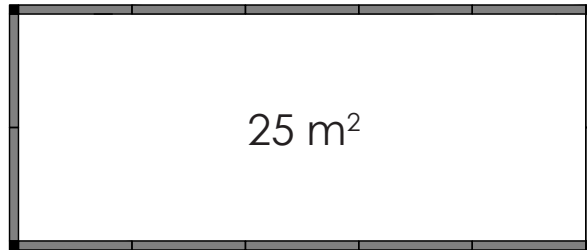


figure 49. SIP construction detail scheme

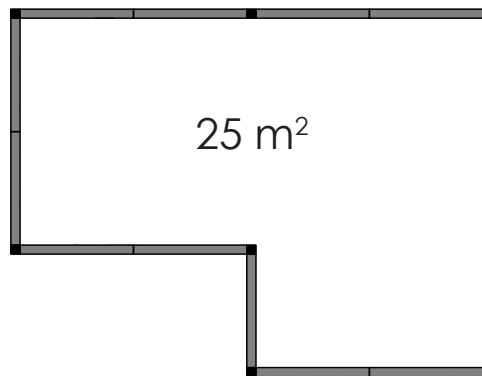
7.4. Spaces and functions

The building system using SIP panels enables houses of multiple sizes, and it is as easy to build a 50 m² house with the system as a 25 m². However, the context of IKEA Attefallshus dictates the limit of 25 m².

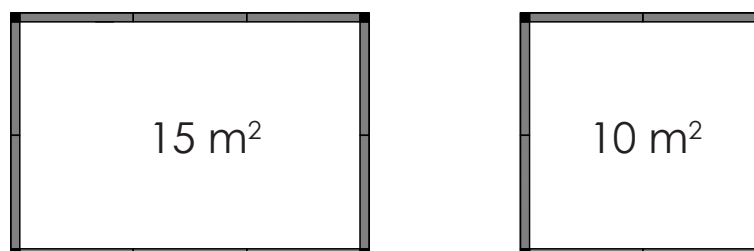
25 m² can be used in many different ways, so as a proof of concept three different plan proposals have been made and thereafter furnished in four different ways.



The first one consists of totally 14 wall panels and measure 3 x 7,5 m on the inside. This creates a floor plan that is easy to use efficiently and that fits on an elongated site.

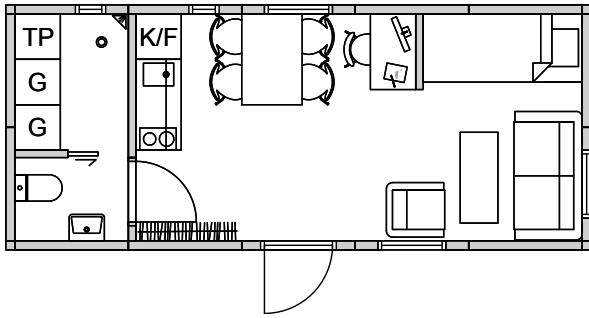


Moving the last section from the prior plan and placing it on the side of the building, it creates a plan that also consists of 14 wall panels but measures 6 x 3 + 3 x 1,5 m on the inside. This creates more corners on both inside and outside, which can make it easier to find "dedicated space" for e.g. a bed or a bathroom.



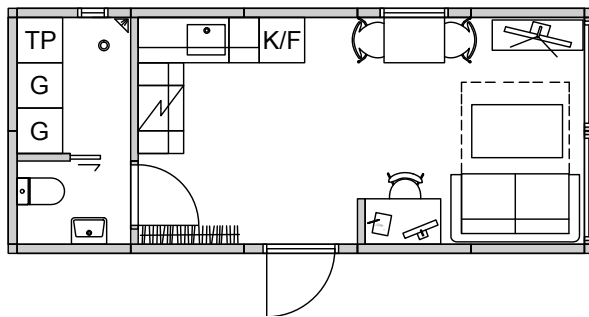
Attefallshus can be built in multiple units with an area total of 25 m². The last plan proposal consists of two volumes that consist of 18 wall panels and measures 4,5 x 3 + 3 x 3 m on the inside. This could have a feeling of a space greater than what it really is.

7.4.1. Plan proposal 1



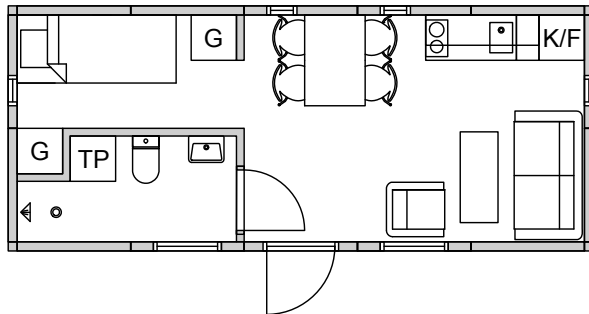
“All included”
Full size bathroom and laundry room
Kitchen
Normal kitchen table
Desk
Bed
Sofa and armchair

12M of storage
 Possibilities to sofabed for overnight guests



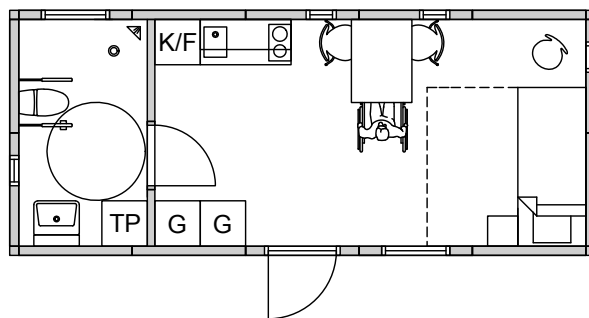
“Larger kitchen”
Full size bathroom and laundry room
Full size Kitchen
Small kitchen table
Desk
Soda Bed

12M of storage



“Sleeping niche”
Full size bathroom and laundry room
Kitchen
Normal kitchen table
Bed
Sofa and armchair

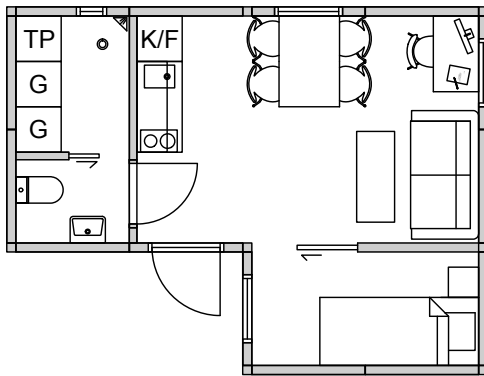
12M of storage
 Possibilities to sofabed for overnight guests



“Disable access”
Full size disabled access bathroom and laundry room
Kitchen
Normal kitchen table
Bed

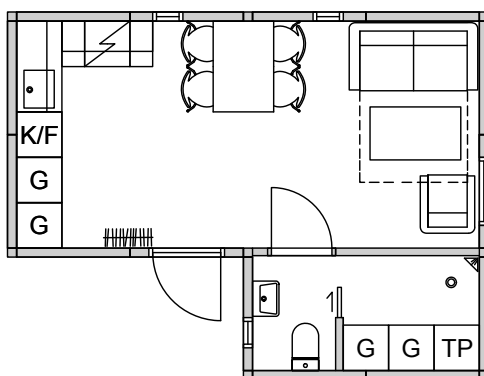
12M of storage

7.4.2. Plan proposal 2 1:100



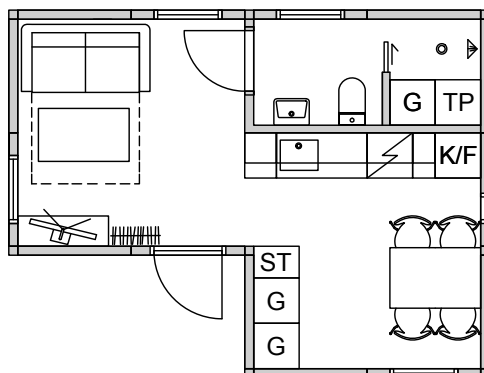
“All included”
Full size bathroom and laundry room
Kitchen
Normal kitchen table
Desk
Bed in niche
Sofa and armchair

12M of storage
 Possibilities to sofa bed for overnight guests



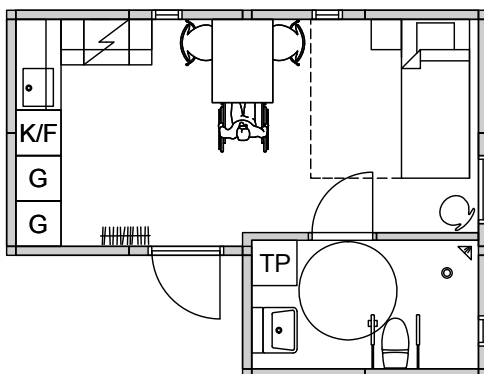
“Larger kitchen”
Full size bathroom and laundry room
Full size kitchen
Normal kitchen table
Sofa Bed

24M of storage



“Divided spaces”
Full size bathroom and laundry room
Full size kitchen
Normal kitchen table
Sofa bed

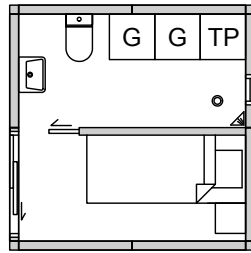
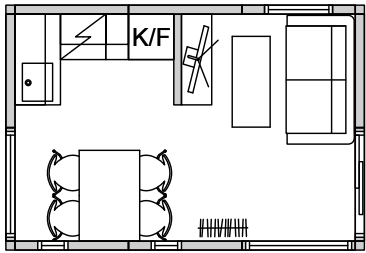
22M of storage



“Disable access”
Full size disabled access bathroom and laundry room
Full size kitchen
Normal kitchen table
Bed

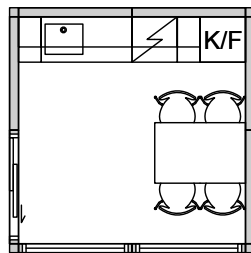
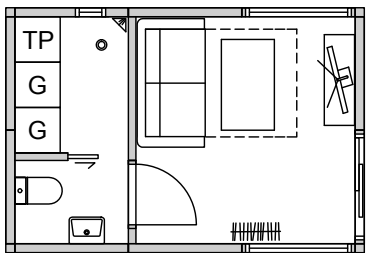
12M of storage

7.4.3. Plan proposal 3 1:100



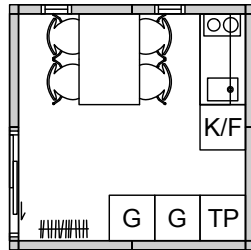
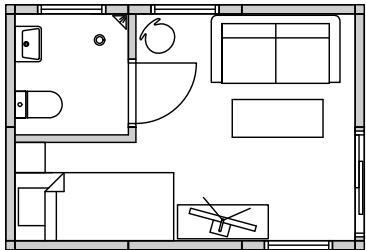
“All included”
 Full size bathroom and laundry room
 Full size Kitchen
 Normal kitchen table
 Bed
 Sofa and armchair

12M of storage
 Possibilities to sofabed for overnight guests



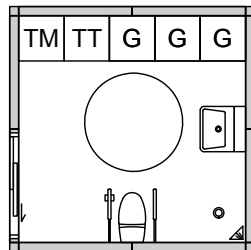
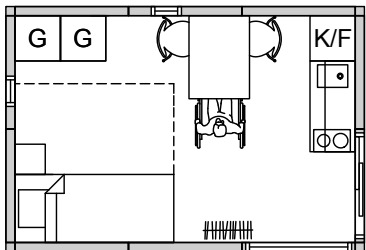
“Larger kitchen”
 Full size bathroom and laundry room
 Full size Kitchen
 Normal kitchen table
 Sofa Bed

12M of storage



“Sleeping niche”
 Smaller bathroom
 Laundry in kitchen
 Kitchen
 Normal kitchen table
 Bed
 Sofa

12M of storage
 Possibilities to sofabed for overnight guests



“Disable access”
 Full size bathroom and laundry room
 Kitchen
 Normal kitchen table
 Bed

30M of storage

7.5. Appearance



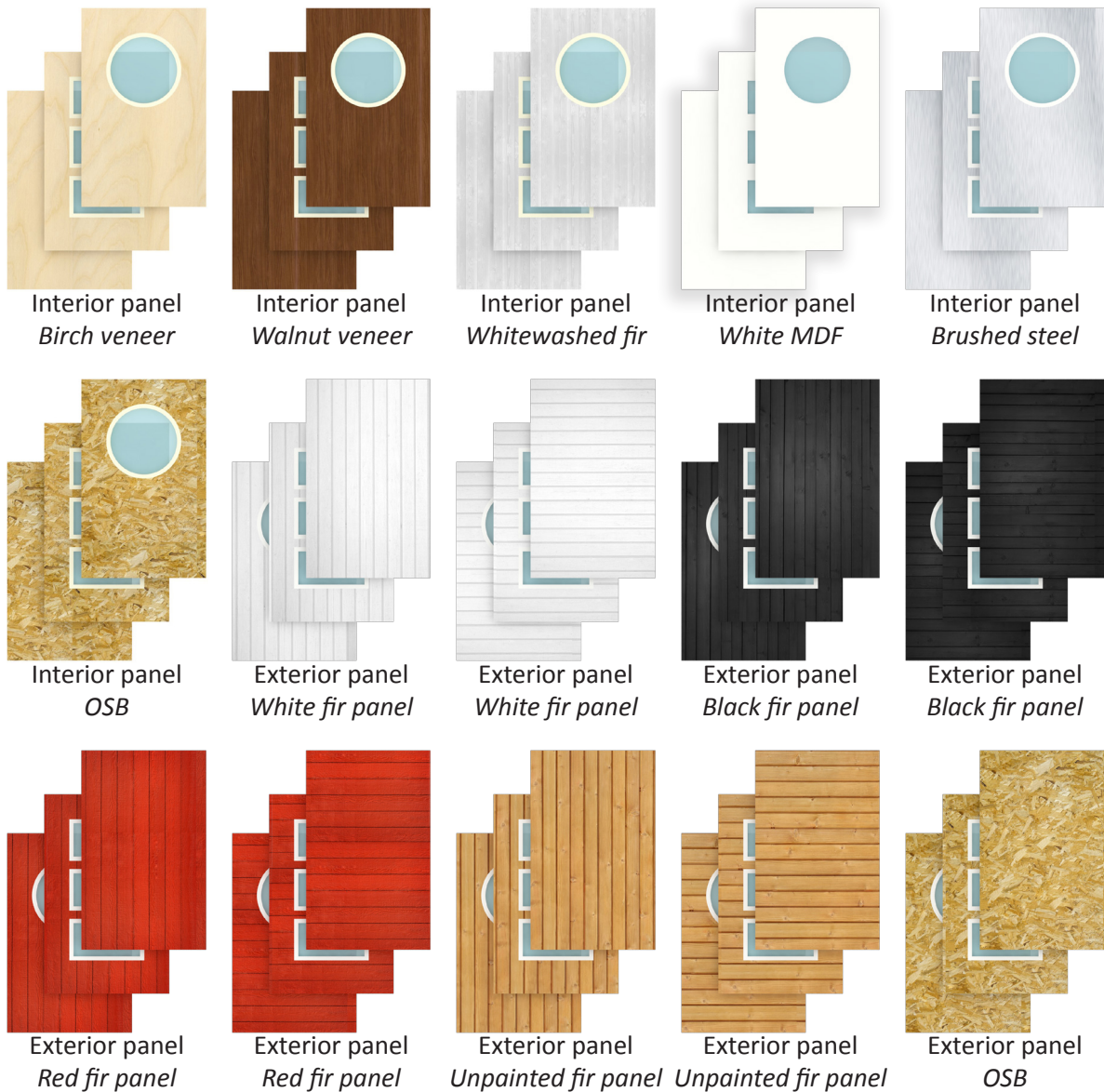
figure 50. Wall panels

The parallel to IKEA kitchen is highly relevant for the wall panels, where interior and exterior cladding works almost like kitchen doors and fronts.

Using the same SIP panels but with different claddings enable serial production which would lower production prices to a level that is commercially viable.

How many different panels there should be is hard to determine, but as for many IKEA doors/fronets the most common ones are stock items and the more unusual are non-stock items, which could apply for wall panels of IKEA Attefallshus.

For this thesis, a range of traditional panel appearances has been chosen to prove the concept (including non-cladded panels for customer who wish to put on cladding themselves). In a real scenario the range would probably be widened.



8. Product prototype



figure 51. Buying guide front

Being an IKEA product, the Attefallshus should also be presented as one. IKEA have a set of buying guides for their products and IKEA Attefallshus could be one of them.

As an Appendix to this thesis is “BEBODD ATTEFALLSHUS Buying Guide 2015”. The guide has been made to demonstrate the Attefallshus designed in a realistic setting.

In this chapter, the different elements of the folder is presented in the context of housing.

8.1. Inspiration and encouragement

IKEA is masters at inspiration. The buying guide should inspire both to purchase and build an Attefallshus, but is also a perfect opportunity to sell existing IKEA furniture, kitchen, storage units, etc. In a 25m² house, furniture like loft beds, sofa beds and other products suited for compact living fit perfectly and IKEA is already today eminent in that field.



figure 52. Buying guide inspiration

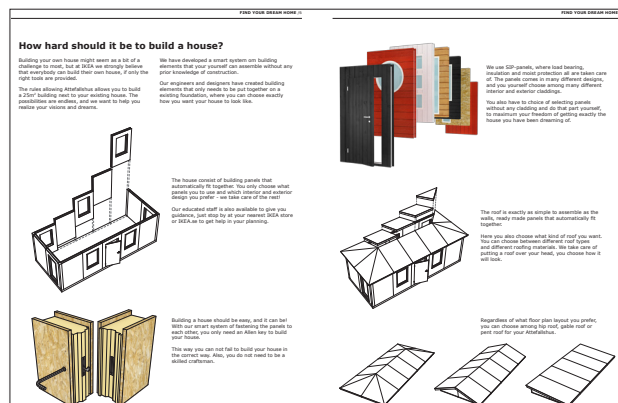


figure 53. Buying guide inspiration

8.2. The variety of choices

One of IKEA's signature marks is the variety of choices in the customer experience. Even if the range is set and everything is mass produced, it still feels like you make all the decisions yourself. For Attefallshus, this i brought forward in presenting the different material choices for wall and roof panels, as well as in suggesting different plan layouts. The feeling of variety is essential, and i graphically presented in lining up the choices next to each other. Very effective, very IKEA.

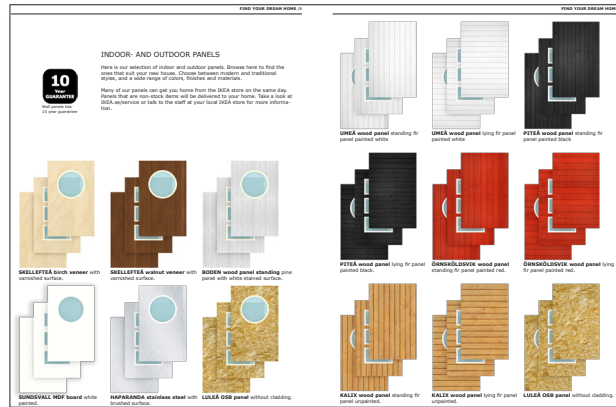


figure 54. Buying guide choices

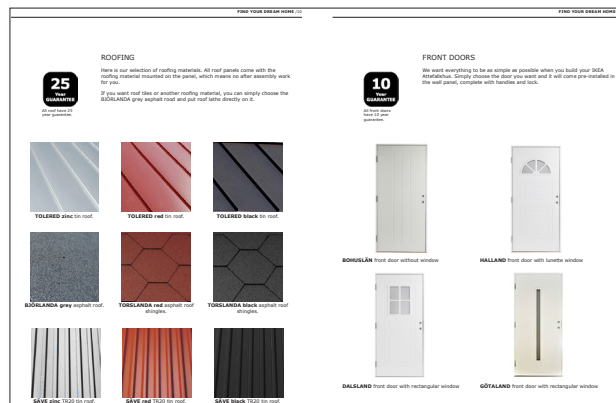


figure 55. Buying guide choices

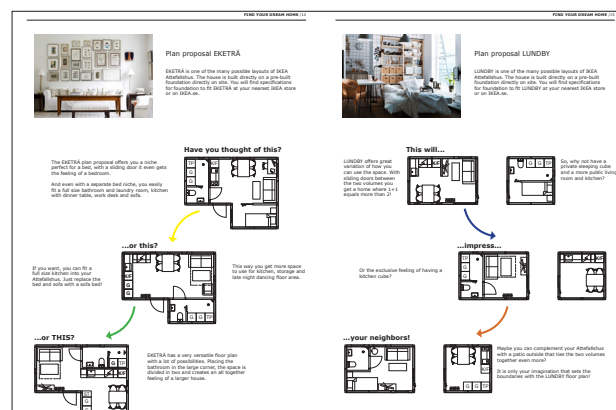


figure 56. Buying guide choices

8.3. Overview and combinations

After being inspired and confident in making your own choices, the customer get an overview of the different items and the possibilities of combination, as well as the price. IKEA's price matrices are somewhat of a classic and needs no further improvement. For IKEA Attefallshus the various building components are outlines, categorized after the different building parts.

figure 57. Buying guide combinations

figure 58. Buying guide combinations

8.4. Reassuring

The buying guide is ended with a reassuring chapter, that breaks down the entire process to four steps to really show how simple it is to buy a house from IKEA. It also show the reader where to find more information about Attefallshus, planning tools and complementing products.



figure 59. Buying guide reassuring

9. Discussion

9.1. Results

Is the available Attefallshus' on the market what customers really want?

To a large extent, customers submit to what's available on the market. Market actors recognize that they do not actually ask their customers what they want and the customers themselves do not seem to know either. By analyzing the market for Attefallshus in relation to the regular housing market, we can see a similar systematic, but with some differences. The regular housing market has three distinct segments whereas the market for Attefallshus only has two, providing room for new actors in a middle price segment, where there are clear signals of customers willingness to pay at the right value proposition.

What is available on the market is what customers want, for the simple reason that what is available is what customers choose from. However, there is clearly room for new types of products on the market, as long as they are communicated in the right way.

Can architecture for Attefallshus be qualitative and at the same time as it meets the customer demands?

The term "quality" has a very generic nature and what defines quality in a construction context differs widely depending on who you ask. This becomes clear when comparing what the author of this thesis through his education has learned to define as architectural qualities and the definition of potential customers to a Attefallshus make.

Architectural quality is to a large extent described in abstract terms such as spatiality, materiality, flexibility, etc. This is concepts that requires qualified training to understand which makes the method used in this thesis, where customers value these terms, not give useful results. Customers' approach to quality is described in tangible values like qualitative materials or function, things that are easy to understand and thus easy to pay for. Price focus is important, but not everything. The existing problem on the regular housing market, that customers do not understand what value an architect adds, is clearly reflected in the market for Attefallshus.

Looking at architectural quality in the perspective of the results of this thesis, the architects definition of qualitative architecture can absolutely exist in a product that meet customer demands. Especially in a system where the architectural work is the basis for large-scale production, where the cost of the architectural work becomes vanishingly small since the work only is made once. In the context of Attefallshus this will of course not create new iconic pieces of architecture, but can reasonably ensure a higher quality in the Attefallshus actually being built.

Is it possible to sell Attefallshus through a tool where the customers gives input and receive proposals?

It is absolutely possible to sell Attefallshus through such a tool. It is already done today for regular housing and could with little effort be "translated" into a tool for Attefallshus.

9.2. IKEA Attefallshus

When facing a housing market where customers have a purchasing behavior that does not value architectural work, the architects really has two choices. Either you ignore that market, or you try to understand the customers and create something that they can take on their own terms.

By creating a concept for Attefallshus like an IKEA product, you can create a product that fits customers' purchasing behavior as well as have a natural market segment. The building system can be protected by IKEA strong brand as well as IKEA's long experience in protecting the components of their furniture and kitchen systems. By taking advantage of IKEA's size and strength, this can create a strong market position in a segment where there is currently no competition.

An IKEA Attefallshus as the one presented in this thesis provides customers with the kind of choices that they want, but take care of the choices that are beyond their ability. IKEA's credibility and level of customer trust ensures the customer that the architectural and engineering properties of the house are all taken care of. This way, conditions for good architecture can be created, where customers choose between a set of choices that are all determined by the architect. You can never completely monitor what is being built in every Swedish villa garden, but with the right conditions you can increase the chance of a general high quality of the Attefallshus being built in Sweden.

Conclusion

The housing market and its customer have a rather tired relationship, almost like an old marriage where safety through predictability is chosen over the thrill of true happiness, since "rocking the boat" potentially involves risk. The customers choose among what is available on the market rather than demanding what they actually want from the market actors, and needs to be presented with alternative solutions to even consider them.

There are room for new products and concepts in the market for Attefallshus, but the communication of the value of new products and concepts must be performed in a way that can be understood by the customers.

Creating IKEA products for Attefallshus would create a "carrier" of the concept that already have the trust of its customers. The IKEA concept is well established and fit well together with the building system for Attefallshus presented in this thesis. If realized, this would create a product in a middle price segment on the market for Attefallshus that offers qualitative houses as well as giving IKEA the possibility to sell both the houses and all the furnishings that is going to be inside the house.

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