The past matters

The implementation of vernacular design principles in contemporary Dutch housing

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Abstract

In the present we as a society experience difficult times. The climate is changing, sea levels are rising, energy prices are under pressure and there is an immediate shortage of affordable housing. This research plan aims to provide architects with concrete design solutions, centring on the resurgence of *vernacular architecture*; a movement that emphasizing local context, local materials, the local climate, and low-tech, passive housing design. The research will involve a focused study of vernacular architectural practices in the Netherlands, uncovering historical design principles and contextual factors for contemporary relevance. It will explore the sustainability aspects of vernacular architecture, particularly its energy efficiency and climate adaptiveness design strategies which ultimately contribute to making the building more affordable.

Introduction

In the past, before the ongoing industrial revolution changed the world forever, architecture was very dependent on the context: the environment in which the building stood. When designing a building, close attention was paid to the local climate, local building materials, elements to use less energy, soil composition and a building was often incorporated into the local built environment. Beginning with the industrial revolution, later with the introduction of international modernism from the 1920-80s and more recently through technological developments that can manipulate the indoor climate, context-bound, traditional vernacular architecture has gradually been lost at sight through time. Vernacular architecture based on the local context was first seen as limiting: ‘The more severe the climatic conditions, the more limited and rigid the solutions are’ (Coch, 2020). However, as we see that many contemporary buildings in the world seem to become interchangeable and a contemporary building in The Netherlands can also stand in Spain, America or Japan, vernacular architecture can also contribute to giving a place a local identity. At a time when sustainability and a distinctive national identity are getting increasingly important again, local context-bound architecture and local building techniques are therefore once again coming more to the lens of engineers. Perhaps architects can learn from lost vernacular ideas about buildings to ensure that building materials, installations and construction methods can be applied more sustainably to construct sustainable and affordable buildings in a wet context in a Dutch peat polder.

The aim for this research is to look how principles of vernacular Dutch architecture can be implemented in a contemporary situation to create energy efficient, rational and more affordable housing.

Definition:

To formulate a precise problem statement and address the main and sub-questions, it is crucial to first establish a clear definition of ‘vernacular architecture.' Vernacular architecture is typically understood as the construction practice that employs local materials, proven building methods and construction without the involvement of teached architects. Usually this immediately says vernacular architecture is made by amateurs, as said by historian R. Brunskill ‘[Vernacular architecture is] designed by an amateur, guided by a series of conventions built up in this locality, paying little attention to what may be fashionable’ (Adam, 2020). However, this is just one interpretation. In my opinion it is equally plausible that a structure, constructed with local materials and using traditional techniques, can be designed by a trained architect or skilled carpenter as well, and throughout

generations, architects, builders, and skilled craftsmen have often used the local existing conditions to various degrees, sometimes heavily dependent on the context and sometimes less dependent. Therefore, it would be too restrictive to define whether a building qualifies as 'local architecture' solely based on the identity of its designer or builder.

This is backed up by the notion that vernacular architecture extends beyond 'local materials, -building methods, and -traditions'; it also encompasses structures attuned to the local climate, weather, and environmental challenge. ‘In popular architecture the climate is simply one more of the different forces that generate the forms of architecture. It is in conditions of low technology that the climate plays the main role and becomes the dominant force in the solutions used’ (*Coch, 1998*). This renders vernacular architecture as ‘hyper-local and constructed using materials available at specific locations’ *(Jenkins, 2023).* For the purposes of this research plan, vernacular architecture is therefore defined as 'context-bound architecture that emerges from an exploration of the local identity, traditions, building materials, and climatic conditions of a specific location. As 'traditions' and 'traditional building methods' are frequently mentioned, the term ‘vernacular architecture' is largely interchangeable with traditional architecture, stated as 'traditional architecture is evidence-based, rooted in centuries of knowledge about what works well. The architecture is based on the human scale and is therefore designed with the final image in mind' (Bosse, 2022). To enhance the notion and relevance of this research, this term is therefore also researched. ‘Traditional architecture’ is of a movement that takes inspirations and lessons from the past and uses them for new buildings. The International Network for Traditional Architecture & Urbanism (INTBAU) describes this as: '*Traditions allow us to recognize the lessons of history, enrich our lives and offer our inheritance to the future. Local, regional and national traditions provide the opportunity for communities to retain their individuality with the advance of globalization'* (Drijver, 2022). This touches on the aim to implement vernacular architecture principles; learn from the past and what proved to be successful, and skip failed experiments that proved to be successful in architecture. Traditional architecture in any form heavily relies on local traditions and design language of a place, which makes it similar to the origins of vernacular architecture: ‘In architectural terms […] originally meant the local {design} language as a contrary to Latin’ (Adam, 2020). The counterpart of the stated definition would be the internationally oriented ‘modern’ architecture movements that emerged as early as the 19th century with the industrial revolution and most notably with the modernist architecture from the 1920’s till the present day. These modern architecture movements viewed context and traditional principles as constricting factors and did not consider the region as a significant aspect in building design.

Furthermore, this research plan also examines the notion of 'sustainable buildings', mentioned in the main question. The term ‘Sustainability’ has evolved during the last four decades to encompass 3 major aspects: Social-, Economic-, and Environmental sustainability (Kandachar, 2014). E*nvironmental sustainability* evaluates the building's impact on the climate defined with the impact when construction a building as well as the emissions a building emits. *Economic sustainability* examines how buildings can be build affordable and to keep them affordable for future generations as well as houses that are easy to maintain. S*ocial sustainability*, which examines how the building integrates into the local environment and assesses the perception of the general public toward buildings and has a close relation to the lifespan of the building. A fourth notion is added: *life cycle sustainability*, which considers the lifespan of materials as well as how the building is

detailed to last for a period longer than the 30 years houses are currently build for. How vernacular architecture can contribute to this is clearly explained in a paper that studied vernacular architecture in Arab; ‘It is not just nostalgia that draws people to vernacular architecture. Much of what is valued in this architecture is its sustainability and response to the climate, natural setting, and locally available building materials. Their usefulness as model for new buildings only adds to their value’ (Salman, 2018).

Problem statement:

The question that may arise is where the application of local architecture or specific aspects thereof can serve as a solution. Is it not advantageous that buildings are no longer dependent on the constraining context in which they stand? We live in an era where the belief persists that everything is technically achievable: houses can be mechanically heated, cooled, ventilated, hydrated, and so on. Moreover, seemingly impossible constructions can now be realized which are albeit clever, often not logical, expensive, and irrational from the standpoint of physical principles. However, this extensive technical knowledge has led to a lack of incentive and motivation to explore the local, rational, and logical attributes of a location and how they can be used to improve a building without relying on energy consuming technological measures and complex structures. [In the past] the air movement has had an effective role in local climatic control and was often manipulated by using lattices, screens and awning (Trombadore A., Visone F. (2019), but nowadays dwellers rely increasingly on the use of air condition units and mechanical ventilation systems (Le Clercq, 2023) We also reside in a time where terms like climate change, rising sea levels, energy efficiency, and a sense of identity, in the wake of global interconnectedness, are seen as crucial. A time where vernacular architectural principles are back in the spotlights again.

Example of passive cooling, shutters and white walls. Source: Broekhuis Houtbewerking

For instance, if a new building becomes uncomfortably warm in the summer, it may be more environmentally and affordable to investigate why this occurs and how it can be prevented in the architectural fundamentals, rather than installing an energy-guzzling cooling system that merely addresses the symptom without addressing the root cause. Buildings use around 40% of all energy consumed worldwide and are responsible for 36% of greenhouse gas emissions (EC, 2020), and using passive principles instead of machines can drastically reduce this percentage (Emekci, 2023). To see if using as less machines as possible and to change to architecture to the local context can help in creating affordable housing, a study in a very extreme climate was done. The conclusion here was: ‘In the hottest days of the year […], using special architectural elements would make the air temperate and even pleasant. In the hottest days of the year and the hottest regions of the country, using architectural elements would make the air temperate and even pleasant. This has been used through specified methods for various regions, to save costs’ (Anjomshoa, 2018). The opposite also

causes houses to consume a lot of energy for heating; ‘in cold regions, the most important factor for the habitability of the buildings is keeping the heat trapped inside’ (Coch, 2020). Furthermore, a logical and easily comprehensible structure that respects the fundamental principles of physics can contribute to affordable housing. In these illustrative cases, local architecture contributes to buildings that harness the best of the location and traditional innovations while minimizing energy wastage on potentially unnecessary installations. These principles can also alleviate the significant challenges of affordable housing shortages and the contemporary climate crisis. An additional benefit is the preservation of the local identity of a place, often characteristic of the location for centuries, thus precluding new construction from being seen as generic, devoid of character, or universal.

The objective of this research, therefore, is to explore how modern architects can learn from the past, local traditions, and low-tech solutions to address contemporary issues such as energy consumption, longevity, and affordability in The Netherlands. Furthermore, thorough research into the potential benefits of local architectural principles can prevent this architecture from being perceived as 'something from the past' and from constraining the design of new buildings (Adam, 2020). This objective adds to the current base of knowledge that it touches on Dutch vernacular architecture, were most existing researches to this subject have been done to much warmer, often Mediterranean locations. Since the climate is changing due to global warming, this existing research becomes more interesting as well, but direct design solutions for the current -and coming- wet and temperate Dutch climate are missing. The hypothesis is that design solutions, which will be part of the *research-by-design methodology*, will create a hybrid between traditional Dutch architecture and traditional Mediterranean architecture.

To come to concrete answers the following main question is formulated:

In what way can architects learn from local vernacular techniques to create sustainable & affordable houses in The Netherlands?

This main question is backed up by three sub questions that will be:

-What are vernacular building techniques in The Netherlands?
-How can vernacular architecture contribute to affordable housing?
-Why can vernacular principles contribute to sustainable housing?

Relevance

The exploration of local or traditional architecture around the world is not new. However, the majority of literature predominantly focuses on the architectural practices of specific regions facing extreme weather conditions by Dutch standards. Many examples of analyses and research exist, delving into the traditional architecture of areas with very high or low temperatures, regions prone to significant flood risks, or regions where building materials are scarce. Little to no research has been conducted regarding what local architecture signifies in a country like the Netherlands, a small country with a rather moderate climate, yet a country deeply impacted by future climate change.

Possibly, valuable insights can be taken from prior research on local architecture in other countries. We are well aware that climate change is causing increasingly extreme weather patterns around the world and especially in the Netherlands: floods, drought periods, severe frost, and prolonged heat waves are expected to occur more frequently in the future (World Weather Attribution, 2021). This establishes a direct link between the past

and the future: the climate that a specific country had in the past is likely to be anticipated in the Netherlands in the coming decades.

This phenomenon is already unfolding today. Due to global warming, the Netherlands now experiences the climate that central France only had half a century ago (NRC, 2022). In the future it is expected that this will shift even more extreme (WWA, 2021). What sets this specific research apart from existing literature is that it examines both traditional architecture in the Netherlands and how such principles can be applied to construct sustainable and affordable housing. Additionally, it explores the potential lessons that can be derived from age-old traditional building methods in countries that faced climates similar to what the Netherlands is expected to encounter in the future, like previously mentioned Mediterranean countries like Spain, Italy and Southern France. The aim is to create innovative architecture in The Netherlands based on the past, but made with current insights and using previously done studies in places with a local climate that is similar to the expected local climate in The Netherlands.

Contemporary traditional/vernacular housing in Delft
Source: WAM architecten / YuconVR 2018

Theoretical framework

Various other principles and ways of building that have a close connection to vernacular architecture have been explored in the past that will be described below. More principles and definitions will be introduced in the final research, but five themes will be shortly discussed in this research plan to give a broader notion into which context this research falls.

Architectural epistemology

As explained previously, this research focuses both on the building performance, local climate and building physics; as well as the experience of vernacular architecture and the local identity of a place. Therefore, on the one hand, I am approaching architecture as an ‘ecology’, the episteme ‘ecology’ focusses on building performance, climate and building physics (Havik, 2023), which in this research can be used to both create more sustainable as well as more affordable housing. On the other hand, I am looking at how buildings are experienced by its users as well as passers-by of a building, which connects to ‘phenomenology’, this focusses on the perception, sensory and embodied experience of a place or building (Havik, 2023). Both of these approaches, when applied to vernacular architecture, ultimately lead to a careful attention at how materials are being used in buildings, the crafts and details which connects to the third episteme used in the research: material culture.

Vernacular architecture and sustainability

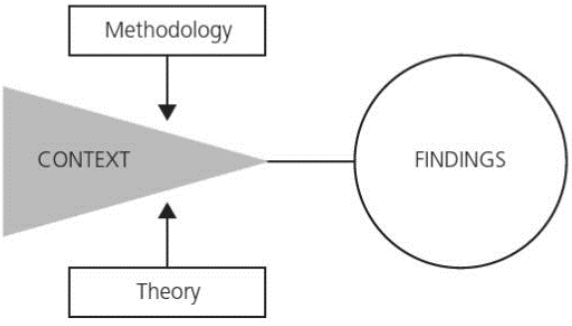
The hypothesis is that in the design implications, principles of the so-called passive houses will be used. Passive housing is focused on making best use of the “passive” influences in a building – like sunshine, shading and ventilation – rather than active heating and cooling systems such as air conditioning and central heating (The Passive Housing Institute). These principles are closely related to vernacular buildings from the past that could not make use of these energy consuming systems and rather rely on the local climate to create a building. This theory is connected to the previously mentioned architectural episteme of ‘Ecology’. The connection between contemporary passive housing and vernacular architecture is once again confirmed by a research to vernacular architecture in Egypt saying: ‘Modern passive design concepts have learned to build upon climate responsive methodology that was found in and inspired from vernacular and traditional buildings’ (Dabaieh, 2013).

Vernacular architecture and affordability

The research on vernacular architecture touches on limiting machines, energy efficient housing made of local materials and rational construction methods. This contributes to the global shortage of affordable housing since the findings of these research contribute to simpler designs that are made cheaper by skipping out on unnecessary, expensive parts. It therefore helps to create more affordable housing but not losing the local identity of a place. Using the context in which the building is placed in to contribute to affordable housing, is a generally used theory, but has not been extensively researched in The Netherlands. A study to affordable vernacular architecture in Persia concluded: ‘An important factor always taken into consideration in traditional architecture has been use of local material. Utilizing local materials has been matched with the climatic condition of the region and have been cost saving in this regard’ (Anjomshoa, 2018)

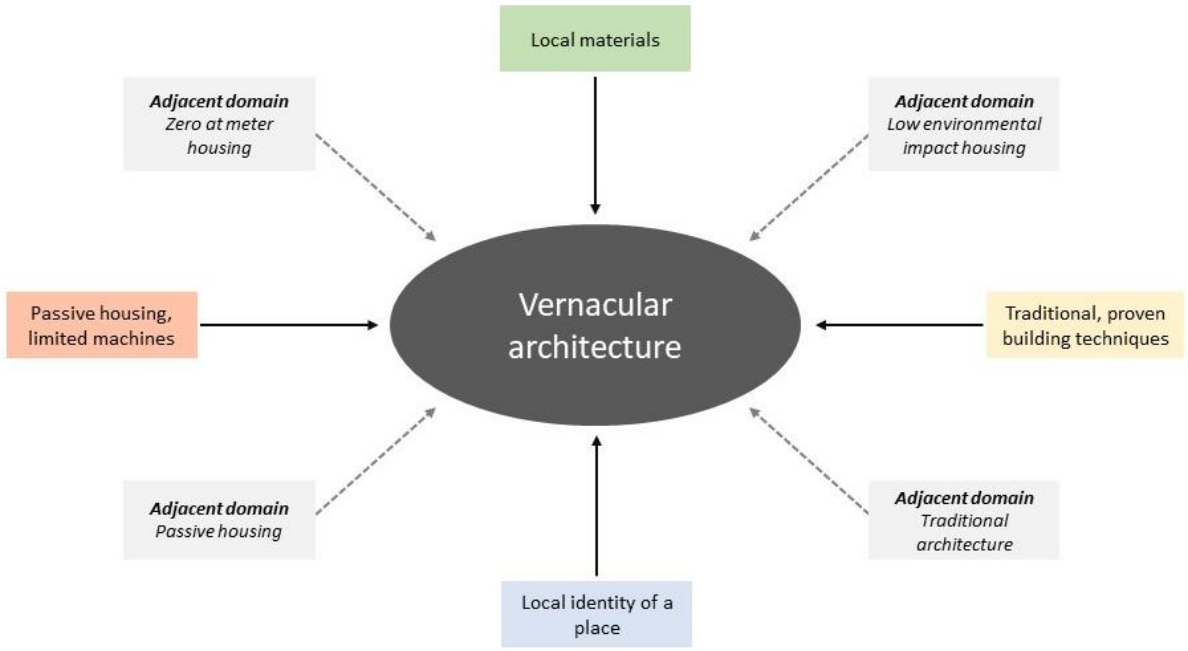
Zero at the meter housing

In Dutch a so-called 'Nul op de meter woning' is a dwelling that in total uses as much energy as it produces. This is described as: 'This means that throughout the year, for home-related use -space heating, cooling and hot tap water- and domestic use -appliances and lighting-, the home consumes as much energy -or less- as is sustainably generated locally' (Schilder, F., van Middelkoop, M., van den Wijngaart, R. 2016). In the far past, when all houses were independent from the electricity net, houses were 'zero at the meter' in a sense. Especially was especially true in the days when locally grown wood was the main source for hot water and heating. Therefore this principle has a potential close relation with the research to vernacular architecture.



Example diagram as made by Lucas, R. (2016)

Vernacular architecture in England, source: BBC



Methodology

As stated in the theoretical framework before, the epistemes which are used in this research will be mainly *ecology*, with side roles for *phenomenology* and *material culture*. These epistemes are essential in framing a methodology for the research. Combined with the theme of the research, the main question and the aim the methodology will therefore be a combination of four methods: literature review, field research, comparative analysis and research-by-design. These methods will be mainly in the field of qualitative research, but will include quantitative data as well.

Literature review

This method will be used throughout the complete research. The objective is to see what has been previously researched in the field of vernacular architecture and how this can be used to create more affordable and more sustainable housing. These previous researches, which have been conducted in countries with more extreme climates, can help to formulate principles that will become more relevant in The Netherlands due to climate change. Since most research on this topic is done in countries that have a completely different climate than The Netherlands, the literature study will also include a study of what vernacular architecture means in The Netherlands before the industrialist era to understand our heritage better and use it as a base for future developments.

Comparative analysis

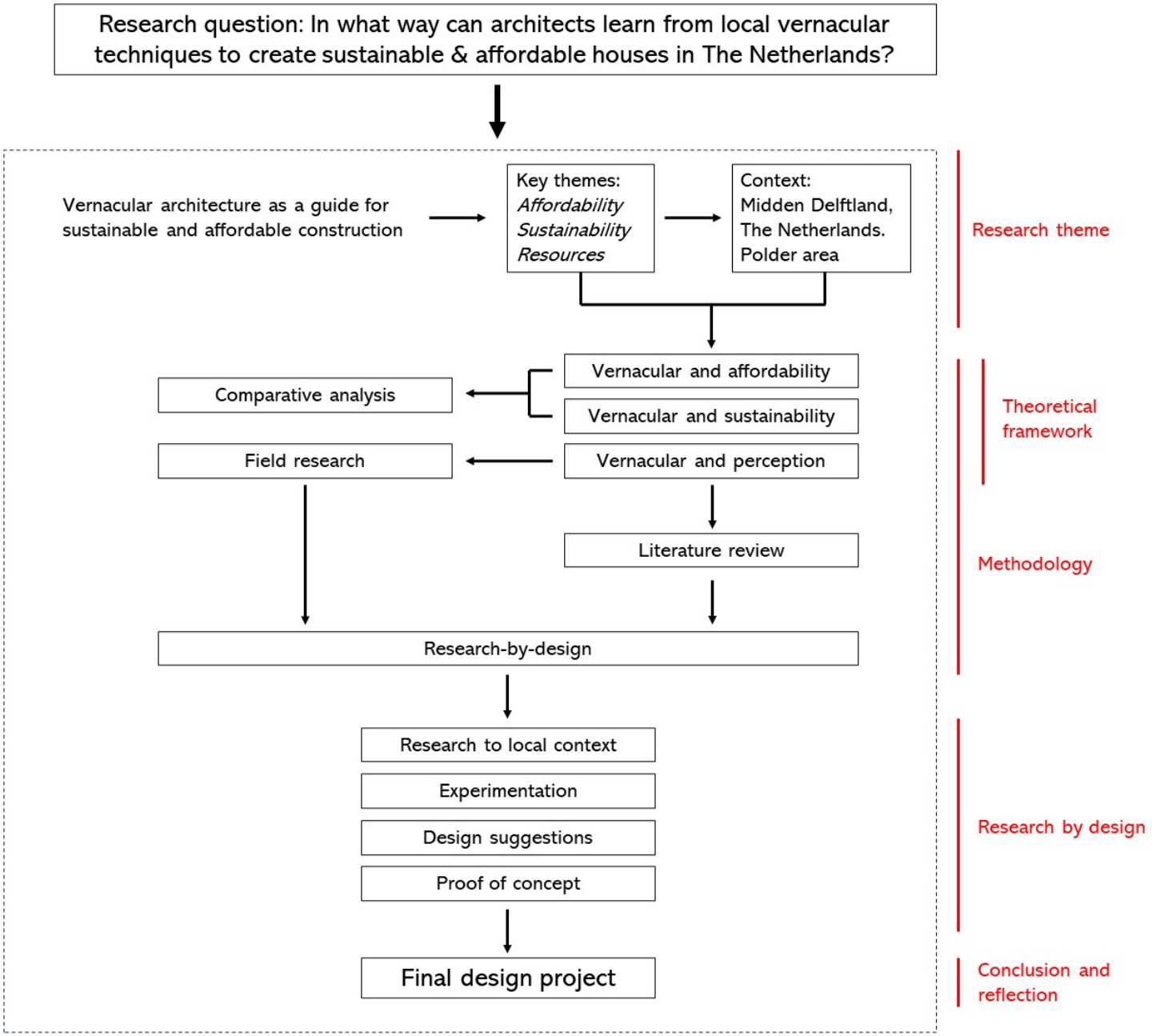
This method involves conducting on-site investigations and observations within context bound, vernacular architecture in The Netherlands build in between the years 1200 – 1700. Doing this kind of research helps to understand Dutch vernacular principles and, combined with the literature reviews of vernacular architecture in extreme climates, to create a hybrid of vernacular principles to build future proof sustainable and affordable housing.

Research-by-design

This method involves utilizing the research findings to generate design proposals and applying the knowledge gained through the research process to introduce concrete architectural design solutions to create more sustainable and more affordable housing in The Netherlands. Since this research is closely to a design assignment, this method will possibly the most important for the complete research and contribute to the aim of the research.

Field research

This method looks at the 'phenomenology' episteme introduced in the theoretical framework. It involves doing interviews and a historical analysis to gain a better notion of how vernacular architecture is perceived by its dwellers. The four research methods will finally create a broad research with direct design solutions and suggestions that architects can use in countries with moderate climates similar to The Netherlands.



Literature list

Used literature for this research plan, definitive literature list for the research will be more extensive since more sources need to be used for a thorough research.

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