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MASTER

How demolition turns into preservation

A preference research to cultural-historical transformed residential objects

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Colophon

This graduation thesis is publicly available

Summary

Motivation

Over the years the loss of functions and services has created a supply surplus, causing buildings to become vacant. Increasing financial pressures, aggravated by the covid-19 crisis, are reinforcing this trend *(Hielkema, 1999; de Fijter & Den Boer, 2021; Meurs & Steenhuijs, 2020)*. Multiple trends are leading to more adaptive reuse within vacant buildings. First, certain buildings could be protected after receiving a monumental status. Second, the increase in raw material prices in combination with stricter climate targets has also ensured that adaptive reuse has received more attention *(Fufa, Flyen, & Flyen, 2021; Meurs & Steenhuijs, 2020)*. Adaptive reuse is often times applied to cultural-historical buildings, which based on the studied literature will be defined as:

> *A building of regional or national importance that is considered worthy of preservation and can be protected through a monumental status.*

At the moment little research has been done into the mental representations behind the purchase of cultural-historical buildings. The studies are mainly limited to the financial benefits of living in a cultural-historical building *(van Duijn et al, 2016)*. One of these financial benefits is that cultural-historical buildings are generally reasonably stable in value. This research fills the research gap in the mental representations behind the purchase of cultural-historical properties. It was decided to focus on transformed buildings. Due to its earlier function, the building has a certain historical value. The focus of this research is on three types of heritage objects, religious, industrial and school heritage. As many of these buildings were built during the time of the Industrial Revolution, the research focuses on buildings built within this period. Using a mental representation model, this research will provide a broader insight into the preferences for owner-occupied cultural-historical transformed buildings. This leads to the main research question within this study:

> *What are the revealed and stated mental representations of home seekers for cultural-historical transformed buildings?*

Methodology

This research uses the online Causal Network Elicitation Technique (CNET) developed by Arentze et al. *(2008)* to answer the main research question and to visualize the purchasing motives for cultural-historical buildings in a mental representation model. The model is based on the concept of mental representations (MR), introduced by Johnson-Laird *(1983)*. Within this research, the mental representation model visualizes both the attributes and underlying motives on which the real-estate buyer

has assessed/ will assess the choice for a cultural-historical transformed building. The interview method which will be used is the online-CNET method. The online-CNET method uses semi-structured interviews to map these attributes and underlying motives. An online CNET allows interviews to be conducted on a large scale (the advantages of a quantitative study), with minimal interviewer impact.

The survey consists of two samples, a stated sample group and a revealed sample group. The revealed sample group is currently living in cultural-historical buildings and the mental representation model shows the attributes taken into consideration with the underlying motives, behind the purchase choice. The stated sample group may be interested in cultural-historical buildings. This concerns the considerations and the underlying motives behind a hypothetical purchase choice. The mental representation model of this sample group will be compared with that of the revealed sample group.

Results and conclusion

The research provides insight into the importance of preserving certain attributes. For the revealed group, the mental model shows that the purchasing choice seems to be mostly based on the visual attributes of the home and its immediate surroundings. Attributes like high ceilings, visible structural elements and architecture are experienced as important. The flexibility in the layout and design, as well as the surface area of the house, whereby preference has often been given to a spacious house. Regarding environmental factors, the proximity to green appears to be the most important buying motive, where mainly the health and recreation advantage plays a role.

Major differences were observed between the important attributes and underlying motives of the revealed and stated research groups. For the stated group, environmental factors, social factors and price appear to play a much larger role. The form of living and social contact are often mentioned. Much attention is paid to the attributes that promote health, well-being and social control. Shared facilities, outdoor space and greenery in the area fall within the top six attributes mentioned. Affordability seems to be a recurring consideration. Cultural-historical characteristics are experienced as less important related to other attributes.

Discussion and Recommendations

From the results of this study, the recommendations to both designers and real estate developers are to keep the spaciousness of the building and preserve the structural elements and the old aesthetically pleasing elements where possible. Since aesthetics and character are frequently named benefits. Based on the results of this study, if the property is located on a larger plot, the recommendation would be to facilitate/ maintain enough green space around the building and to maintain

parking facilities where possible. When a choice must be made between maintaining green or creating parking facilities, green space seems to be favoured over parking facilities.

The primary limitation of this study is the sample size (129 respondents for the revealed sample). Because the research has qualitative properties, conclusions can be drawn concerning the importance of mainly building characteristics such as high ceilings, visibility of structural elements and housing size. This results in giving the building character, making the building unique and creating a spaciousness feeling. However, this sample is too small to draw strong conclusions about socio-demographic characteristics. Furthermore, this research gives limited information about the cultural-historical attributes present in cultural-historical properties and their differences in the three heritage types. For further research, it would be interesting to question a larger sample group about the cultural-historical characteristics that are still present in their home. Then a mental representation model could better be matched to certain types of real estate properties.

Summary

Acknowledgements

Before you lies the thesis: "How demolition turns into preservation", in which residential preferences for cultural-historical buildings have been mapped by means of a mental representation. This thesis was written as a conclusion to the master of Architecture, Building and Planning at the Eindhoven University of Technology. The thesis research was conducted in the period from December 2021 to October 2022.

This thesis marks the end of five years of studying at the Eindhoven University of Technology, where I was able to learn a lot and built great friendships. Over the years I have discovered my interest in heritage, which has also been the motivation for this thesis research.

Together with my head thesis supervisor Stephan Maussen and with the support of Theo Arentze, I devised and formulated the research question. Subsequently, Theo Arentze supported me with the research method and the extraction of the results. Irene Curulli, helped me with literature suggestions that were ultimately used in defining cultural-historical property attributes. I would like to express my gratitude to my thesis supervisors for their support and guidance.

I would also like to thank my family and friends for their support during the entire process and for creating a pleasant working atmosphere and study time. Besides, I want to thank the respondents for making the research possible. Next, I am grateful to Pascale Simons who helped me to distribute the surveys in central Brabant and to Lina Bekker and Kai van Kuijk for their input and feedback on parts of this thesis.

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Introduction

(Van der Krabben Makelaardij Uden, 2022)

1.   Introduction

This chapter gives a short introduction to the topic of this thesis and explains how an increase in the vacancy of heritage has led to an increase in the number of transformation objects. This forms the basis of the research problem, which will be explained in more detail. The research questions are discussed, after which the social and scientific relevance of the research is discussed in more detail. This chapter is concluded with a general overview of the chapters of this thesis.

1.1   Background

The vacancy of large complexes is an increasing problem because of economic and social changes and cannot always be prevented. Some buildings such as churches, monasteries, factories and schools can no longer fulfil their original function *(Hielkema, 1999)*. Factors like secularization, diminished demand for products/services, increased fixed costs and reduced occupancy/visitation can contribute to this process. Furthermore, Covid-19 has strengthened this ongoing trend of buildings losing their original function.

In the case of churches, income from collecting has decreased significantly. This has contributed to the trend of the past four years, during which circa 400 religious buildings have been sold. By 2030 it is expected that 1700 churches will lose their function *(de Fijter & Den Boer, 2021)*. Over the years, many religious and industrial monuments have been demolished. Most of these buildings were built during the industrial revolution that took place in the second half of the 19th century.

The Dutch province of North Brabant in particular had a large quantity of religious heritage, it used to have almost 700 monasteries in the 19th century *(Huismans, 2022)*. In addition, there was a lot of large and medium-sized industry within Brabant. The textile and tannery industry was big within different cities in Noord-Brabant. Especially the tannery industry flourished during the war years, partially due to a large market in soldier boots *(Wols, 2011)*. Furthermore, Philips had many buildings within Eindhoven, where it originally produced light bulbs and electrical products. Brabant had a favourable location since labour costs and land prices were relatively low. However over time, due to a variety of reasons production failed, resulting in religious heritage, industrial heritage and schools losing their function . This in turn resulted in vacancies. Because the buildings were often built after 1850, the buildings did not meet the original preconditions to be listed as a monument and thus to be protected. Therefore, loss of function was often equivalent to the demolition of a building. This trend continued until about the 1970s.

In the years after the Second World War, social changes took place so quickly that (industrial) cities could no longer develop using the original

city structures. This resulted in the demolition of large parts of city centers. Due to the rising importance of the car, demolition was seen as necessary to create sufficent car parks. Around the 1970s, dissatisfaction increased with the large division of inner cities. By lowering the age standards , more buildings could be protected through a monumental status. Redevelopment started to play an increasingly important role. Adaptive reuse as it is often called started to be discussed in architecture around 1960-1970. The high material and fuel prices were the reason for this, in combination with the appreciation that cultural heritage received and the dissatisfaction with the large-scale destruction in the inner cities. In addition, adaptive reuse contributes to the increasing global need for sustainability, as discussed in the book Reuse-Redevelopment and Design *(Meus & Steenhuis, 2020)*, Re-used are often environmentally friendly and contribute to the circular economy . Adaptive reuse results in less energy consumption and waste *(Cantell & Huxtable, 2005; Fufa, Flyen, & Flyen, 2021; MIsIrlIsoy & Günçe, 2016)*. Redevelopment (or adaptive reuse) is defined as preserving an existing, possibly historic, building by giving it a new function. Appreciation plays an important role, since what is considered valuable is worthwhile of being repurposed.

1.2   Research problem

Research shows that several trends are currently leading to an increase in the vacancy rate of cultural-historical buildings. In general, the demand for certain functions/services is disappearing, leading to a supply surplus and sometimes an increase in financial strains . This has been strengthened by the Covid-19 epidemic which has increased financial strains. Concerning religious heritage specifically, secularization plays an important role in the increasing vacancy of religious heritage. Also within this type of heritage, the effect of the corona crisis was visible since churches were receiving less income *(de Fijter & Den Boer, 2021; Hielkema, 1999)* . Adaptive reuse is increasingly being used as a solution to the increase in vacancy of cultural-historic buildings *(Meurs & Steenhuijs, 2020)*. Figure 1, schematically indicates the redevelopment cycle.
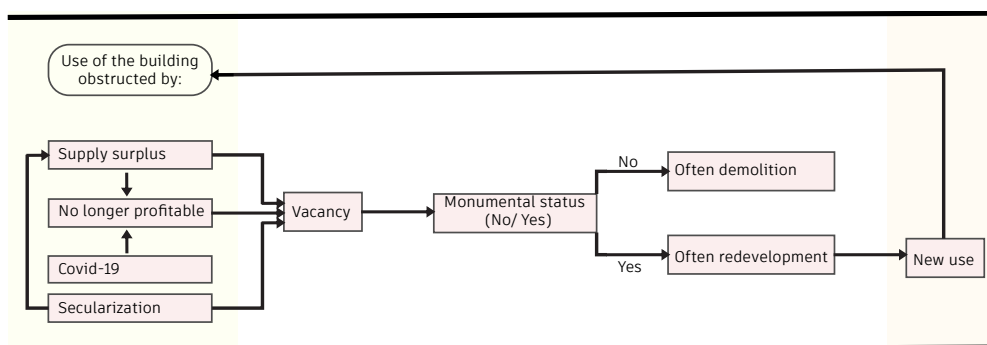
Figure 1,
Redevelopment cycle

Despite the discussed increase in adaptive reuse of heritage buildings, little literature could be found on why individuals would buy cultural-historical buildings. Several studies show the positive financial benefits of living in and around monumental buildings *(Ahlfeldt & Maennig, 2010; van Duijn et al, 2016; Franco & Macdonald, 2018)*. Other research shows cultural heritage's indirect effects and it reveals the appreciation and importance of repurposing cultural heritage *(Platform31 et al, 2013)*. Furthermore, research shows the property, accessibility and environmental characteristics people value. These characteristics will be discussed in chapter 3. Nevertheless, little emphasis is placed on the purchasing reasons for cultural-historical buildings, since these buildings do have different characteristics .

1.3 Research objective

Using a mental representation model, this research will provide a broader insight into the preferences for owner-occupied transformed religious, industrial and school monumental buildings. Attributes of transformation projects have been determined based on listings and advertisements from real estate agents and developers. Whether these attributes influence or will influence the residential purchase will be investigated by looking at the mental representations of individuals who have purchased a cultural-historical building or who are subscribed to the KilimanjaroWonen newsletter and are potentially interested in buying a cultural-historical building.

As discussed in the study by Naderi et al. *(2012)*, the valuation of housing attributes is often contextualized for specific market segments. Attributes considered important within a residential purchase established in other studies (which are not typical cultural heritage characteristics) will also be included in this study. In this way, a broader picture of the market can be sketched and the chance of possible bias by not including important attributes can be decreased.

The attributes that are considered important for the user of the heritage object provide new insides to designers, real estate developers, fellow researchers and municipalities for possible future development choices. Furthermore, the results can be used for targeted marketing.

1.4 Research questions

This research will study the mental representations behind a residential purchasing choice. This main research question will be covered with help of multiple sub-research questions.

Main research question
(1)   What are the revealed and stated mental representations of house seekers for cultural-historical transformed buildings?

Sub research questions

(1) How can a buyer's profile of a cultural-historical building be described?
(2) Which characteristics can be used to describe a cultural-historical building?
(3) Which attributes are taken into account when choosing a cultural-historical building?
(4) What are the underlying motives (benefits) for choosing a cultural-historic building?

1.5 Relevance

Within this chapter, a distinction is made between social and scientific relevance. The social relevance focuses on the common interest of the research. It describes why the research is being conducted. The scientific relevance, on the other hand, focuses on how this study can contribute to existing literature studies and papers.

1.5.1 Social relevance

Analysis has shown that there is currently an increasing trend in the vacancy rate of cultural-historical buildings. The loss of functions/ services creates a supply surplus, causing buildings to lose their function. In the case of a lot of religious heritage, secularization and the increasing financial pressure, exacerbated by the current Covid-19 crisis, contribute to the increasing vacancy rate. Due to the monumental status, buildings are protected and loss of function no longer equates to demolition, which was often the case before. However, this protected status leads to an increase in repurposing. This trend will continue and repurposing will play an increasingly important role in the future. In the event of repurposing, in addition to a new function, a choice must be made as to how the building will be transformed. It is important to understand the demand and needs of future users. This research will provide an insight for agents within the housing market into the attributes and benefits that are considered important by buyers or future buyers of these repurposed properties. When the important attributes and benefits can be mapped in a mental representation model, designers, real estate developers and municipalities can use this information for future development choices. This information could possible give information about which elements are important to retain when executing transformations . Moreover, the socio-demographic characteristics can be used for targeted marketing

1.5.2 Scientific relevance

The performed literature study (chapter 3), has shown that there is currently a research gap that will be filled through this research. Where research shows location and housing preferences in different countries and among different age groups . First, these studies depend on the

market and therefore differ for countries and sometimes also cities. Second, information is missing that shows why people would opt for cultural-historically transformed buildings. Studies are mainly limited to the financial benefits of cultural-historical buildings. Several studies have shown the positive financial and tax benefits of buying cultural heritage objects. Furthermore, research has shown the appreciation people have for heritage and how policy planners are using heritage to increase the quality of life in areas. Hopefully this study will provide more insight into why people would purchase cultural-historical buildings.

1.6 Outline of the chapters

This thesis is split up into seven chapters. Chapter 1 will start by introducing the subject of this thesis. It will discuss the research problem, goal, relevance and will show the main- and sub-research question. Chapter 2, will discuss the theoretical framework. The concepts mentioned in the research question, which form the basis of this thesis, will be introduced. This includes the explanation of the concept of cultural heritage and three specific types of heritage: religious, industrial and school heritage. Since many cultural heritage objects have a monumental status, this concept will be explained in more detail as well. In chapter 3, the literature study conducted will be discussed. A division has been made in the chapter between explaining the real estate objects and the purchasing attributes and considerations. The attributes arising from the various surveys (the purchasing motives/ residential preferences) form the basis of the survey . These are the attributes which respondents are presented with. Chapter 4 will discuss the methodology. The methodology discusses which method will be used for analysing the data (online-CNET) and which tools will be used for obtaining the answers (Limesurvey). The theory behind the research method will also be discussed. In addition, the data gathering process showing how/when/where the questionnaires will be distributed will be explained. Chapter 5, will discuss the data preparation. The data preparation chapter presents the outcome of the questionnaires. It will be explained how the data has been prepared for analyses and for obtaining the results. Chapter 6 will present the results. The findings of the study are summed up and chi-square tests will be performed, comparing the stated and revealed sample groups. Chapter 7 will be the conclusion chapter. This chapter is built up into four parts. First, conclusions of the results will be made. Second, the method, data preparation and results will be discussed. Hereby also the implications and limitations of the paper will be discussed. Third, recommendations are drawn up for future research and fourth, a reflection of the overall study will be discussed.

Theoretical framework

2.   Theoretical framework

The main question of this research concerns the mental representations behind the purchase of repurposed cultural-historical buildings. To answer this main question, it is necessary to define a cultural-historical building. The definition will be the basis for the conducted research.

2.1   Cultural heritage

Cultural heritage is a facet considered important by many individuals. It is present everywhere in our society, it tells us where we come from, it shows us how we develop and it offers the opportunity to connect people *(Ministerie van Algemene Zaken, 2021a)*. Cultural heritage is passed on from generation to generation. As a result, heritage creates a common bond and a sense of belonging. John Feather defines the driving force between all heritage definitions as "a human creation intended to inform", *(2006)*. In a world where the global is becoming increasingly important and the national less and less, heritage offers recognition. UNESCO describes how world heritage must meet: "Outstanding Universal Value". In the operational guidelines for the implementation of the World Heritage Convention *(2019)*, this concept is further defined: "Outstanding Universal Value means cultural and/or natural significance" *(Operational Guidelines, 2021, Paragraph 49)*. Cultural heritage preserves people's identity and tells people something about their 'roots'. ICOMOS Netherlands *(2022)* is an association part of the international ICOMOS that is involved in the exchange of knowledge of cultural heritage. It acts as a lead advisory body for UNESCO World Heritage. Due to the importance and value that people attach to cultural heritage, several laws have been passed over the years.

In 1907, heritage was first included in international law *(Blake, 2000)*. In 1954, after the damage caused in the Second World War, The Hague Convention took place in which an agreement was signed for the protection of cultural heritage during armed conflicts. The Monuments Act, which was introduced in 1961, gave a monumental status to certain heritage buildings built before 1850. This meant that the so-called 'young architecture' from 1850-1940 was not protected and often disappeared by loss of function. During this period, the Netherlands had a lot of wealth due to the industrial revolution the Netherlands was in. Urbanization increased and multiple religious heritage objects in the form of monasteries were built during this time together with industrial heritage. In 1988 a new Monuments Act was passed, which laid down the decentralization of monument care. Something that later led to a lot of commentaries because, according to some, it has led to a greater demolition of culturally historic buildings. Municipalities were given the choice to designate buildings as municipal monuments, there was no age limit for this in contrast to national monuments.

The choice for designating municipal monuments lies with the municipality. Budget cuts within municipalities meant that in some cases monument conservation came to a standstill, which led to more vacancy and in some cases demolition *(Redactie, 2017)*. Beyond these problems, decentralization created another need.

The need was expressed for a wide-ranging national survey of younger architecture: Monuments Inventory Project (MIP). This research started in 1987 and was completed in 1990. The research was intended to increase the cultural-historical value of buildings from this period *(van der Hoeve et al., 1992)*. The investigation resulted in the 1850 boundary being changed to a minimum of 50 years. A building only had to be 50 years old to be designated as a national monument, after which another 90 buildings from the period 1959-1965 were designated as national monuments. In 2012, a proposal was made to completely abandon the 50-year limit. This is not yet the case *(Banning advocates, 2012)*. The appreciation given to cultural heritage in the form of monument status means that vacancy is converted into an increasing trend of repurposing and transformation.

There is no unambiguous definition of culturally historic buildings. It does appear that a culturally historic building is a building to which value is attached. It also appears that through a monumental status, buildings that are labelled as important can be protected. Nevertheless, we also see more and more buildings that are called 'worth preserving' and are for this reason repurposed, without these buildings having a monumental status. These buildings also fall under cultural heritage. Furthermore, in times of housing shortages, a building located on a large site will most likely be demolished (when vacant) to make way for large-scale construction. If this is not chosen and a building is repurposed, the building will most likely have a cultural-historical value (regardless of the lack of any monumental status). Within this research, a cultural-historical building will be defined as:

> *A building of regional or national importance that is that is considered worthy of preservation and can be protected through a monumental status.*

Due to the references made to monuments, it is important to properly define the term 'monument' and discuss the scale of its presence within

2.2 Monuments

The Netherlands has approximately 120,000 monuments to live or work in *(van der Lee, 2021)*. Some of these monuments are privately owned. In addition, it is possible that the government, municipality or for example, housing associations own a monument. Every owner has his reason why he/she owns the monument. Monuments are part of cultural objects and are intended to commemorate. It is a stability factor within the changing

environment. *(Horst et al, 2021)*. In the Netherlands, monuments are subdivided into four types: national monuments, provincial monuments, municipal monuments and protected cityscapes and village views.

2.2.1 Types of monuments

In December 2020, the Netherlands had 61,814 National Monuments *(Rijksdienst voor cultureel erfgoed, 2021)*. National monuments used to fall under the Monuments Act, which was appointed in 1961. However, in July 2016 the law has been transferred and split up as part of the Heritage Act and the Environment Act *(Wettenbank, 2016)*. A permit is required to modify, disrupt or demolish a national monument. Owning a national monument in contrast to a regular owner-occupied home/building can provide tax benefits. For example, a housing subsidy can be applied for within 2 months. A subsidy scheme for the conservation of monuments (Sim) can also be applied for national monuments that are not residential *(Rijksdienst voor het Cultureel Erfgoed, 2022)*.

Provincial monuments are only present in North Holland and Drenthe. In 2019, there were a total of 811 provincial monuments in the Netherlands, of which 804 were architectural *(Ministerie van Onderwijs, Cultuur en Wetenschap, 2020)*. In 2016, the Netherlands had 55,801 municipal monuments. The choice of whether a monument is a municipal monument is left to the municipality. The municipality can decide to put a 'special' building on the monument list. This may be the case if the building has no national value and importance, but is of local or regional importance. There is no national list of municipal monuments. These lists are available per municipality *(erfgoed brabant, 2017)*. At this moment there are 472, protected cityscapes and village views, within the Netherlands *(Ministerie van Onderwijs, Cultuur en Wetenschap, 2022)*. These views are all established before the Second World War and are not assigned to specific buildings on their own. The types of monuments can be further classified into fourteen categories *(CBS, 2022)*.

In North Brabant, there are only national monuments, municipal monuments and protected cityscapes and village views. The research will focus on repurposed religious heritage, industrial heritage and schools. Heritage categories of which many objects are located in North Brabant and many objects have been repurposed in the past 20 years. In addition, the focus is on repurposed (adaptive reuse) objects in which several residential units have been created together. Each type of heritage will be briefly explained together with the characteristics that are presumably considered important in (sales) brochures. The heritage types form the basis of the research. The data obtained from the various adaptive reuse projects will be used to create a general picture of a redevelopment project and to find out which questions need to be asked to define the characteristics of the cultural-historical buildings. Nevertheless, redevelopment projects are known to all have their own identity and therefore to be unique. As a result, the general picture that will be sketched is a combination of the many adaptive reuse projects. Per heritage type the commonly found characteristics will be discussed.

2.3   Religious heritage

The Netherlands has a rich history of religious heritage. Religious heritage includes places of worship, monasteries and chapels. The Netherlands has experienced secularization since the 1960s. The so-called 'baby boom' generation no longer took religion for granted. The aim was to create a more progressive society. This meant that religion started to play a less important role in society. Schools and churches in particular were no longer obvious linked to religion *(Erfgoed Brabant & Provincie Noord-Brabant, n.d.).*

For North Brabant, where the majority is Roman Catholic, this had a lot of influence, since religion used to be a determining factor in society. In 1960, 98% of the population in North Brabant was Catholic, compared to 61% in 2015 *(De Jong, 2012).* When religion started to play a less important role, vacancies arose in among other things, monasteries and churches. Brabant used to have almost 700 monasteries *(Huismans, 2022)* and many churches. Many of the monasteries in Brabant are no longer inhabited by the monastic community, but have lost their function over the years, or will lose their function in the next years. Since monasteries are often national or municipal monuments, they often underwent redevelopment. The same happened with churches. Here too, there has been a lot of repurposing, especially in the last 50 years.

A dataset has been created with several religious heritage complexes (Appendix A.2). These are churches, monasteries and chapels. Most religious heritage seems to have a monumental status. In addition, many (sales) brochures use authentic elements and the word 'character' as ways to describe the property. Table 1 shows a list of religious heritage property attributes mentioned in (sales) brochures/ advertisements.

2.4   Industrial heritage

The International Committee for the Conservation of the Industrial Heritage *(TICCIH, 2003)* defines industrial heritage as: *"the remains of industrial culture which are of historical, technological, social, architectural or scientific value."* The largest part of industrial heritage was built during (and after) the period of the industrial revolution. In the second half of the 19th century, the Netherlands experienced the Industrial Revolution. The industrial revolution started in the Netherlands in Maastricht (Limburg). From about 1850, other cities followed in the Netherlands.

The industrial revolution has different types of industries. In the case of Industrial Heritage, we often talk about lighter forms of industry. The textile industry was very large within cities in Brabant, such as Eindhoven and Tilburg and within the city of Enschede (Overijssel). Tanning was also very big in Brabant. At the end of the 19th century, the Netherlands had 550 tanneries. During the Second World War, the tanning industry flourished, since there was a large market for soldier boots *(Wols, 2011).*

In 1950, of the 163 tanneries that the Netherlands still had, 124 tanneries were located in Brabant. After this time the contraction increases rapidly. In 2006 only a few tanneries were still in use. Some tanneries are currently vacant for possible repurposing. Other tanneries have already been repurposed or they have been demolished.

Next, there are many industrial complexes in Eindhoven. As already explained, these complexes are often related to Philips. Many of these buildings have been repurposed over the years. Contrasting to other industrial complexes, they have slightly different characteristics, because of different architectural features.

A dataset has been created with several industrial heritage complexes (Appendix A.2.). Within industrial heritage multiple buildings without a monumental status have been transformed. An example is the paint factory in Oisterwijk and the Iron factory (Piushaven) in Tilburg. Since municipalities designate the municipal monument themselves, there seems to be a difference in the number of municipal monuments within a municipality. 's-Hertogenbosch seems to have more municipal monuments than municipalities in the central Brabant region (Appendix A.2.).

In contrast to religious and school heritage, larger changes have been made in industrial heritage transformations. Take as an example a carpet factory (Het Pattern) in Oss *(Kreule, 2020)*, a tannery (Stationsstraat 115) in Waalwijk and a cigar factory (Stationsstraat 121) in Waalwijk *(Allround makelaardij, 2022)*. Only part of the facade and structural elements from the roof seem to have been preserved. A list has been made with cultural-historical related industrial heritage property attributes in (sales) brochures/ advertisements (Table 1).

2.5   School heritage

There are currently many schools that are being repurposed. This may be because the old school buildings no longer meet the current requirements, or the student flow has decreased. In addition, it is possible that religious heritage has been transformed into a school building and has later been repurposed. To cite Mariaoord, in Vught and Kweekschool Concordia en H. Hartmulo in 's-Hertogenbosch as an example. Over the years it is expected that many more schools (built between 1800 and 1950) will become vacant and will potentially be redeveloped.

Schools less often have a monumental status, which also means that these buildings less often get redeveloped. School heritage can best be compared with religious heritage, due to the format of the heritage type. This is reflected in the attributes. Also within school heritage, common areas such as stairwells and corridors are mentioned as building-specific attributes. What is now specially mentioned concerning school heritage is terrazzo stairs and floors and the panelling of tiles. Furthermore, high

spaces/windows and in some cases stained glass was mentioned as well. In contrast to religious and industrial heritage, the grand history of the building often receives less attention. Within (sales) brochures the former function is often mentioned, but the impact or importance of the building is often left behind. Table 1 shows a list with optional cultural-historical property attributes, based on (sales) brochures/ advertisements Authentic structural elements

Table 1,
Attributes per type of heritage

Literature	Attribute
Religious heritage	
	Authentic structural elements *such as:* trusses, arches and/or wooden beams
	Characteristic windows *such as:* high windows, 'pack distribution' and/or stained glass
	Characteristic doors *such as: original wooden doors and panel doors*
(Restauratiefonds, 2022)	High ceilings
	Spacious stairways and hallways
	Old tiles
	Unique dwelling/ apartment with its own identity
	Rich history and the buildings tell/have a history
	Monumental status
	Allure
Industrial heritage	
	Authentic structural elements *such as:* trusses, arches and/or wooden/ concrete beams
	Characteristic windows *such as:* high windows and/or 'pack distribution'
(Gemeente Geldrop-Mierlo-Team Strategie en beleid, 2021; Restauratiefonds, 2022; TICCIH, 2003)	High ceilings
	ornamental (details), repative elements
	Unique dwelling/ apartment with its identity/ authenticity
	A rich history and the buildings tell/ have a history
	Monumental status
School heritage	
	Authentic structural elements *such as:* trusses, arches and/or wooden beams
	Characteristic windows *such as:* high windows, 'pack distribution' and/or stained glass
	Characteristic doors *such as: original wooden doors and panel doors*
(Restauratiefonds, 2022)	High ceilings
	Spacious stairways and hallways
	Old tiles
	Unique dwelling/ apartment with its own identity
	Rich history and the buildings tell/have a history
	Monumental status
	Allure

Literature study

3.   Literature study

Housing preferences and the choice to buy a house depend on many aspects. Besides the facets of the house and the environment, individual factors play an important role. First, the current owner-occupied housing market will be analysed. Every three years, the 'Ministerie van Binnenlandse Zaken en Koninkrijksrelaties' conducts a Woononderzoek Nederland (WoON survey). The latest published research concerns the year 2019. The publications provide insights into the age, income, nationality and household composition of both private owners and tenants of homes, within the Netherlands *(BZK, 2022)*. The information from the WoOn survey is combined with information received from literature studies. Then, an overview of the socio-demographic factors that may influence housing preferences will be created. These socio-demographic categories can be used to create a buyer profile. Ultimately, the attributes and underlying motives of real estate buyers for cultural-historical properties will be examined. The literature will show which attributes are potentially influencing a real estate purchase and will be included in the research.

3.1   Dutch real estate market

40.2% of the households in the Netherlands have an owner-occupied home. The average household income of a household having an owner-occupied home appears to be much higher than owners of rental properties. The figures provisionally published by Statistics Netherlands in 2020 show that the average household income of owners of owner-occupied homes within the Netherlands is €61,100 *(CBS, 2021b)*. This opposes the average household income of €28,200 for homeowners of rental properties. It is important to note that this concerns household income. The median personal income for 2020 was €34,000 *(CBS, 2021c)*. This average is also far above the average household income of €46,800, which brings together both homeowners of owner-occupied homes and rental properties. The preliminary figures for 2017 in the WoON-2018 survey confirm this large income difference *(Lijzenga et al., 2019)*. Commissioned by the Ministry of VROM and NEPROM, a picture was sketched of the housing consumer. It is confirmed that people with a higher income more often prefer buying over renting, especially people in their thirties *(Blijie et al., 2009)*.

The WoON-2018 research shows that most people in the Netherlands own an owner-occupied home, followed by people with a Western nationality. People with a non-western ethnicity have the lowest amount of owner-occupied dwellings, around 36% *(Lijzenga et al., 2019)*.

Existence, bequest and societal value play a role in the valuation of cultural heritage. The existence value, is the value people attach to heritage. The bequest value is how heritage influences future generations *(Klamer, 2013)* and the societal value is the value a community has with the building *(Bullen & Love, 2011)*. The existence value of national or municipal

monuments may differ for people with Dutch or non-Dutch nationality. This information might help with defining the target (interested) group. Nevertheless, ethnicity is a sensitive subject, which is why it was decided not to ask about this. Nevertheless, is important to check whether the history of the property indeed influences the purchase choice. For this reason, the property's history will be included as an attribute within this study, which may influence the purchase choice.

3.2   Socio-demographic characteristics

Socio-demographic characteristics have a major influence on the housing preferences of individuals and thus on the purchasing choices that individuals make. Housing characteristics such as age, gender, ethnicity, education, household composition and income were examined. This will show which socio-demographic characteristics should be included in the research. Socio-demographic characteristics are personal characteristics that tell something about the real estate customer.

Shawki *(2007)* conducted research into gender-related differences in housing preferences. The research shows that, in general, men and women have similar housing preferences. This contrasts with the research by Opoku et al., *(2010)* which showed how women generally attach more value to interior layout, private living space, aesthetics and exterior space (it should be noted that the research participation among women was much lower than among men (75 over 482), within this research). According to Shawki, the main difference lies in the motivation of housing preferences. According to the research of Shawki, women are more likely to make a decision based on emotion. Women often attach a higher value to a home and social network. Personal and family needs are often more important in the choices. The lifestyle in which she (the respondent) finds herself is often included in the choice. Men on the other hand appear to have more practical considerations in housing preferences.

Research frequently mentions how lifestyle aspects such as background, age, household composition and ethnicity are related to housing preferences *(Shawki, 2007)*. A study by Beamish et al. *(2001)* does this too by showing how lifestyle and housing needs are related. Housing choices seem to be influenced by the income and education people have. A higher level of education can lead to a higher income, which then again can lead to high demands. Furthermore, well-paid jobs, jobs for which a higher level of education is needed are often located in a limited amount of places. These are places around which higher educated people are often situated. Within Brabant, Breda, Eindhoven and 's-Hertogenbosch are clusters with on average more educated people (40% more)*(CBS, 2021a)*. These cities are also the places where adaptive reuse is done.

Housing choices change as we go through different stages of life and as the household composition changes *(van Ham et al., 2012)*. In younger years one can aim for a smaller apartment as this can give freedom and autonomy. Families with children more often chose to live in a larger house,

within a suburban neighbourhood. If the children move out, people often return to a smaller home near amenities that are in demand at that time. In addition, families with children and older people move less quickly. It has been decided to divide starters, families and older people within this literature review, to reflect the housing needs per age phase.

Starters

Research from Canada *(Crawford, 2013)*, supports the assumptions of Behamish et al. *(2001)*. The survey shows how location is seen as a top priority by 33% of millennials, defined as people born in the early 1980s and later. Commute time is within the location aspect seen as important by 46% of the surveyed millennials. As stated in the research by van Ham et al. *(2012)*, young singles often prefer living in and around city centres. This is supported by the research of Booi & Boterman, *(2021)*, showing how millennials are often located in urban areas.

Next, good access to restaurants, cafés and public communications is preferred as well *(van Ham et al., 2012)*. This is supported by the research of Currie *(2018)*, which shows how especially the social aspects of a neighbourhood are important for starters. Amenities nearby, open spaces and sidewalks, good contact with neighbours and a mixed neighbourhood turned out to be important.

Furthermore, the younger age groups (28-35), prefer good accessibility to schools and work *(van Ham et al., 2012)*. *(Kauko, 2006)*, agreed in his article with the importance of location. However, he points out the difference between Randstad (Netherlands) and Helsinki (Finland). While in Helsinki location is considered more important than dwelling characteristics, spaciousness and functionality appear to be experienced as important in the Randstad.

Hoekman (2019), conducted a study on the housing preferences of millennials. Here, location (16.3%), distance to a train station (13.6%) and distance to a highway (5.3%) were mentioned as important. Concerning housing characteristics, area (31.5%) and price (28.0%) were mentioned as important. A similar result was received by Kauko *(2006)*. Research shows how starters seem to have fewer requirements. Currie *(2018)* describes starter homes as often single-family houses or row houses with similar characteristics.

Nevertheless, Jansen *(2014)*, has found that starters are less likely to prefer new construction. The lack of character and lack of a 'unique' feel contribute to this. In the book reuse, redevelopment and design by Meurs and Steenhuijs *(2020)*, a comparable statement is made. It concludes that a fix-up house in an old city district is more in line with the housing needs of millennials than a 'spick-and-span' house in a new residential area. This however contradicts the findings by Dogge and Smeets *(2005)*. Dogge and Smeets, mention that low maintenance is often experienced as important. A fix-up

house does not seem to meet this need.

Nevertheless, (large-scale) redevelopment projects are often larger projects in which a Vereniging van Eigenaren (VvE) is involved after the sale. Major common maintenance is carried out by an external party, paid from the monthly contribution of the VvE.

Families

As described in the study by Booi et al, *(2021)*, there is no homogeneous group with young families. Among other things, income determines housing preferences *(Blijie et al., 2009; Booi et al., 2021)*. Families appear to find the space the most important choice variable and seem willing to give in to the location. Families (especially with young children) are more likely to choose suburban regions than the city *(Booi & Boterman, 2020)*. Furthermore, families with children seem to find the neighbourhood its reputation, safety, child-friendliness and access to schools, sports facilities and parks important *(van Ham et al., 2012)*.

For families, a distinction should be made between lower-income families and higher-income families. Blijie et al. show in their research how households in the top half of the market would like a detached house. Preference is more often given to 'extra' rooms for hobbies and this does not necessarily depend on the household size. Higher-income households can more often meet their preferred characteristics, a larger garden or living room is more often the decisive choice. In lower-income households with children, it appears that the size of the house is perceived as more important than, for example, a slightly better location. The number of desired rooms also appears to depend strongly on the family size. It also appears that the lack of a room is not compensated by a large living room or garden, as these do not appear to be strong choice factors *(Blijie et al., 2009)*. Moreover, proximity to amenities is seen as more important *(Blijie et al., 2009)*.

Besides housing aspects, the social aspect of a neighbourhood also appears to be important for families. Urban families often orient themselves in neighbourhoods with families they would like to belong to and among so-called peers, people with similar characteristics *(Karsten, 2007)*. Concerning facilities, it appears that families like to have facilities within cycling distance. Daily activities appear to be a decisive factor in the choice of location. Greenery in the area and good contact with neighbours are also experienced as important *(Blijie et al., 2009; Karsten, 2007)*.

Elderly

Elderly are often defined as 55+. Nevertheless, someone of 55+ can have different housing preferences than someone of 75+. Research by Blijie et al. *(2009)* shows that older people often want an apartment or want to stay in their current single-family home. When vitality decreases and the need for care increases, the desire

for apartments or bungalows appears to increase. From the age of 70-75, the dominant choice is apartments. The willingness to move also increases, however an emotional connection with the current home can slow down this process *(Blijie et al., 2009)*.

The research by Mulliner et al., *(2020)* also shows that as people age, the preference is more frequently for houses with an elevator or single-story houses. In addition, preference is given to adaptable homes, in which the adaptability of the bathroom is most important. Extra space in the house or garden is considered less important as someone gets older. Moreover, good housing conditions, energy efficiency, temperature and thermal comfort, security, good views and natural and artificial light are considered important.

Concerning environmental factors, environmental facilities appear to be the dominant factor. A home with a convenient location opposite amenities is preferred. *(Blijie et al., 2009)*. A study by Mulliner et al., *(2020)* examines the neighbourhood preferences of older adults. Here it is found that preference is given to housing in central locations. Neighbourhoods on the edge of the outskirts of cities are less desirable. With increasing age, there seems to be a decreasing preference for living close to public transport and forest land. However, there is an increasing preference for well-maintained footways, safe crossings, seatings, public toilets and greenery. The findings in the study by Mulliner et al. *(2020)*, are supported by the research of Meurs and Steenhuis *(2020)*. They indicate that older people like to move to a city, provided there is a safe feeling and care facilities are within reach.

To conclude, research shows that socio-demographic characteristics can have a large influence on housing and neighbourhood preferences. Gender, age, income, household composition and education will be included in the research (second column). These attributes can be used for profiling the respondent. In Table 1, the attributes above are further subdivided into attribute categories, to which respondents are asked to answer. This is shown in the third column.

Previously conducted literature articles supporting the importance of different socio-demographic attributes within housing choices have been added in the first column. This makes it easier to see which studies relate to which attributes.

For age, an age group is asked. This was needed for privacy reasons. Income and education can be categorized into low, middle and high. However, making this type of categorization could offend people. For income, the groups will be based on a certain percentage of the average private household income. This will be below 60% of this private household income, for the lowest income group and above 200% of the private household income, for the highest income group *(CBS, 2021b; Salverda & De Jong, 2017)*. For education, the different categories forming the low, middle and high-income groups are categorized in Table 2.

Table 2
Socio-demographic characteristics

Literature/ articles	Socio-demographic attributes	Attribute categories	
(Opoku & Abdul-Muhmin, 2010; Shawki, 2007)	Gender	Men	
		Women	
		Other: (For example Non-Binary)	
		No answer	
(Beamish et al., 2001; Booi & Boterman, 2020; Blijie et al., 2009; Crawford, 2013; Currie, 2018; Dogge & Smeets, 2005; Hoekman, 2019; Jansen, 2014; Kauko, 2006)	Age	Number	18-24
			25-44
			45-64
			65-79
			>80
(Beamish et al., 2001; Blijie et al., 2009)	Income *	(46,800*0.6)< € 28,080	Low
		€ 28,080 - € 46,800	Low – Middle
		€46,800 - € 93,600	Middle - High
		(46,800*2=)> € 93,600	High
		No answer	
	Family composition	Single without children	
		Single with children	
		With partner without children	
		Multi-person household without children	
		Family/ multi-person household with children	
		Other:	
		No answer	
	Family members	Number	
(Beamish et al., 2001; CBS, 2021a)	Education **	None	
		Elementary school (special education)	
		Lower vocational education or secondary special education	Low
		Vmbo or learning path support education (inclusive theoretical learning path)	
		Mavo	
		Havo	
		Pre-university education, gymnasium, athenaeum	Middle
		Mbo	
		Hbo	
		University, inclusive post graduate training, PHD education	High
		No answer	

*/** both the income levels and levels of education will be divided into low, middle (low-middle / middle-high) and high. This will not be presented to the respondents in this way as it may be perceived as offensive.

3.3 Real estate purchasing reasons

Several studies have been looked at to discover the possible attributes and underlying motives that play a role in the purchase of a residential product. The different studies have differentiated different categories, within which a list of attributes is drawn up. These attributes are the aspects on which the researchers thought customers might rate a residential product. These surveys with their categories will be used to create new categories that underlie property buyers' choices. These categories form the basis of the literature study and will be used as the final database in the research. A list of attributes will be drawn up for each category.

The different studies listed in Table 3 have been conducted with different research methods in different countries. Much of the research is based on quantitative research methods. This offers the possibility of including a large number of respondents in the survey, but the reasons why certain attributes are preferred by a respondent are not included in the survey. As the study by Rahadi et al. *(2013)* shows, it is also possible to measure the motivations behind a choice by using a qualitative study. As will be

Table 3
Research methods and categories for analysing customer's preferences

Literature/ articles	Categories	Research type	Country
(Rahadi et al., 2013)	Dwellers demographics	Quantitative research 2.5 months	Jakarta Metropolitan Regio
	Dwellers social economy		
	Neighbourhood environment		
	Neighbourhood dwelling		
	Building		
(Naderi et al., 2012)	Accessibility	Quantitative research (Likert scale) 2 months	Tehran
	Residential		
	Environmental		
	Financial		
(Adair et al., 1996)	Property	Quantitative research (Likert scale)	Belfast residential area
	Distance		
	Environmental		
	Financial		
	Quality		
(Rachmawati et al., 2019)	Price	Quantitative research (Likert scale)	Selangor, Malaysia
	Location		
	Promotion		
	Corporate Image		
	Location		
(Das & Nath Datta, 2020)	Price	Structured questionnaire (bipolar scale)	Kolkata, India
	Design Factor		
	Public Service		
	Security Factor		
	Luxury Factor		

explained in Chapter 4, the group of respondents that can be surveyed using this technique is rather limited. Therefore, a different research method is ultimately chosen. Chapter 4, Methodology will focus on this. Based on the research by Naderi et al. *(2012)* and the study by Adair et al. *(1996)*, the following re-established categories have been created, visible in table 4.

In the study of Naderi et al. *(2012),* five categories are distinguished. These five categories seem to be the most complete, allowing them to plausibly encompass all attributes on which a buyer can base his choice for a residential product. Nevertheless, two adaptations will be made. In the study by Adair et al. *(1996),* one of the categories is named property instead of building. This seems a more fitting name when including plot attributes, besides housing attributes. It has also been decided to remove the 'residential' category and partly merge it with 'environmental'. For the residential category, neighbourhood attributes are needed as average age, population density and social class. Neighbourhood attributes like these are unknown and could only be collected using a zip code. However, this reduces the anonymity of the research and can lead to a decrease in responses.

Table 4
New decision categories within the study

(Naderi et al., 2012)	New categories
Building	Property
Accessibility	Accessibility
Residential	
Environmental	Environmental
Financial	Financial

In conclusion, several studies were examined. Based on these studies, four categories have been drawn up. Within these four categories, a list of attributes that can influence the purchase will be created. These attributes are based on literature findings. The main aim of the research is to gain insight into attributes and underlying motives that are prefered when purchasing a cultural-historical building. Because the online-CNET method has been used, it is important to create a large list of attributes and underlying motives, since people may have different considerations for their residential purchase decision.

In the order of Table 4, Property, Accessibility, Environmental and Financial, the categories with their attributes will be discussed.

3.3.1 Property

In this research, property is defined as the house/ apartment and plot on which a house is standing. Only privately owned properties are taken into consideration. Different aspects are defining a property. Multiple studies have been performed to find the important purchasing decision attributes of real estate owners. In this research, a division will be made between cultural-historical attributes of the property and non-cultural historical attributes, since this study focuses on adaptive reuse buildings, which are buildings with cultural-historical characteristics. In chapter 2, Theoretical background, the type of heritage objects that will be explained is in focus. In addition to cultural-historical building attributes, several factors appear to play a role in the choice of a real estate product.

Non-cultural-historical property attributes

In the study by Blijie et al. *(2009)*, the number of rooms is mentioned as 'very important' in the purchase choice. For families from the middle and lower segments, the preference for the number of bedrooms depends on the family size. For families from the higher segment, extra rooms are more often preferred. The study by Adair et al. *(1996)* agrees with the importance of the number of bedrooms. It is within the fourth place of purchase motives among buyers with a significance at the 1% level.

Furthermore, the purchase includes living rooms and bathrooms as possible considerations. The number of bedrooms also appears to be an important factor in the study by Naderi et al. *(2012)*, with a score above 5 out of 6 (Likert scale). However, in this study, the score is not significant, which can mean that there are large differences in the score that people assign to the number of rooms. The number of bathrooms and living rooms is perceived as less important. It is, important that there is at least one bathroom *(Adair et al, 1996)*. However, within the dataset, there are no residential livings where there is no private bathroom. The dataset with possible addresses (Appendix B) also shows that few homes contain multiple living rooms or bathrooms. Therefore these attributes will not be included in the possible purchase motives.

House size is considered important in many studies. Blijie et al. *(2009)* show how people are willing to make concessions on the location to have a larger home. The study by Adair et al. *(1996)* shows that the size of a house is perceived as more important than the plot size. For semi-detached and detached dwellings, housing size is seen as the second most important attribute and for terraced houses, the importance of house size is ranked third. Furthermore, plot size appears to be more important for detached dwellings than for semi-detached dwellings. However, the results of the study by Adair et al. *(1996)* concerning house size are insignificant. Including these attributes in the research could yield new results.

In the Naderi et al. *(2012)* study only apartments are considered. So, no differentiation is made between the house size and the size of the plot (with outdoor space). This study does show how the plot size (which in this case is equal to the apartment size) is generally mentioned as the most important aspect and agrees in this way with the research by Blijie et al. *(2009).*

For redevelopment projects, housing size can be important. In connection with the monumental status, project developers are often tied to certain sizes. In many redevelopment projects, there are no discernible adaptations at the front of the buildings, while at the rear of many projects outdoor spaces have been created in the form of balconies or extra living space through dormer windows. Presumably because of the demand for it, which will yield in more saleable area and thus profit. Examples of relevant adaptations can be seen at Mariaoord (Vught) (Figure 2) and the Shoe factory (Dongen) (Appendix A.2).

The changes to the front are limited to restoration work. The view from the Glorieuxlaan has remained unchanged.

Figure 2,
Parc Glorieux 1982 vs 2020   *(van Leeuwen, c. 1982; Synchroon, c. 2022)*

The attribute plot size is not always applicable for redevelopment projects, since many projects (besides a terrace or balcony) do not contain any outdoor space. However, it is possible to take into account the types of outdoor space and to use this as a possible choice attribute. Within redevelopment projects, outdoor space is often communal. But there are exceptions as is often the case with churches and small-scale industrial heritage projects where sometimes a small garden has been created.

Concerning plot type, Blijie et al. *(2009)* describe how relative wealthier families more often prefer detached dwellings. Currie *(2018)* describes how starter homes, on the other hand, are often single-family, row houses. An economic reason is presumably decisive for these preferences. According to the study by Blijie et al.*(2009)*, older people often indicate how they prefer continuing to live in their current (one-family) home. When aged 70-75, there is a slight preference for apartments. Research by Naderi et al. *(2012)* shows how important plot type is perceived among buyers, with an attribute ranking of two. Adair et al. *(1996)*, distinguishes in the study between terraced houses, semi-detached houses and detached houses. Where plot type is not experienced as very important with terraced houses, it can be seen that for semi-detached houses, plot type already

plays a greater role and for detached houses, plot type is at rank four of the factors that have influenced the buyer in its purchase. There are no detected or semi-detached dwellings within the study. The largest part of the dataset concerns apartments (with 1-2 bedrooms). This suggests that the target group contains starters or older people without children or with children living away from home. In the larger cities, the apartments are well above the average housing price in the Netherlands (€ 428.000, first quartile 2022) *(NVM, 2022)*, which suggests that first-time buyers may not be able to afford this, so an older group may live in the complexes.

Parking is also an attribute that potentially influences people their purchase motives. In the dataset, many addresses appear to be located in the village/city cores. Locations where parking can be more difficult because many historic city centres were built before the introduction of cars. This leads to an increase in cruising costs (time lost by someone looking for a parking space) *(de Groote et al., 2018)*. The introduction of paid parking has reduced the cruising cost, but it has not resolved the problem. Spots where someone is allowed to park, with a parking permit can often be used by individuals who pay for this as well (paid parking).

However, many redevelopment locations appear to have a common parking area, where private parking facilities are often facilitated, or as the study by Adair et al. *(1996)* defines, 'onsite parking'. This offers the possibility to have (private) parking even in central locations, where parking can be more difficult. In more rural locations such as Sancta Monica and Klokkenberg, parking is probably not a problem at all. The question is whether parking is an aspect on which individuals base their purchases. Research by de Groote et al. *(2018)* shows that there is no significant effect of the introduction of paid parking and residential parking permits on housing prices. This could mean that parking facilities have little influence on purchasing choices. Nevertheless, parking will be included in the investigation as it is an advantage of many adaptive reuse projects.

Concerning the interior, several facets can be looked at. The cultural-historical characteristics will be explained in more detail shortly. In addition, maintenance of the interior and modernity appears to play a role. In the study of Adair et al. *(1996)* the modernity of different parts of the house are compared separately. These are the modernity of the bathroom, kitchen and modernity in general ('repair needed'). All these aspects are experienced as less important than the number of rooms, the size of the house/plot and the housing type, but all appear to have a significant influence on the purchase choice. Concerning adaptive reuse projects in many cases both the bathroom as well as kitchen are not older than 20 years, since many of the adaptive reuse projects have been transformed in the last 20 years.

In addition, the research by Rahadi et al. *(2013)* shows a significant effect between the purchase decision for an apartment and the quality of an

apartment. For many monuments, the maintenance is relatively high. Research conducted by the Restoration Fund *(2020)* shows how 53% of monument owners have been working on restoration in the past 5 years. In many cases, this was in the first two years after purchase. In addition, 92% of monument owners indicate that they have lost (extra) maintenance or restoration costs. Adaptive reuse projects, on the other hand, are a special part of cultural heritage. Adaptive reuse projects are often large projects in which the entire building is redeveloped by one party. This means that in many cases the building has already been modernized during the transformation and therefore, people have a ready-to-move home.

It is also mandatory for complexes with multiple residential units to be affiliated with the VvE, hereby the VvE is responsible for the common parts and maintenance of the property *(Ministerie van Algemene Zaken, 2021b)*. This means that the maintenance does not lie to one person. This can be a decisive factor for private individuals who do not want to do the maintenance themselves, but who still want to live in a characteristic building. The affiliation with the VvE affects the quality of the building and the financial burden of maintenance. However, not every VvE does its job equally well. A VvE can be active or dormant. In the second case, there are no meetings and the building is not properly maintained. Since 2018, a VvE is obliged to request a minimum amount of maintenance, to try to make dormant VvEs active and to prevent overdue maintenance *(Ministerie van Algemene Zaken, 2021b)*. Having an active Owners Association could contribute to the decision to buy a home. However, it is difficult to measure how active a VvE is.

Whether communal areas are well maintained is something that can be measured (known by the respondent) and can be an important choice factor. Communal maintenance often concerns facades, roofing and entrance areas and can play a major visual role in a purchase choice. However, the concept of 'good' remains subjective and will have to be taken into account in possible conclusions.

In apartment complexes, the presence of an elevator, the storey height of the apartment and the number of apartments in the building/per flour-storey are sometimes included as potential decision attributes when buying an apartment *(Das & Nath Datta, 2020; Naderi et al., 2012)*. For example, someone might want to live on an upper floor in order to not have upstairs neighbours (who can cause noise nuisance).

Nevertheless, in some of the adaptive reuse projects, there is no elevator. The floor height can play a negative role as well. Where the top floors of high-rise buildings often hold up more money, mainly penthouses such as in the light tower in Eindhoven, the opposite can apply for buildings without elevators. However, it is questionable to what extent attributes as these contribute to the research. In new construction, an elevator will probably always be installed.

Next, the number of apartments per floor and in total as well as the floor height are unknown. This could be requested, but when the time burden for the respondents to answer these questions is compared with the result that these questions yield and the conclusions that can be drawn from them, it does not seem worth it. Obtained results may differ greatly, which is why it has been decided not to include story height as well as the number of apartments in the building/ per storey in the questionnaire.

In addition, there are aspects such as the layout of the building and specific sustainability improvements that can play a role for real estate owners. Nevertheless, when using an anonymous questionnaire, no conclusions can be drawn from these aspects because the data is unknown and asking respondents for these data can again be experienced as a large burden and increase the possible dropout.

Elements such as house size, house type, number of bedrooms and parking facilities are elements that can be asked from respondents without causing them too much burden. These are also questions that can be answered using a single multiple-choice question or a numerical question. This is not the case for layout and specific sustainability provisions.

For redevelopment projects, sustainability can be a hard topic. Cultural resilience, which among other things determines the building's capacity for changes in function is determined by the building's ability to adapt to economic and sustainability requirements *(Holtorf, 2018)*. The costs for cultural heritage can be high, but through, for example, Owners' Associations, it is possible to cover general costs and maintenance after private ownership. It may be different for sustainability measures. Alterations to the building can be hard because of the monumental status. Many redevelopment projects show how the shell of the building, the facade with roofs and the structural elements on the inside have been preserved. Then various sustainability options are applied on the inside. As an example, a former church in Boxtel, project 'Sacre-Coeur'. Among other things, underfloor heating, ventilation with heat recovery, HR++ glass and heat-resistant glass have been applied in the field of sustainability to achieve the current sustainability goals *(de Groot, 2021)*. Since the majority of transformation projects have been transformed in the past 20 years, many of the projects score well on sustainability. A possible important factor for the real estate owner.

Table 5 shows an overview of the property attributes resulting from the literature review (column 1). These are also the attributes that will be included in the questionnaire (column 2). Together with the possible benefits/considerations that an individual can have and influence the living preference (column 3). The cultural-historical property characteristics are not yet included.

Table 5
Property attributs and benefits based on the literature research

Literature/ articles	Attributes	Benefits
(Adair et al., 1996; Blijie et al., 2009; Naderi et al., 2012)	House size	Need for more space; Need for less space; Less maintenance/ cleaning More room to move;
(Adair et al., 1996; Blijie et al., 2009; Currie, 2018; Naderi et al., 2012)	Outdoor space	Need for outside space; Less maintenance; Fresh air; Gardening
(Beamish et al., 2001; Blijie et al., 2009)	House type	Social contacts; Social control (safety); (Close to) amenities; Mobility reasons (for example no stairs)
(Adair et al., 1996 Blijie et al., 2009; Naderi et al., 2012)	Number of bedrooms (these include rooms that could be used as bedrooms but are now used for other purposes as work)	Extra space for work, leisure or clothing; Enough bedrooms for the number of family members (/residents)
(Adair et al., 1996)	On-site parking	Increase of mobility; Lower commuting time; Safety (against vandalism)
(Adair et al., 1996; Hamstra, 2020; Rahadi et al., 2013; Ministerie van Algemene Zaken, 2021b)	Modernity of the house (kitchen/ bathroom)	Practical; Hygiene; Aesthetics; Increase of housing value
(Ministerie van Algemene Zaken, 2021b)	Good maintenance of public spaces	Practical; Hygiene; Aesthetics; Increase of housing value
(Holtorf, 2018; de Groot, 2021)	Sustainability	Good indoor climate; Reduce maintenance; Reduce energy costs/ consumptions; Carbon footprint reduction
	Monumental status	Possibility to get subsidy for maintenance and restoration The permit process is often shorter than for monuments

Concerning house size, outdoor space, housing type, number of bedrooms and on-site parking, it is important to know which property attribute categories belong to the respondent's property. These aspects tell more about the preferred dwelling as well as the characteristics of a cultural-historical building. In table 6, column 3 the category attributes are shown.

Table 6
Property attribute categories based on literature research

Literature/ articles	Attributes	Attribute categories
(Adair et al., 1996; Blijie et al., 2009; Naderi et al., 2012)	House size	≤ 75 m²
		75 - 100 m²
		100 – 150 m²
		≥ 150 m²
		Unknown
(Adair et al., 1996; Blijie et al., 2009; Currie, 2018; Naderi et al., 2012)	Outdoor space	Balcony
		(Roof)terrace
		Private garden
		Public garden/ park
		Unknown
(Beamish et al., 2001; Blijie et al., 2009)	House type	Studio
		Loft
		Apartment
		Penthouse
		Dwelling
		City villa
		Unknown
(Adair et al., 1996; Blijie et al., 2009; Naderi et al., 2012)	Number of bedrooms/ hobby/ other 'extra' (recreational/ work) rooms	#
(Adair et al., 1996)	On-site parking	Yes
		No
	Monumental status	Yes
		No

Cultural-historical property attributes

From religious heritage, industrial heritage and school heritage, keywords have been drawn up, describing the cultural-historical building attributes gained important by the selling or developing party. The traditional way of construction (often coupled with good architectural quality) and uniqueness and character are mentioned as important attributes of homes. Uniqueness and character are concepts that are difficult to define and are defined within this study by distinguishing attributes mentioned in brochures.

In 2014, the Cultural Heritage Agency of the Netherlands published a report on the search for an integral cultural-historical valuation of material heritage *(Bleumink, 2014)*. Within the heritage building, a division was made between, among other things, the architecture and art-historical value, the cultural-historical value, situational and ensemble values, intactness, recognisability and rarity. Because all these valuation criteria can be distinguished within the individual objects, it was decided to split the valuation into the valuation of archaeological features (divided into

interior and exterior) and the valuation of the significance of the object. The meaning contains various facets such as the meaning of cultural history, function, image determination, etcetera.

Table 7 shows an overview of the cultural-historical building characteristics. The first column shows the attribute categories. An extra column has been created visualising some of the cultural-historical characters (column 2). Next, the third column will show the possible benefits of the attributes.

Many adaptive reuse projects are characterized on the inside by visible structural elements and high ceilings. Furthermore, during restorations, it has often been decided to retain certain old materials (in addition to structural elements) such as the old tiles/terrazzo floors in the arrival area or within the corridor structures. This seems to be the case, especially in school and religious heritage. Next, can be chosen to keep interior or exterior doors. Since interior doors often do not originally serve the purpose of a front door (which means they cannot be locked, are not sound-absorbing or meet (fire) safety requirements), the preservation of the interior doors is less common. For this reason, it was decided to include interior and exterior doors as possible purchase attributes within the survey. In addition, during a transformation, it is often chosen to retain ornaments, details and elements referring to the former function. For example, for religious heritage, this could be small elements such as religious signs and holy water containers.

Looking further at exterior elements, the type of windows within adaptive reuse projects are often large and have a grid division. In the past, the size of the window that could be made was a lot smaller, so to create a large window area, a grid division was necessary.

The ceiling height was also much higher resulting in the window heights being a lot higher as well. In addition, stained glass was used in many religious heritages (including school heritage), nevertheless, these are often replaced during transformations (presumably due to the limited incidence of light that comes through coloured glass). The research will show whether these large windows are highly valued or not experienced as important.

Subsequently, all heritage objects have their history, transformed, are unique and have their own identity. The importance and effect of the property on the environment and the respondent may have been important purchase reasons. Nevertheless, both elements are difficult to include in future development plans. The contemporary character and history of a property is something that has developed over the years and is difficult to adopt. However, a demonstrable value attached to these attributes would contribute to the argumentation to keep a streetscape unchanged and for example, to apply adaptations mainly to the rear, to keep people their memory value intact.
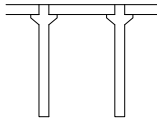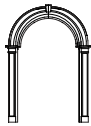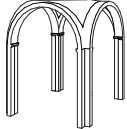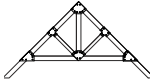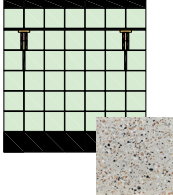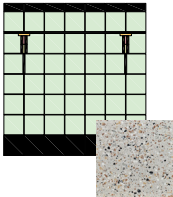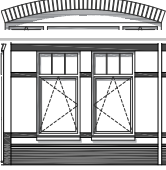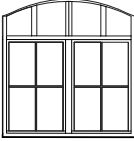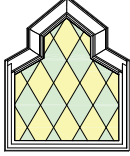
Table 7
Cultural-historical property attributes and benefits based on the literature research

Attributes	Benefits
Archeological features (interior)	
Ceiling height	Architecture
	Large incidence of light
	Open-layout
	Character
	Unique
Authentic structural building elements	Aesthetics
	Character
	Building quality
	Unqiue
Authentic materials as tiles and terrazzo floors	Aesthetics
	Character
	Unique
(Unique) entrance (hall)	Aesthetics
	Character
	Unique
(Reuse of) original interior/ exterior doors	Aesthetics
	Character
	Unique
Archeological features (exterior)	
Architectural elements	Aesthetics
	Identity
	Unique
	Character
Authentic windows	Aesthetics
	Large incidence of light
	Character
	open lay-out
	Unique
Valuation of significance of the object	
Unique home with its own identity	Aesthetics
	Identity
	Character
Rich history (for example a memory value or defining image)	Unique
	Identity
	Memorial value
	Status

Where, in Table 6, a choice has to be made in category attributes, this is not the case with cultural-historical attributes. A property can have multiple attributes within one category. As an example, there can be large size (and high) windows with a grid division together with stained glass windows, within one building. Furthermore, there can be multiple visible structural elements such as truss structures, wooded beams and columns. Table 8 shows the attribute categories, together with a visualisation of the attribute categories.

Table 8
Cultural-historical property attribute categories based on the literature research

Categories	Category attributes	
Archeological features (interior)		
Authentic structural building elements	Visibility of beams	
	Visibility of columns	
	Arches	
	Vaults	
	Trusses	
Authentic materials as tiles and terrazzo floors	Terrazzo or tiled floor	
	Old tiles on wall	
	Panelling of tiles	
(Unique) entrance (hall)	Spacious unique entrance hall	
	Wide corridor	
	Wide stairs	
	Terrazzo or tiled floor	
	Panelling (of tiles)	

Archeological features (exterior)		
Architectural elements	Wall anchors	
	Roller layers/ arches above windows and doors	
	Cementing	
	Façade decoration	
	Type of mortar joint	
	Laying bond	
Authentic windows	Large window dimensions	
	Rot division	
	Stained glass	

3.3.2 Accessibility

Accessibility is the ease with which a place can be reached. An individual (often) has a great diversity in activity patterns. There are activities to provide basic facilities such as health and food. These are the distance to shopping centres, supermarkets and shops. But also the distance to medical facilities such as pharmacies, dentists, doctors and hospitals. Next, there are activity patterns for daily activities such as distance to work and school. The distance to public transport, train stations, main roads and highways are part of this. Then there are recreational trips. These are the distance to friends and family, local amenities, recreational facilities and green.

Research shows how people their age and life stage result in different locational needs. Within locational aspects, commute time is seen as important by 46% of the surveyed millennials *(van Ham et al, 2012)*. The research by Hoekman *(2019)* shows how both the distance to train stations and highways are considered important by several people. Many young people find the social aspect of an environment important, distance to amenities and green must be limited. This is supported by the research of, van Ham et al., *(2012)* and Currie *(2018)*. They show that there is a preference for good access to restaurants, cafes and public

communication. Social contacts, in the form of contact with neighbours and a mixed neighbourhood, are experienced as important. The research by Ham et al. *(2012)* also shows that people in the age group (28-35) often prefer good accessibility to schools and work. This can be seen in the location choice of many young people. For example, life in and around cities is often preferred *(van Ham et al, 2012),(Booi & Butterman, 2021)*. For families, location is often a compromise point and is experienced as less important than the size of a house.

Access to schools, sports facilities and parks can be important *(van Ham et al, 2012)*. An American study showed how people are willing to pay more when their home is restricted with higher test scores. 2.1% more, for a 1% increase in test scores *(Black, 1999)*. Nevertheless, this is not comparable with the Netherlands, because here you can also send your child to another school. Only in large cities, there is a lottery system. Furthermore, greenery in the area and social contacts (contact with neighbours) can be considered important. Many families prefer facilities within cycling distance *(Blijie et al., 2009) (Karsten, 2007)*. Furthermore, families often prefer a home in a suburban region *(Booi & Boterman, 2020)*.

For older people, the distance to basic needs and greenery is important *(Blijie et al., 2009)*. That is why preference is often given to housing in central locations *(Mulliner et al., 2020)*. Living on the edge of outskirts or cities is less desirable. In addition, the need for living close to public transport and forest land also appears to decrease with age.

In conclusion, green is experienced important in the living environment for every age group. Age plays an important role concerning preferred distance from work and school. Distance to basic needs is important for every age group as well, only the preferred maximum distance varies per age group (from walking to cycling distance). As a result, the extent to which the category seems to have an influence differs per age group.

Many redevelopment projects are located in urban areas. This means that basic needs and distance to recreation are often close by. Public transport is also often a short distance away, which can, in particular, affect the distance to work. Table 9 shows the possible accessibility consideration categories in the choice of a real estate object. The first column shows the literature that supports the previously examined importance of the different categories. Column two shows the attributes and column 3 shows the possible benefits/ considerations, of the chosen attributes.

Table 9
Accessibility attributes and benefits based on literature research

Literature/ articles	Attributes	Benefits/ considerations
(Blijie et al., 2009; Karsten, 2007; Mulliner et al., 2020; van Ham et al., 2012)	Distance to basic needs (Shopping centres; supermarkets; shops; pharmacy; doctors; hospitals)	Less travel time; Less travel costs; More contacts; More experience
(Blijie et al., 2009; Currie, 2018; Karsten, 2007; Mulliner et al., 2020; van Ham et al., 2012)	Distance to recreation (Friends/ family; local amenities; recreational facilities; green)	Less travel time; Less travel costs; More contacts; More experience
(Currie, 2018; Hoekman, 2019)	Distance to work and school (Main roads/ highways; public transport; train stations; travel time to work; distance to school)	Less travel time; Less travel costs; Safety

3.3.3 Environmental

The environmental chapter focuses on possible environmental motivations for buying real estate objects. First, the possible negative externalities were examined. A person can choose to live in a neighbourhood not having certain negative externalities. In addition, there are characteristics and facilities that neighbourhoods can have. These characteristics and facilities could have been important motivations for buying the house/ apartment.

Negative externalities

Various studies show how house price is negatively influenced by external effects such as noise, pollution, air quality and safety. These negative externalities can influence real estate buyers buying choices. Research by Wilhelmsson *(2000)* shows how the house value for houses along a busy road is 30% lower. The commuting costs, on the other hand, are lower again, which then again has a positive effect on the house value. A similar negative impact on home values followed from a study by Boes, S. & S. Nüesch *(2011)*. However, this study looked at aircraft noise rather than traffic noise and thus did not benefit from lower commuting costs, which are the costs people need to find a parking spot. Concerning air quality, improved air quality only appears to affect house prices and therefore probably affects buying preference if there is a strong observable improvement *(Boes & Nüesch, 2011)*. This is probably not the case at the locations of the redevelopment projects. Safety is a general attribute that is taken as important. Nevertheless, in the study by van Ham et al. *(2012)*, it is specifically mentioned as a choice factor for families. For older people, security is experienced as important *(Mulliner et al., 2020)*, a comparable

attribute. Since the negative externalities are not the focus point of this research, it was decided to divide these externalities into two attribute categories.

- Pollution, which includes noise pollution, pollution of the environment and air
- Safety (feeling).

Neighbourhood characteristics/ facilities

According to research by Karsten *(2007)*, people like to be around people with similar characteristics. To cite an example the so-called 'yuppen districts' (young urban professionals). A district in which often young educated people settle at the beginning of their career. Nevertheless, neighbourhood information is unknown and can only be obtained through a zip code. Asking a respondent their zip code greatly reduces the anonymity of the survey, while the information gained is limited. However, it can be asked whether certain neighbourhood characteristics have played or would play a role in a purchase choice.

Important aspects can be the mix of functions, density and the type of houses in the area. Starters and older people seem to prefer living in a mixed neighbourhood, which means a variety of functions nearby *(Mulliner et al., 2020; van Ham et al., 2012)*. This could be due to the diversity of such neighbourhoods. An aspect that many redevelopment projects meet. This may contribute to more social contacts, which in turn can be a motivation for people to choose to live in a particular location. These neighbourhoods are often denser areas. The research of Lai et al. *(2021)*, also shows the negative externality of high-density areas. It shows how density can cause loneliness and social insulation. Furthermore higher densities seem to have a negative influence on the health of people *(Berghauser et al., 2020)*. Redevelopment projects are located in different locations (with different densities and a different mix of functions). There are redevelopment projects within the city ring (or in a village centre), where the density and mix of functions are relatively high. There are also several locations completely outside.

Nursery school Concordia and H. Hartmulo ('s-Hertogenbosch), Mariënburg ('s-Hertogenbosch) and the Lichttoren (Eindhoven), are locations in city centres. These locations are located in an area with a relatively high density. In addition, the mix of functions is very high due to the central location. Many cities have expanded from their city centres, which means the oldest and perhaps characteristic buildings are located in this area. All aspects potentially influencing an individual in his/her purchasing choice.

As for the locations outside the city ring, Sancta Monica (Esch), and Klokkenberg (Breda) can be mentioned as an example. In the case of

these larger locations outside the city ring, there is often talk of a general area transformation (besides the rezoning itself). These are locations with more green and a greater distance to facilities.

The research focuses on religious, industrial and school heritage. Much of this heritage is located on private or private-public land, originally segregated from unauthorized. During the redevelopment projects, regardless of the location and the density in which the repurposed building is located, there is often a shared site. Here, quite often collective space which can serve as a garden, park or terrace (green urban outdoor space) has been created. Furthermore, in many redevelopment projects, parking facilities are created, within the building site. This is described earlier under 'Property' characteristics. A possible important attribute for (future) real estate owners.

To give some examples:
- In the project NRE Twee (Eindhoven), the choice was made to facilitate room for companies next to the residential function. A jazz club and bicycle cafe are located on-site *(MAC architecten, n.d.)*.
- In the project Cenakel (Tilburg), the choice was made to create a communal garden with a private parking space on the property. Inside the former monastery, in addition to apartments, a meeting room with an exhibition and a room for music performances have been created *(Lemmens Makelaardij, 2022)*.
- In the project Geldersedam ('s-Hertogenbosch), it was decided to create a shared outdoor space (a communal garden), a popular choice when repurposing *(KilimanjaroWonen, n.d.)*.
- In the project Lichttoren (Eindhoven), the choice was made to combine working, a hotel function, recreation and residential. On the ground floor, a commercial area was created. Furthermore, parking is facilitated underneath the building *(BNA Onderzoek, ca. 2022)*.
- In the project Mariënburg ('s-Hertogenbosch), it was decided to turn the monastery gardens into a city park.

In conclusion, many redevelopment projects facilitate joint functions resulting in more social contacts. These are all potential attributes, which can be important within a residential choice. Table 10 shows the possible environmental (neighbourhood) consideration categories in the choice of a real estate object. The first column shows the literature that supports the previously examined importance of the different categories. Column two shows the attributes. The third column shows the considerations/ benefits (why a person could value an attribute).

Table 10
Environmental attributes and benefits based on the literature research

Literature/ articles	Categories	Benefits
(Wilhelmsson, 2000; Boes & Nüesch, 2011)	Level of pollution	Well-being/ happiness;
		Health
(van Ham et al., 2012; Mulliner et al., 2020)	Security (safety) within neighbourhood	Well-being/ happiness
		Kid friendliness;
		More social activities
(Berghauser Pont et al., 2020; Lai et al., 2021; Mulliner et al., 2020; van Ham et al., 2012)	Density within residential area	Well-being/ happiness;
		Health;
		Social contacts;
		Close distance to facilities
(Mulliner et al., 2020; van Ham et al., 2012)	Type of houses/ mix of functions in the neighbourhood	Well-being/ happiness;
		Social contacts;
		Diversity
(Blijie et al., 2009; Mulliner et al., 2020)	Green space in the neighbourhood	Well-being/ happiness;
		Health;
		Social contacts
	Common facilities	Mobility;
		Social contacts;
		Lower commuting time

For the (location) density and the facilities that are shared, specifications about the current living situation/ future preferences can be needed. Table 11 shows an overview of the attribute categories. For shared facilities,

Table 11
Environmental attribute categories based on the literature research

Literature/ articles	Categories	Category attributes
(Berghauser Pont et al., 2020; Lai et al., 2021; Mulliner et al., 2020; van Ham et al., 2012)	Density within residential area	City centre
		City(outside the ring)
		Suburb
		Town (>5000 inhabitants)
		Village
		Unknown
	Common facilities	Communal garden
		Communal parking
		Common entrance/ hallway
		Communal living room / meeting room
		Other

3.3.4 Financial

The price of a property determines for whom it is possible to buy the house and therefore plays an important role in the buying process. Many studies have shown the importance of price for a real estate customer. According to Harahap *(2018)* and Das & Nath Datta *(2020)*, price is the most important factor for customers in their purchase decision. The study by Rachmawati et al., *(2019)* and Naderi et al. *(2012)* confirm the importance of price, however, they see location attributes (Rachmawati et al.) and property aspects (Naderi et al.) as more important. The study by Rahadi et al., *(2013)* also recognizes the importance of the price of a house and in their research measure the attributes that influence the price of a house, from the perspective of the real estate developer.

House prices have risen by an average of 92% since their lowest point in 2013, (measured in February 2022)*(Frijters, 2022)*. Due to this increase, likely, current residents are not able to estimate the value of their homes properly. Information about the year when their house was bought and the price category when the house was bought will probably be better known. To conclude, almost every research concerning consumer real estate preferences included the importance of price, but it is important to take into account the year in which the property was purchased.

The interest rate, mortgage and price are separate elements, but all these elements are connected. The interest rate determines how much mortgage someone can get. The higher the interest rate, the lower the amount someone can borrow. Interest rates have fluctuated over the years but have generally fallen since 1980. The mortgage is the money that someone borrows from the bank to buy his property. The mortgage depends on the property price and the amount own money that someone uses for their property. It is chosen to include price as a consideration a mortgage and interest rate as benefits/ explanation.

Because the research focuses on cultural heritage, the value and financial advantages/disadvantages of cultural heritage have been examined. Research by the Vrije Universiteit Amsterdam *(2009)* shows that homeowners are willing to spend more money on their home when it is in the vicinity of a municipality with a lot of heritage. A similar result was provided by the study of van Duijn et al. *(2016)*. Through a difference-in-difference design in which houses were compared in two different periods, before and after the completion of the redevelopment, it followed that in the major cities a positive external effect is observed of the development of industrial heritage on real estate prices. Ahlfeldt and Maennig *(2010)* also found a direct effect of heritage on the home value of surrounding homes. Positive external effects on property prices within a distance of approximately 600 meters from landmarks were visible. This research was performed in Berlin, Germany. Franco and Macdonald *(2018)* came up with similar results with their research on the effect of cultural heritage

on residential property values in Lisbon. However, this research showed differences in the type of cultural heritage and its effects on property values. Landmark churches seem to have an insignificant effect on house prices. Non-landmark everyday churches yield negative effects. Palaces, lithic structures and historical buildings seem to positively influence residential property values. This may be explained by the aesthetic properties of these buildings.

Middendorp *(2017)*, performed research about the value of monuments themselves. She concluded that a listed status has a value-increasing effect on the transaction price of a home. The price increase for monumental buildings is slightly higher than for regular owner-occupied homes. This could ensure that the property is seen as an investment. Since the research aims to determine why individuals choose to buy a home in a repurposed cultural-historical building (instead of a non-cultural historical building) and buying can generally be seen as an investment, this is not a choice factor that will be given as an option. However, people can always enter this, when this is the case.

In addition, Private owners of national monuments can apply annually for a conservation subsidy *(RCE, 2022)*. This subsidy has replaced the former tax deduction (80% of the maintenance was deductible) for private owners of national monuments *(OrangeTax, 2015)*. This may outweigh the restrictions associated with a monument status for the owner of a monument. Because the transaction price of listed buildings is higher than regular homes, this can affect the stage of life in which someone buys such a home. For example, income could play a major role in combination with possible previous owner-occupied homes. Therefore, it is important to inquire whether the respondent or his/her partner has previously owned an owner-occupied home.

Attention has been paid to the disadvantages of buying monuments too. First, the selling time of listed buildings is on average 1.5 times longer than that of regular owner-occupied homes *(NVM, 2016)*.

Second, restoration can be seen as a disadvantage. Research conducted by the Restoration Fund *(2020)* indicates that 53% of the monument owners have been working on restoration in the past 5 years. In many cases (57%), this restoration took place in the first 2 years after purchase. Of the monument owners, between 66%-67% indicate that their monument is in good structural condition. 2-7% of the houses are in poor or moderate structural condition. In addition, many monument owners indicate that they want financial support in making their homes more sustainable (54%). Nearly all monument owners expect to invest in (extra) maintenance or restoration costs (92%). Where 5% did not answer and 3% answered with 'nothing' to the question about investments *(Hamstra and Slagter, 2020)*.

As discussed earlier, for many redevelopment projects, owners are affiliated with the VvE. This is automatically the case when a building is divided into,

for example, apartments. The VvE is responsible for the common parts and maintenance of the property *(Ministerie van Algemene Zaken, 2021b)*. This means there is a shared responsibility, which can be a decisive factor for private individuals who do not want to do the maintenance themselves, but who still want to live in a characteristic building. However, the extent of the VvE's activity will determine the quality and pace of maintenance. It has been decided to measure the maintenance of public spaces under 'property properties' instead of 'finance' in the survey.

Table 12 shows an overview of the attributes potentially influencing a residential purchase (column 2), based on the literature study (column one). The possible considerations a person has for finding an attribute important are shown in column three. Next table 13, shows additional information about the year of purchase, earlier purchases and the paid price/ willingness to pay price. These questions need to be asked to profile the real estate customer and the residential product.

Table 12
Financial attributes and benefits based on the literature research

Literature/ articles	Attributes	Benefits
(Adair et al., 1996; Ahlfeldt & Maennig, 2010; Beamish et al., 2001; Blijie et al., 2009; Currie, 2018; Franco & Macdonald, 2018; Naderi et al., 2012; van Duijn et al., 2016)	Price (when purchased/ willing to pay)	Mortgage Interest rate (Current) level of income
(OrangeTax, 2015; RCE, 2022)	Tax benefits / conservation subsidy	Fewer maintenance costs
(Hamstra and Slagter, 2020, Ministerie van Algemene Zaken, 2021b)	Maintenance by the Vereniging van Eigenaren (VvE)	Multi-year maintenance plan Less responsibility for maintenance Joint insurance

Table 13
Financial attribute categories based on the literature research

Literature/ articles	Categories	Category attributes
	First owner-occupied house/ apartment	Yes No
	Currently living in an owner-occupied house/ apartment	Yes No
	Year of purchase	# / Unknown
(Adair et al., 1996; Ahlfeldt & Maennig, 2010; Beamish et al., 2001; Blijie et al., 2009; Currie, 2018; Franco & Macdonald, 2018; Naderi et al., 2012; van Duijn et al., 2016)	Price (when purchased/ willing to pay)	<€345,000 €345,000 - €460,000 >€460,000 Unknown / I don't want to answer this

In conclusion, several studies were examined to create a list of possible attributes influencing people their real estate choice and attributes needed to create a picture of the real estate owner and the type of house they are interested in. The attributes are divided into four categories. The attributes found in the different studies form the basis of the research that will be carried out. The next chapter will explain the methodology.

Methodology

4.   Methodology

This chapter presents the methodology of this research. First, the research method will be explained, then the data gathering process will be discussed.

4.1   Research method

Mental representation model

This research aims to find the aspects of cultural-historical buildings that are experienced as important when buying a transformed cultural-historical building/apartment. According to the research by Horeni et al. (2014), two types of choice behaviour can be distinguished, impulsive and conscious decision-making. In the case of purchase motives for a home, it is about conscious decision-making. This is where the concept of mental representations (MR) comes in, introduced by Johnson-Laird *(1983)*. A simplified picture of reality is envisioned since, due to the limitation of the working memory only the relevant information will be recorded.

A mental representation model visualizes which attributes a decision maker assesses choice alternatives on and concerning which benefits. In the case of this study, there is one decision variable for the decision makers (D), depending on the sample as described later on in this chapter (stated and revealed preferences). This is the decision for the current cultural-historical building in which people live (revealed sample group) or the decision for a future home (stated sample group). The mental representation model will visualize on which attributes (A) this decision is based. In addition, it will be examined which advantages (B) this decision yields (Figure 3) *(Myers, 1976)*. The concrete characteristics of the decision made are displayed as the attributes in the mental representation model. The benefits conceptualize a person their needs concerning the decision made. Benefits are abstract concepts, unlike attributes they cannot be measured physically.
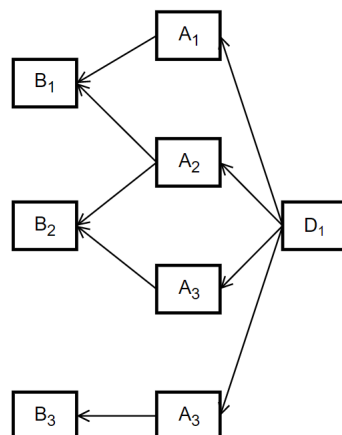
Figure 3
Schematic example of a mental representation, based on the model by Arentze et al. *(2014).*

These mental representations will be determined from an online CNET interview that will be conducted. The explanation about this and the choice for this technique will follow later in this chapter. Before the interview will be conducted, a literature review was conducted. From this, a list has been drawn up of socio-demographic, building/location characteristics and possible important attributes and benefits. This list and the interview procedure are explained under the heading questionnaire setup and will be discussed further.

Quantitative research method

Although the online-CNET method will be used to map the mental representations of (possible) homeowners for cultural-historical buildings, there are several other research methods. A frequently used method for mainly mapping the purchasing motives is laddering. It focuses on the physical attributes.

In laddering, hard and soft laddering can be distinguished. Hard laddering (HL) *(Russell et al., 2004)* is often used as an online quantitative research method, with the advantage of the larger sample size that can be included in the research. A disadvantage is that the possible components that can influence the choice of the respondent are shown in advance *(Horeni et al., 2014)*. As a result, a possible spontaneous reaction can disappear and the response of the respondent can be influenced. In addition, other components that may have played a role can be missed in the study. A possible risk because in the case of heritage characteristics, characteristics can be difficult to define. Soft laddering (SL), has been used more often as a qualitative research method. It uses face-to-face interviews. It often produces spontaneous reactions, but there is a chance that certain considerations will not be taken and the interview duration is relatively long (55 minutes) *(Dellaert et al. (2008)*. Russell et al. *(2004)* describe how soft laddering is better at making connections between abstract elements in the causal network. In contrast, hard laddering more often results in more ladders.

For this reason, some researchers combine both studies by first performing soft laddering and using the obtained attributes to structure the hard laddering interviews *(Moghimi et al., 2016)*. Nevertheless, as described, laddering mainly focuses on the means-end chain. Therefore, the need was seen to develop a new technique, focused on visualising mental representations. For this, the knowledge obtained from the laddering techniques was used.

Arentze et al. *(2008)* developed a method called the Causal Network Elicitation Technique (CNET), for measuring mental representations of decision problems. Originally, this was developed as a face-to-face interview technique. This gives the same disadvantages as soft laddering. In particular, the relative long interview duration of an offline CNET (55

minutes) *(Dellaert et al, 2008)*, is seen as a major disadvantage of this method as well. As there are a limited number of redevelopment projects in Noord-Brabant, finding respondents willing to spend this much time for an interview can be hard.

To map the larger target group and decrease the interview duration, it was decided to conduct a quantitative study. Since, relatively little research has been done into the valuation of heritage objects, distinguishing heritage characteristics can be difficult. As described within the method of hard laddering, the possible lack of a spontaneous reactive and the possible missing of important attributes is a pitfall here. Both odds can lead to a bias that leads to incorrect conclusions.

These reasons led to the development of a relatively new method an online version of the face-to-face CNET interview *(Arentze et al. (2008)*, explored by Horeni et al. *(2008)*, which uses an online large-scale open-ended CNET approach.

Online CNET survey

The research will be conducted in the form of an online CNET survey. Online CNET allows interviews to be conducted on a large scale (the advantages of a quantitative study), with minimal interviewer impact. The surveyed data is automatically available digitally. In addition, the time required for the respondents to complete the interview appears to be much lower (one-third of the face-to-face CNET interview) *(Horeni et al., 2010)*, which increases the chance of starting the survey and completing the survey. An online CNET interview is a semi-structured interview. The online CNET survey that will be conducted sits between the association pattern technique (APT) and the original online CNET survey in structure. Both will be explained below.

APT is a quantitative online tool in which respondents are presented with a list of revealed attributes, consequences and values *(Ter Hofstede et al., 1998)*. The APT consists of two matrices, one for the attributes and one for the consequences and values. Causal links are indicated by respondents checking cells. As with hard laddering, the respondent's freedom of reaction is limited. Nevertheless, an advantage is the large scale on which the research can be conducted.

The original online CNET survey is a quantitative research tool in which respondents are confronted with open input fields in which considerations can be noted instead of being presented with a list of attributes. The survey works with a recognition algorithm in which a follow-up question depends on the completed answer. This means that no question will be shown in case of spelling mistakes or other answers. Or the respondent will again be asked to type an answer, but this can be seen as a burden.

To overcome the above drawbacks, a variation of the standard online CNET interview was chosen, one that has aspects of the APT method. First,

open-format questions will be asked to retrieve the important attributes. One of the discussed drawbacks of face-to-face is that possible important attributes are not mentioned because they are simply not thought of. This has also been taken into account.

After the spontaneous response has been requested and attributes have been entered, the respondents are asked to mark the attributes that are experienced as important. This list of attributes that could be marked and is based on the literature study is listed in Table 14. All to minimize the interviewer's impact and prevent a possible follow-up question not to show up, due to no matches. It is stated here that these may also be attributes that are not considered, as will explain in the 'questionnaire setup'. The attributes previously written in the open format questions are shown. In this way, the respondent can see what he/she has previously answered.

Next, based on the marked attributes, a list of benefits will be shown. Because the mental model tries to visualize a person's needs concerning the choice made. For each previously marked attribute by that respondent, the respondent will be shown a list of benefits (Table 17). The respondent will be asked to mark per attribute the benefits that have played/would play a role in the purchase of a cultural-historical building (with the option for own input). This is discussed in more detail in the questionnaire setup.

Questionair setup

To perform the research an online survey tool will be used, which will be Limesurvey. This online tool offers the possibility to apply piping variables and question/answer conditions. This means that the answers given to a previous question can be applied to a follow-up question. To give an example:

> One respondent indicated that the height of the ceiling was important. A follow-up question can apply this and include this previously answered answer in its question: Why is the ceiling height important to you?

In addition, survey results can be exported, which aids in the analysis and data preparation phase. This also makes it easier to share results with future researchers. Appendix A.1 shows a summarized example of the questionnaire. The questions represented within Appendix A.1 will focus on the questions asked to the revealed sample group. The questions for both sample groups are formulated in the same way. The difference is whether the sale has already been made, or whether there is talk of a hypothetical situation. The online CNET survey will be performed according to certain steps. At each step, it will be explained which questions were presented to the respondents. The respondents will first receive a call to complete the online survey in the letterbox or via email. On this letter or email, a link/ QR (Quick Response)-code will be placed, which will direct the respondents to the questionnaire.

Step 1: The CNET survey will start with an introduction, which is in the form of a welcome message (Appendix A.1, Step1). After the welcome message, the respondents are asked for permission to use the data. It is mandatory to fill this in. If a respondent does not give permission, the questionnaire will be terminated (Appendix A.1, Step1). Next, the respondent will be asked how he/she received the questionnaire. Depending on these questions, the rest of the questions will be presented. There will be two options: it can concern the previously made purchase choice ("I did receive this invitation letter by post. This means I am currently living in a transformed cultural historical building") or the questions will be about a hypothetical future purchase choice ("I did receive the invitation letter since I am subscribed to the KilimanjaroWonen newsletter").

Step 2: The respondent will be asked to answer some personal questions (socio-demographic questions). The socio-demographic attributes that will be asked for arose from the literature review that was conducted earlier (Table 2). Questions about income and current living situation are asked later on in the questionnaire. For each question group, a brief explanation is given as to why the question was asked. To show the respondents the importance of asking the questions. Tables 14 shows all socio-demographic attributes and attribute categories in the survey. The respondents are asked to mark the attribute categories that apply per attribute. All questions except for the number of family members are closed questions.

Table 14
Socio-demographic characteristics within the questionnaire (1)

Socio- demographic attributes	Attribute categories	(recoded)
Gender	Men	
	Women	
	Other: (For example Non-Binary)	
	No answer	
Age	Number	18-24
		25-44
		45-64
		65-79
		>80
Family composition	Single without children	
	Single with children	
	With partner without children	
	Multi-person household without children	
	Family/ multi-person household with children	
	Other:	
	No answer	
Family members	Number	

Education **	None	
	Elementary school (special education)	
	Lower vocational education or secondary special education	Low
	Vmbo or learning path support education (inclusive theoretical learning path)	
	Mavo	
	Havo	
	Pre-university education, gymnasium, athenaeum	Middle
	Mbo	
	Hbo	
	University, inclusive post graduate training, PHD education	High
	No answer	

Step 3: The respondent is asked to create an open list of attributes (with a maximum of eight) which will be important for their future residential purchase (stated group) or have been important within their last residential purchase (revealed group). This is to gain a spontaneous reaction (open-ended CNET).

Step 4: The respondent is asked to mark the attributes matching the attributes filled in earlier and to mark potential other attributes, they now see, but did not think of. The list with attributes will this time be created by the interviewer based on earlier literature research. A maximum of 12 attributes could be marked (closed-ended CNET). Table 15 shows the possible purchasing decision attributes. If a respondent will indicate that he considers structural elements, authentic structural materials, entrance hall, (characteristic) windows or exterior elements to be important, more specifications will be requested about the elements present in the building/home. Table 16 shows the list of attribute categories presented to respondents, in case one of the attributes was marked. Several attribute categories can be present within a building. The respondent is asked to mark everything that is present/has a preference within their (preferred) building. This table is a summary of Table 7.

Table 15
Purchasing decision attributes

Property characteristics	Accessibility
Surface of the house	Distance to basic needs (such as shopping malls, supermarkets, shops, pharmacy, doctors, hospitals)
Outdoor space	Distance to recreation (as friends/family, local amenities, recreational facilities, greenery)
Housing type	Distance to work and school (such as main roads/highways, public transport, train stations, travel time to work, distance to school)
Number of bedrooms	*Neighbourhood/ location*
Parking on-site	(low) level of pollution
Modernity of the house (kitchen/bathroom etc.)	Security (safety) in the neighbourhood
Good maintenance of public space	Density within residential area
Sustainability of the property	Type of housing/ functional mix in the neighbourhood
Monumental status	Green space nearby
Authentic building elements	Common facilities in and around the property (for example: communal garden, communal parking, communal entrance/ corridor, communal living/meeting room)
Ceiling height	*Financial*
Use/ preservation nof authentic materials as tiles and terrazzo floors	Price
(Unique) entrance (hall)	Tax benefit/maintenance subsidy
(Reuse of) orginal interior/ exterior doors	
Preservation of details, ornaments and elements referring to the former function	
(Characteristic) windows	
Unique home with its own identity	
Rich history (for example a memory value or defining image)	

Table 16
Cultural-historical property attribute categories

Categories	Category attributes
Archeological features (interior)	
Authentic structural building elements	Visibility of beams
	Visibility of columns
	Arches
	Vaults
	Trusses
Authentic materials as tiles and terrazzo floors	Terrazzo or tiled floor
	Old tiles on wall
	Panelling of tiles
(Unique) entrance (hall)	Spacious unique entrance hall
	Wide corridor
	Wide stairs
	Terrazzo or tiled floor
	Panelling (of tiles)
Archeological features (exterior)	
(Architectural) exterior elements	Wall anchors
	Roller layers/ arches above windows and doors
	Cementing
	Façade decoration
	Type of mortar joint
	Laying bond
Authentic (characteristic) windows	Large window dimensions
	Rot division
	Stained glass

Step 5: The respondent will be asked to order the marked attributes based on how important they find them. This order will be used to give a weight to the attributes, as will be explained in the chapter results.

Step 6: The underlying benefits are determined, by asking all respondents for each of their marked attributes the question: *"Why is this attribute important to you?"* The option is always given to mention three considerations/ benefits, besides the ones given.

Table 17 shows the benefits per purchasing decision attribute. The option 'other' are not shown in this table, but they were included in the questionnaire.

Table 17
Attribute benefits

Attribute categories	Possible benefits
Property characteristics	
Surface of the house	Need for more space
	Need for less space
	Less maintenance/ cleaning
	More room to move
Outdoor space	Need for outside space
	Less maintenance/ cleaning
	Fresh air
	Gardening
Housing type	Social contacts
	Social control (safety)
	(Close to) amenities
	Mobility reasons (for example no stairs)
Number of bedrooms	Extra work/ hobby space (work, leisure and/or clothing)
	Enough bedrooms for the number of family members (/ residents)
Parking on-site	Mobility reasons (possible increase)
	Lower commuting time (time needed to park your car and search for a parking spot)
	Safety (against vandalism)
Modernity of the house (kitchen/bathroom etc.)	Practical
	Aesthetics
	Increase of housing value
Good maintenance of public space	No nuisance

Good maintenance of public space	No nuisance
	Hygiene
	Aesthetics
	Increase of housing value
	Less responsibility for maintenance
	Multi-year maintenance plan
	Joint insurance
Sustainability of the property	Good indoor climate
	Reduce maintenance
	Reduce energy consumption/ costs
	Reduction of carbon footprint
Monumental status	Possibility to get subsidy for maintance and restoration
	The permit process is often shorter for non-monuments
Authentic building elements	Aesthetics
	Unique
	Building quality
	Character
Ceiling height	Aesthetics
	Unique
	Character
	Large incidence of light
	Open layout
Use/ preservation nof authentic materials as tiles and terrazzo floors	Aesthetics
	Character
	Unique
(Unique) entrance (hall)	Aesthetics
	Character
	Unique
(Reuse of) orginal interior/ exterior doors	Aesthetics
	Unique
	Character
Preservation of details, ornaments and elements referring to the former function	Aesthetics
	Character
	Unique
(Characteristic) windows	Aesthetics
	Unique
	Character
	Large incidence of light
	Open layout

Unique home with its own identity	Aesthetics
	Identity
	Charcter
Rich history (for example a memory value or defining image)	Unique
	Identity
	Memory value
	Status

Accessibility	
Distance to basic needs (such as shopping malls, supermarkets, shops, pharmacy, doctors, hospitals)	Less travel time
	Less travel costs
	More contacts
	More experiences
Distance to recreation (as friends/family, local amenities, recreational facilities, greenery)	Less travel time
	Less travel costs
	More contacts
	More experiences
Distance to work and school (such as main roads/highways, public transport, train stations, travel time to work, distance to school)	Less travel time
	Less travel costs
	Safety

Neighbourhood/ location	
(low) level of pollution	Well-being/ happiness
	Health
Security (safety) in the neighbourhood	Well-being/ happiness
	Kid friendliness
	More social activities
Density within residential area	Well-being/ happiness
	Health
	Social contacts
	Close distance to facilities
Type of housing/ functional mix in the neighbourhood	Well-being/ happiness
	Social contacts
	Diversity
Green space nearby	Well-being/ happiness
	Health
	Social contacts

Common facilities in and around the property (for example: communal garden, communal parking, communal entrance/corridor, communal living/ meeting room)	Mobility
	Social contacts
	Lower commuting time (time needed to park your car and search for a parking spot)
Financial	
Price	Morttgage
	Interest rate
	(Current) level of income
Tax benefit/maintenance subsidy	Less maintenance costs

Step 7: The respondent will be asked to fill in information about their current housing characteristics and income. This information will be used to define the characteristics of a cultural-historical building. These characteristics are based on earlier performed literature research. The respondents will be asked to mark the attribute category that is applicable or preferred (Tables 18 and 19).

Table 18
Additional information requested concerning the property

Attributes	Attribute categories
House size	≤ 75 m^2
	75 - 100 m^2
	100 – 150 m^2
	≥ 150 m^2
	Unknown
Outdoor space	Balcony
	(Roof)terrace
	Private garden
	Public garden/ park
	Unknown
House type	Studio
	Loft
	Apartment
	Penthouse
	Dwelling
	City villa
	Unknown
Number of bedrooms/ hobby/ other 'extra' (recreational/ work) rooms	#
On-site parking	Yes
	No

Monumental status	Yes
	No
Type of heritage	Religious heritage
	Industrial heritage
	School heritage
Density within residential area	City centre
	City(outside the ring)
	Suburb
	Town (>5000 inhabitants)
	Village
	Unknown
Common facilities	Communal garden
	Communal parking
	Common entrance/ hallway
	Communal living room / meeting room
	Other
First owner-occupied house/ apartment	Yes
	No
Currently living in an owner-occupied house/ apartment	Yes
	No
Year of purchase	# / Unknown
Price (when purchased/ willing to pay)	<€345,000
	€345,000 - €460,000
	>€460,000
	Unknown / I don't want to answer this

Table 19
Socio-demographic characteristics within the questionnaire (2)

Socio- demographic attributes	Attribute categories	(Recoded)
Income *	(46,800*0.6)< € 28,080	Low
	€ 28,080 - € 46,800	Low – Middle
	€46,800 - € 93,600	Middle - High
	(46,800*2=)> € 93,600	High
	No answer	

Stated and Revealed preferences

The survey consists of two samples, a stated sample group and a revealed sample group. The mental representations of the stated group will follow from the reaction of the respondents who subscribed to the KilimanjaroWonen newsletter and are possibly interested in buying a cultural-historical building. The mental representations of the revealed group will follow from respondents living in cultural historical buildings and will show the attributes and reasons behind the attributes (benefits) these respondents had for buying their property.

4.2   Data gathering process

The process of data gathering will be described, starting with explaining how and where the data will be gathered.

Selection of regions

The dataset of addresses of private property owners has been obtained from a combination of several sources. For practical reasons (distributing questionnaires) and theoretical reasons (different demographic characteristics between cities/towns and villages), the focus will be placed on three regions within the province of Noord-Brabant. For the research to be successful it is necessary to have enough respondents and therefore enough transformed heritage sites. For this reason, it has been decided to include large projects around the three regions in the study as well. The three regions concern: North-East Brabant ('Noord-Oost Brabant), Central Brabant ('hart van Brabant') and Eindhoven ('stedelijk gebied Eindhoven') (Figure 4).

Within these regions redeveloped cultural heritage buildings, with a monumental status and redeveloped cultural heritage buildings without a monumental status have been systematically selected (Appendix A.2). The transformed complexes have been selected based on their former (religious, industrial or school) function.
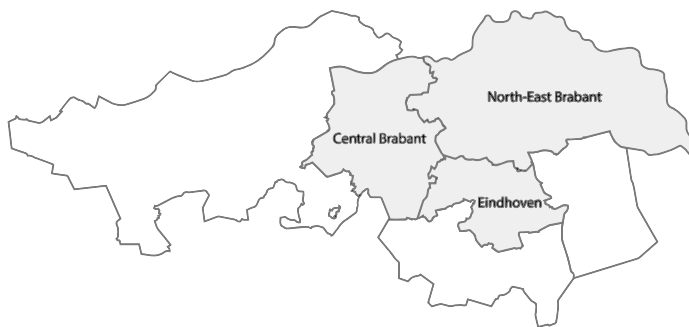
Figure 4
Research areas

Selection of transformed cultural heritage (revealed choices)

Within (and close to) the three regions (Figure 4), several cultural-historical buildings have been selected that currently facilitate apartments/ dwellings and were used to facilitate a religious, industrial or school function (Appendix A.2). A five-step systematic approach was taken by selecting properties per municipality within the regions concerned.

1 The Brabant Historical Information Centre (BHIC) archive
Used to gain information about the religious heritage and industrial heritage within Noord-Brabant. All monasteries, chapels, brother houses and rectories are listed per municipality.

2 Herbestemming.nu
Used to find larger redevelopment projects. These include projects with a monumental and non-monumental status.
For example: KVL terrain, Oisterwijk; Klokkenberg, Breda; Mariënburg, 's-Hertogenbosch; Leerlooierij Driessen, Dongen and Lichttoren, Eindhoven)

3 Monument list per municipality (municipal/ national monuments)
A list of the national and municipal monuments can be found per municipality (Appendix A.2, Table A1). These lists have been filtered by words such as '*voormalig*' (former), to recognize redevelopment projects. Since redevelopment projects were not always indicated in this way, sometimes extra research was needed.

4 Additional research within the larger industrial cities/ towns
This included memorandums and newspaper articles. Take Dongen as an example. The Municipality of Dongen drew up a cultural heritage memorandum in 2016. This memorandum gave a clear overview of the redevelopment projects within the municipality.

5 Funda
Used to find redevelopment projects and receive information whether a complex has rental or owner-occupied dwellings/ apartments.

Detailed information on the locations and type of heritage after which the survey has been sent can be found in Appendix A.2.

Selection of potential buyers of cultural heritage (stated)

The part of the survey testing the stated preferences has been distributed among subscribers of the KilimanjaroWonen newsletter. KilimanjaroWonen focuses on unique small-scale residential projects. KilimanjaroWonen uses the Collective Private Commissioning (CPO), development form. The group of private individuals who are going to buy the house influence the final realized houses/apartments. Within the projects, contact with residents is important, since some facilities will be shared.

The principles on which KilimanjaroWonen is based are in line with the principles of many redevelopment projects. As previously explained in Chapter 3, many redevelopment projects have shared spaces/facilities. Among other things, communal outdoor space (city garden/park/ vegetable garden), parking facilities, entrance hall and in some cases a living space (which can be used as a meeting room/common space) can be shared. All selected projects are located in a complex where three or more residential units have been created after the transformation. This makes the principle with which KilimanjaroWonen works applicable to many redevelopment projects.

The research focuses on culturally historic buildings. The project portfolio of KilimanjaroWonen not only includes culturally historic buildings but already multiple projects with these types of buildings are done. To cite: NRE Twee (Eindhoven), De Schrijver (Eindhoven) and Geldersedam ('s-Hertogenbosch). For this reason, it is assumed that buildings with

a cultural-historical value may be valued by members subscribed to the KilimanjaroWonen newsletter and the stated preferences will be determined by this group of subscribers.

Distribution of the questionnaires

The questionnaires for the revealed sample group have been distributed within a timeframe of eight days (A.3). A question for completing the questionnaire has been put in the mailbox at 800-900 addresses. The letter contained an introduction to the study with a personal photo (Appendix A.3). Research by Horeni et al., *(2010)* showed a low response rate as a possible risk for online-CNET research. Possible reasons given were the fact that people were not encouraged to complete the questionnaire. The invitation lacked personal contact with the researcher (where a personal photo and description could help). Also, without the addition of the TUE logo, the questionnaire may not be considered reliable. Finally manually entering the survey website can be experienced as a burden. Within the conducted research, an attempt has been made to anticipate these possible reasons for not completing the survey.

The letter contains an online link with a QR code (both ways are possible to complete the survey), to decrease the burden of filling in the survey website. Finally, my student email address has been included, then people can send questions about the research and have the option to receive a digital link to the questionnaire by email. This may also increase the trustworthiness of the research. Figure 5 shows the location of the different cultural heritage objects (for the revealed preference). It shows both the monumental as well as non-monumental cultural objects.

The questionnaires to the people subscribed to the KilimanjaroWonen newsletter have been sent within a timeframe of one day and will be used to gain insight into the stated preferences.
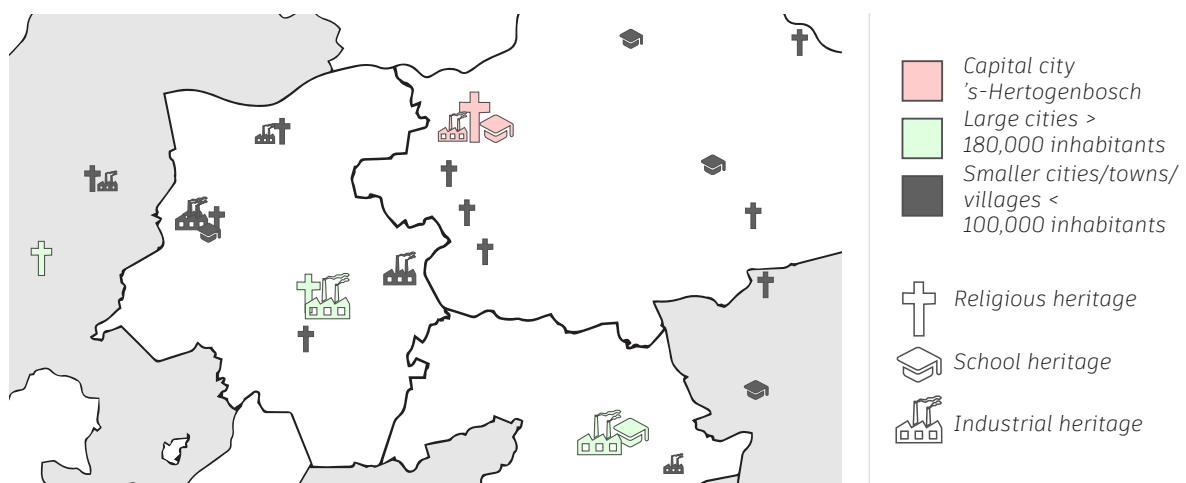
Figure 5
Cultural-historical building locations

Data preparation

5.   Data preparation

In this chapter, the data of the survey will be prepared. The research is divided into a revealed and a stated part.

The questionnaire was opened 336 times. The first step was deleting the 44 responses who opened the questionnaire without answering any questions. This resulted in 292 valid responses (Table 20).

Table 20
Statics of finished surveys

Total responses	Valid	Missing
336	292	44

The total survey resulted in 234 fully completed surveys (Table 21), which means a response rate of approximately 13.8%. After also removing the respondents which not agreed with the privacy settings, 231 respondents were left. (In this case, the questionnaire was immediately ended, but the response was registered as fully finished.) Responses with structural missing variables were not included in the research (Appendix B1). By not including the responses with structural missing values, 105 responses were filtered out. If everyone who started the questionnaire had completed the questionnaire, this would have meant a response of approximately 18% instead of ~14%.

5.1   Ratio between stated and revealed preferences

Within the questionnaire, the question was asked about how someone received the questionnaire. People living in cultural-historical buildings received the questionnaire by post. Their answers are used to find out the revealed preferences. People subscribed to the KilimanjaroWonen newsletter have received the questionnaire by email. These responses are needed to determine the stated preferences. These people (probably) do not currently live in cultural-historical transformed buildings, but they may be interested. Answers within creating the open-ended attribute list show that three respondents (within the stated group) are currently already living in a transformation project, where it is clear that in two cases it concerns a project of KilimanjaroWonen. Including these respondents in the stated research group would give a distorted picture. Therefore, it was decided not to include these three responses in the study. The distribution between the two sample groups is shown in Table 21.

Table 21
Distribution between the two sample groups

	Frequency	Percent
Revealed vs Stated sample group		
I did receive this invitation letter by post. This means I am currently living in a transformed cultural-historical building.	129	56.6
I did receive the invitation letter since I am subscribed to the KilimanjaroWonen newsletter.	99	43.4
Total	228	100.0

5.1.1   Research population

Revealed preferences

A survey is distributed among circa 800 addresses. The survey resulted in 129 fully completed surveys (within the revealed preferences). This means a response rate of approximately 16% (excluding unfinished surveys and surveys in which the respondent did not agree with the privacy statements.

The respondents living in a rental home are included in the survey since five of the six respondents answered they rent in the free sector (>€763.47) (one did not answer). Assuming, that if a respondent rents in the free rental sector, then a tenant has deliberately chosen to live in a cultural-historical building.

Stated preferences

The survey is distributed among 800-1000 people subscribed to the KilimanjaroWonen newsletter. In the questionnaire, it is incorporated that if someone is subscribed to the KilimanjaroWonen newsletter but has also received the questionnaire by post, this person should click:

"I did receive this invitation letter by post".

The survey resulted in 102 (99 after removing people currently living in a transformed building) fully completed surveys (within the stated preferences). This means a response rate of approximately 11%. The dropout is much higher among people who indicate that they are subscribed to the KilimanjaroWonen newsletter than among people who already live in cultural-historical buildings.

5.2   Regrouping/ recoding variables

Several attributes need to recoded and regrouped. First the demographic attributes will be recoded, followed by the housing and neighbourhood attributes. Next the open-ended and closed-ended attributes will be regrouped.

5.2.1   Recoding the demographic attributes

First, the demographic attributes will be recoded. For gender and age, no recoding is required. For education, the attribute categories are recoded into low, middle and high education (Appendix B.2.1, Table B2). If 'other' has been chosen, the level of education within which the respondent is classified is manually checked. If a respondent has not specified his level of education, missing is used. Choosing an average value could give a distorted picture and if all other questions are answered, the respondent will not be removed from the dataset.

Also for family composition, the answers of respondents with 'other' are recoded in one of the five answer groups (Appendix B.2.1, Table B3). The question of how many (family) members his/her household consists of was only presented to people whose number of family members was unknown. If someone is single or lives with his/her partner, this number is calculable. This value of 1 or 2 has been entered manually. Here it is assumed that there are no polygamous relationships.
In addition, one respondent appears to have answered that she is single with children. She then replied that her family consists of 1 family member. It has been decided to change this value to 2 since a value of 1 is not possible.

The income attribute categories are recoded into low, middle-low, middle-high and high income (Appendix B.2.1, Table B4). For the income attribute categories, there are some missing values. For this question, there was the option of not answering. This choice was made deliberately to avoid the questionnaire not being completed due to the potentially sensitive nature of this question. No assumption about these missing incomes will be made. Table 22 and 23, show the frequency tables of the socio-demograhpic attributes of the stated and revealed groups.

Table 22
Frequency of the socio-demographic attributes (revealed preferences)

Questions	Valid
How would you describe your gender?	129
What is your age?	129
What is your family composition?	129
How many (family) members does your household consist of?	129
In which price range is your family income?	114

Table 23
Frequency of the socio-demographic attributes (stated preferences)

Questions	Valid
How would you describe your gender?	99
What is your age?	99
What is your family composition?	99
How many (family) members does your household consist of?	98
What is your highest achieved level of education?	98
In which price range is your family income?	89

5.2.2   Recoding the housing/neighbourhood attributes

Regarding the preferences of the housing and neighbourhood attributes, the survey asked about the monumental status, type of heritage, housing type, house size, amount of bedrooms, on-site parking option, the density of the residential location and shared facilities. As has been explained in Chapter 4.1 Research method (Table 18). The same attributes were asked for both the revealed and stated preferences. In the case of stated preferences, these were hypothetical preferences and in the case of the revealed group, the respondents were asked for their reasons (preferences) behind their already made residential choice.

In addition, in the case of the revealed preferences, the respondents were asked if it concerns an owner-occupied home, in which year the home was purchased, whether this was the first owner-occupied home and for what amount the home was purchased. In the case of the stated preferences, the respondents were asked in which price range the preferred new dwelling will be.

Concerning monumental status, there appear to be three missing values. This means that the respondent answered that he/she did not know whether the building has a monumental status. The choice has been made not to make assumptions and to note missing. For the stated preferences, the option was given to answer no preference.

As for heritage type, three options were given, Religious Heritage, Industrial Heritage and School Heritage. For the revealed group, 17 respondents indicated that their property is a different type of heritage. 13 of these respondents answered that the building they live in can best be described as medical heritage, sanatorium heritage or a former hospital. It appears from these answers that these respondents live on Klokkenberg (sanatorium building de Klokkenberg, Breda). This complex has been included in the research because of the religious basis of the building. Nevertheless, the results show that respondents do not classify it as religious heritage, so it would be distorted if these answers were regrouped under religious heritage. An extra attribute category has been chosen to add medical heritage.

In addition three of the respondents answering 'other' were regrouped into one of the three locations as explained in Appendix B.2.2, Table B5. The respondents of the stated group were asked to give their preference for one of the three types of heritage. All respondents marked one of the given answers since there was no option for 'other'. Recoding was not necessary for housing size as there were no missing values.

In terms of the number of bedrooms, there was a clear outlier with 11 bedrooms in the revealed group. Because this respondent indicated that he lives in a loft and is single, it is likely that this is a typing error and this value will be changed to 1.

Parking options do not require recoding as there are no missing values. Concerning density, 15 respondents of the revealed group appear to have marked 'other'. These are mostly respondents living in Klokkenberg. It is striking that the answers for respondents living at Klokkenborg differ. This indicates that this question was unclear to the respondents.

For the respondents living on Klokkenberg and the respondents answering other, the answers are regrouped. This is explained in Appendix B.2.2, Table B6. Concerning, a preferred residential location (the stated group), 96 respondents chose one of the five mentioned residential locations. Three respondents marked the option other. Again these responses will be regrouped as explained in Appendix B.2.2, Table B6.

Recoding is also necessary for the shared facilities. Many people have made additions to the answer options. Per shared facility will be indicated how often respondents have answered it. 25 respondents indicated that they share one or more other facilities outside of the shared facilities mentioned. Many of these shared facilities could be linked to the four given shared facilities. The name change must be adapted for this as explained in Appendix B.2.2, Table B7. Some respondents indicated that they do not have communal spaces and subsequently filled in several communal spaces that they share. This concerns an error in the questionnaire since it should not be necessary to fill in shared facilities when filling in no communal spaces. It has probably gone wrong as people associate a communal space and shared facility with something else. For the stated preferences the same steps for preparing the data have been done. Both are explained in Appendix B.2.2, Table B7.

Concerning owner-occupied or rental, there are no missing values. 123 respondents answered that they are the owner of the dwelling/ apartment. Six respondents are renting the space. Filtering now on only the respondents owning an apartment/ dwelling. All respondents answered whether this was the first house they bought. Only one respondent did not answer in which year the house/apartment was bought and six respondents did not answer in which price range they bought their dwelling. No assumptions about this can be made and these answers will be notated as missing.

For the stated preferences, all respondents indicated whether or not they currently live in an owner-occupied home, but three respondents did not answer the question about the price at which they were looking for a home. Again no assumptions will be made and a missing value is notated.

Tables 24 and 25 show an overview of the amount of valid and missing answers per attribute.

Table 24
Frequency of housing/ neighbourhood attributes (revealed preferences)

Questions	Valid	Missing
Does the building you live in have a monumental status? (status of a municipal-or national monument)	126	3
What type of heritage best describes the building you live in?	129	0
What best describes your house type?	129	0
What size is your house?	129	0
How many bedrooms does your house has? (This included rooms that could be used as bedrooms but are now used for other purposes as work)	129	0
Do you have on-site parking options?	129	0
How would you describe your residential location?	129	0
Which facilities/ rooms are shared at you residential location?	129	0
Is this the first house you have bought?	123	0
In what year did you buy your current home?	122	1
In which price range did you originally buy your house?	117	6

Table 25
Frequency of housing/ neighbourhood attributes (stated preferences)

Questions	Valid	Missing
Is a monumental status important to you, for a future dwelling/ apartment?	96	3
Which of the three types of heritage appeals to you the most?	99	0
What type of house best describes the type of house you prefer to live in?	99	0
What size is your preferred house?	98	1
How many bedrooms does your preferred house has?	98	1
Do you prefer to have on-site parking options?	99	0
How would you describe your preferred residential location?	98	1
Which facilities/ rooms do you prefer to share at your residential location?	99	0
Are you currently living in an owner-occupied home?	99	0
In which price range do you want to buy your property?	99	0

5.2.3 Regrouping attributes (open-ended CNET)

An online CNET survey was created to define the attributes and underlying considerations for purchasing a cultural-historical transformed property. In a CNET survey, the open-ended CNET is often used to gain a spontaneous response. However, there are two risks. First, the answers can vary widely. The answers have to be grouped by hand, because of this, there is always a risk of bias. Second, there is a detailing risk. The answers given may not be specified.

Both problems emerged. In the open-ended CNET, a total of 581 answers were given for the revealed research part (Table 26). Of the 129 respondents, 128 respondents gave at least four answers. These answers are recategorized manually into new attribute categories (Appendix B.2.2, Table B8). Some of these responses described two or more attribute categories. Then it was decided to have these responses count for both/all attribute categories that apply. In the end, 620 answers were found within the revealed group. These were subdivided into 42 attributes. In Appendix B.2.3, Table B8 a full list of all 42 categories and the number of times an attribute of these categories is mentioned by the respondents is shown.

Table 26
Frequency table open-ended CNET (revealed preferences)

Open-ended attributes	Valid
Attribute 1	128
Attribute 2	128
Attribute 3	128
Attribute 4	128
Attribute 5	42
Attribute 6	20
Attribute 7	5
Attribute 8	2

For the stated group a total of 460 answers were given (Table 27). Also within the stated group, some respondents described several buying motives. In the end, 471 attributes were found. These were subsidized into 32 attributes. Again, in Appendix B.2.2, Table B9 a full list of all 32 attributes and the number of times an attribute is mentioned by the respondents is shown. An attempt has been made to keep the same attributes within the revealed and stated group as much as possible. This is necessary to compare the two groups later on using a chi-square analysis.

Table 27
Frequency table open-ended CNET (stated preferences)

Open-ended attributes	Valid
Attribute 1	99
Attribute 2	99
Attribute 3	99
Attribute 4	99
Attribute 5	37
Attribute 6	17
Attribute 7	8
Attribute 8	2

> **Remark:**
> For both lists created, the attributes in the tables are manually grouped and counted. Therefore, there is a plausible chance that there is an error marge.

Despite the open-ended CNET provoking a spontaneous response, it lacks detailed information. For example, within the revealed preferences, the most frequently mentioned attribute is location, followed by the character, price and architecture. The closed-ended CNET has attempted to provide more granularity by further parsing location and architecture attributes. Also for the closed-ended CNET, the objective is to define the 12 attributes having the biggest influence on a purchase. Ultimately, it will be examined which benefits arise from these attributes.

5.2.4 Regrouping attributes (closed-ended CNET)

For performing the fixed CNET, respondents were asked to indicate the attributes that most influenced (or will influence) their purchase choice (apartment/house in which they (want to) live). For the revealed research group, this resulted in 924 marked attributes. For the stated group 716 attributes were marked. For both groups, the 12 most marked attributes could be determined.

Next respondents were asked to rank these attributes in order of influence. The first ranked attribute had the greatest influence and the last ranked attribute had the least influence. Not all respondents ranked (all) the attributes. In the end, 780 attributes were ranked for the revealed group and 660 attributes were ranked for the stated group. Attributes that were considered the most important were given a weight of 12. Attributes that were ranked 12th received a weight of 1. By combining the weight with the number of times the attribute has been answered (within a certain rank), a new top 12 attributes could be created. The attributes in the top 12 are the same as the top 12 where no weight is applied. However, the order, on the other hand, changes significantly. In Appendix B.2.3, Tables B10 and B11 show the complete list of attributes ranked on the number of marked attributes and after applying a weight, for both sample groups.

Results

6.   Results

In this chapter, the results of the research are shown. The main research question: What are the revealed and stated mental representations of home seekers for cultural-historical transformed buildings? will be answered. To answer this main question, it is important to distinguish the attributes that characterize a cultural-historical building. In addition, an attempt will be made to distinguish the attributes and benefits on which a real estate customer assesses a residential product. These are key elements of the mental representation that will be displayed. In addition, socio-demographic data will be requested from the respondents to be able to describe the profile of a buyer.

As discussed earlier, the research consists of two groups, the revealed and stated research groups. It must be analysed to what extent the socio-demographic characteristics and housing preferences of the stated group correspond to the people who currently live in cultural-historical buildings. Then can be determined whether the stated group is a possibly suitable and interested party for buying a property within a cultural-historical building. These groups are compared using a chi-square test.

Chi-square test

The Chi-square test is used to test whether there is a significant difference between the observed and expected frequencies you would expect under the null hypothesis. The Pierson Chi-square test is calculated with the following formula.

$$\chi 2 = \sum \frac{(O - E)^2}{E}$$

X² = chi-square
O = observed value
E = expected value

The demographic, housing and neighbourhood variables and preferred attributes of the stated and revealed groups are tested, to test whether there is a relationship between the revealed and stated groups. The stated and revealed group can be distinguished by how the questionnaire was received. If the questionnaire was sent by post, the respondents currently live in a cultural-historical building and belong to the revealed group. In case the respondents are subscribed to the KilimanjaroWonen newsletter then they belong to the stated group.

If no relationship could be found between the attributes (categories) within the stated and revealed group (p-value > 0.005), the attributes are independent. This means there is little difference between the attributes (categories) between the stated and the revealed group.

6.1 Socio-demographic characteristics

Socio-demographic characteristics can be used to create a profile of the respondent group. Profiling people is a sensitive issue. Due to previous problems that profiling has caused over the years, just think of the ethical profiling resulting in the benefits affair. Therefore, it has been decided to limit the profiling to gender, age, family composition, education and income. Some of the socio-demographic character traits have been recoded to make profiling possible as has been explained in chapter 5, data preparation. The different socio-demographic variable groups will be discussed below. An overview of all the demographic variables in both respondent groups is combined in Table 28. The profiling will be used to indicate who is currently living in cultural-historical buildings. Furthermore will be tested whether these people have similar demographic characteristics as people who want to live in cultural-historical buildings in the future.

Table 28

Distribution of socio-demographic characteristics

Demographic attribute categories	Revealed group		Stated group		CBS statistics
	Frequency	Percentage	Frequency	Percentage	Percentage
Gender					
Male	80	62.0	49	49.5	50
Female	49	38.0	50	50.5	50
Total	129	100	99	100	100
Age					
18-24	2	1.6	0	0	11
25-44	30	23.3	1	1.0	31
45-64	50	38.8	50	50.5	33
65-79	44	34.1	47	46.5	19
>80	3	2.3	1	1.0	6
Total	129	100	99	100	100
Family composition					
Single without children	38	29.5	27	27.3	
Single with children	2	1.6	3	3.0	
With partner without children	68	52.7	56	56.6	
Family/ multi person household without children	0	0	1	1	
Family/ multi person household with children	21	16.3	12	12.1	
Total	129	100	99	100	

Highest level of education					
Low	6	4.7	5	5.1	41
Middle	16	16	19	19.2	21
High	107	82.9	74	74.7	38
Total	129	100	98	99	
Family income					
Low	4	3.1	9	9.1	
Middle-low	30	23.3	30	30.3	
Middle-high	47	36.4	39	39.4	
High	33	24.6	11	11.1	
Total	114	88.4	89	89.9	

6.1.1   Gender

The results show that concerning the revealed part of the study, more men than women completed the questionnaire (Table 28). On the other hand within the stated preferences research group, more women than men completed the questionnaire. The chi-square test gives the following result.

$$X^2(1) = 3.574, p = 0.059$$

With a p-value of 0.059 (> 0.050), we do not reject the null hypothesis. Within our sample, there was no significant association between gender and the sample group variable. The difference between the expected and observed frequencies is small. This means the female/ male ratio within the revealed and the stated group are similar.

Nevertheless within the revealed group more men than women filled in the questionnaire. Whether this result means that more men are living in cultural heritage cannot be said for sure. From the demographic data of the revealed research group within this research, it appears that a comparable percentage of single men and single women live in cultural-historical buildings. 21 respondents (single men) versus 18 respondents (single women).
Concerning respondents with a partner and living without children, 49 respondents who marked this, appear to be male compared to 19 female respondents. No assumptions will be made about the gender of 'the partner'. But what can be assumed is that the percentage of men and women who live alone or with a child is similar. Furthermore, it is a fact that within the revealed respondent group, the survey was completed by far more men than women.

6.1.2   Age

In this research sample, in terms of age, it appears that a relatively older group of people live in cultural-historic buildings (Table 28). 75.2% of the respondents of the revealed group are above 45 years old. Within the group subscribed to the KilimanjaroWonen newsletter, the age distribution is even older with 99% of the respondents being above 45 years old. This difference in the age distribution between the stated and revealed groups can be seen in the result of the chi-square test. For performing the chi-square test the age groups 18-24 age group are merged with the 25-44 age group and the 80+ age group is merged with the 65-79 age group. The chi-square test gives the following result:

$X^2(2) = 25.628$, p < 0.001

With a p-value below 0.001, we do reject the null hypothesis. A significant association was found between the age variable and the sample group variable. The differences between the expected and observed variables are large. This means the age distribution within the revealed and stated groups differ significantly.

6.1.3   Family composition

In this research sample, the majority of households appear to be alone or with a partner without children. For the revealed sample group, this appears to be the case for 82.3% of the sample (Table 28). For the stated sample group this appears to be the case for 84.4% of the sample. (Table 26). For both samples, the group with a partner without children appears to be the largest group followed by the group single without children. Furthermore, the stated research sample consists of fewer family/ multi-person households with children. All this results in relatively small household sizes. The average family size is 1.98 for the revealed sample group. The average number of family members within the stated group is 1.93. Both averages result from the conducted research.
To determine to what extent the family compositions of the stated group match those of the revealed group a chi-square test has been performed. To be able to perform a chi-square test the group: family/ multi-person household without children will be merged with the group: family/ multi-person household with children. The chi-square test gives the following results:

$X^2(3) = 1.1782$, p = 0.758

With a p-value of 0.758 (>0.05), the null hypothesis will not be rejected. No association was found between the family composition variable and the sample group variable. The difference between the expected and observed frequencies is small. This means the revealed and stated groups appear to have similar family compositions.

6.1.4   Level of education

The level of education in the sample groups within this research is high. Among the respondents within the revealed group in this survey, 82.9% are highly educated. Within the stated group 74.7% are highly educated. The chi-square test shows similar results for the stated and the revealed group.

$$X^2(2) = 2.172, p = 0.098$$

With a p-value of 0.521 (>0.05), the null hypothesis will not be rejected. No association was found between the income variable and the sample group variable. The difference between the expected and observed frequencies is small meaning that the revealed and stated groups have similar educational levels.

6.1.5   Family income

The literature study has shown that the average family income level in the Netherlands is €46,800 (CBS, 2021b). This given, the stated group appears to have an average family income. The revealed group has an income that is slightly higher with 61% of the households having an income that is medium-high to high. A significant income difference can also be seen by reviewing the chi-square test.

$$X^2(3) = 10.752, p < 0.013$$

With a p-value of 0.013 (<0.05), the null hypothesis will be rejected. A significant association was found between the income variable and the sample group variable. The differences between the expected and observed variables are large. This means the revealed and the stated group have different levels of income.

> To summarize, the profile of a buyer of a cultural-historical building can best be described as highly educated having a middle-high level of income, being relatively old and having a relatively low household size. Similarities between the revealed and stated sample group are seen in the gender distribution, family composition and level of education. However, larger differences are found in the age distribution and the level of income.

The more extensive frequency tables and chi-square tests are visualized in Appendix C.2, Table C2.

6.2 Characteristics of cultural-historical buildings

In Chapter 3, a cultural-historical building was defined based on a literature study, to select the addresses of respondents within this study. By asking respondents about their home and location characteristics, the characteristics of the cultural-historical buildings within this research sample can be determined. Hopefully, these characteristics give an idea of the characteristics of cultural-historical buildings in general. In addition, it will be examined whether the housing requirements of the stated response group are similar to the housing characteristics that many residential units in cultural-historical buildings contain, using a chi-square test. An overview of all the housing/ neighbourhood attributes tested and the results retrieved in both respondent groups are combined in Table 29. After this, the different housing and neighbourhood attributes will be explained in more detail.

Table 29
Distribution of housing and neighbourhood attribute categories

Housing and neigbhourhood attribute categories	Revealed group		Stated group	
	Frequency	Percentage	Frequency	Percentage
Monumental status				
Yes	106	84.1	11	12
No	20	15.9	81	88
Total	126	100	92	100
Type of heritage				
Religious heritage	54	42.5	17	17
Industrial heritage	34	26.8	40	40.4
School heritage	26	20.5	42	42.2
Medical heritage	13	10.2		
Total	127	100	99	100.0
Family composition				
Studio	2	1.6	3	3.0
Loft	25	19.4	7	7.1
Apartment	69	53.5	39	39.4
Penthouse	5	3.9	4	4.0
Dwelling	25	19.4	38	38.4
City Villa	3	2.3	8	8.1
Total	129	100	99	100
House size				
≤ 75m2	13	10.1	10	10.1
76-100m2	26	20.2	31	31.3
101-150m2	49	38.0	54	54.5
≥ 151 m2	41	31.8	4	4.0
Total	129	100	99	100

Residential density

City centre	49	38	22	22.7
City (outside the ring)	14	10.9	21	21.6
Suburb	5	3.9	10	10.3
Town	37	28.7	37	38.1
Village	9	7	7	9.3
Barton	15	11.6		
Total	129	100	97	100

On-site parking

Yes	112	86.8	80	80.8
No	17	13.2	19	19.2
Total	129	100	99	100

Common facilities

Outside space (garden, barton, (roof)terrace, balcony, BBQ, playground and sitting spots)	87	67.4	76	76.7
Total	129	100.0	99	100
Parking/ bike storage	90	69.8	61	61.6
Total	129	100.0	99	100
Entrance/ hall/ atrium	90	69.8	30	30.3
Total	129	100.0	99	100
Living room/ kitchen/ meeting room/ conference room	13	10.0	30	30.3
Total	129	100.0	99	100
Indoor facilities/ recreation room (fitness, workshop, guest room, laundry room and storage)	5	7.0	8	8.1
Total	129	100.0	99	100
No communal space	10	7.8	10	10.1
Total	129	100.0	99	100

Chapter 3, showed that there is no unambiguous definition of cultural-historic buildings. However, a cultural-historical building is often a building to which a value is attached. Through a monumental status, buildings that are labelled as important can be protected. Since the research focuses on redevelopment projects (buildings that have been protected), it was expected that the majority of these buildings would have a monumental status. Results show these assumptions were correct. 82.2% of the respondents live in a building with a monumental status. This contrasts the preferences given by the stated sample group. Monumental status does not seem to have a preference for the stated research group. 81.8% of the respondents indicate that they do not need to live in a building that has a monumental status. This difference is supported by the result of the chi-square test

$X^2(1) = 111.385$, $p < 0.001$

With a p-value below 0.001, an association is found between the variable monumental status and the sample group variable. Therefore, the null hypothesis will be rejected. This means, there is a significant difference between the revealed and the stated sample groups.

In addition, the research focuses on larger transformation projects, with a religious, industrial or school origin. The largest group of respondents lives in religious heritage, followed by industrial heritage and school heritage. As described in the data preparation, an extra category with medical heritage has been added. The results correspond to the distribution of the questionnaires among the heritage projects. Religious heritage was the most prevalent within the research area, followed by industrial heritage and then schools. Nevertheless, by looking at the preferences of the stated research group, school heritage and industrial heritage appeal to have the largest preferences. These are also the heritage categories most often not having a monumental status (in comparison with religious and medical heritage). Of the respondents living in industrial heritage, 70.6% indicate that they live in a building with a monumental status and this is 76.9% for school heritage. These large differences between the stated and revealed group are also reflected in the results of the chi-square test.

$X^2(3) = 33.579$, $p < 0.001$

Even when the medical heritage group is not included. Since this option could not be marked by the respondents of the stated group, as explained in the data preparation phase, there would still be a significant difference between the stated and the revealed group.

$X^2(2) = 22.589$, $p < 0.001$

With a p-value below 0.001, an association is found between the variable heritage type lived in or preferred and the sample group variable. The null hypothesis will be rejected. This means, there is a significant difference between the revealed and the stated group

Concerning the focus on larger transformation projects, all locations to which a questionnaire has been delivered were locations where multiple housing units had been created. The largest part concerns the single-story housing type as apartments, followed by dwellings and lofts. The average number of bedrooms is 2.19 (~mean value). The stated research shows that the most common housing type does not quite match the preferred housing type. Results show a relatively larger group of people interested in dwellings and a relatively smaller group interested in lofts. Studios, penthouses and city villas are not included in the chi-square test. The expected value for these housing types is below five. The chi-square test gives the following score:

$X^2(5) = 15.569$, p < 0.001

With a p-value below 0.001, an association is found between the housing type and the sample group variable. The null hypothesis will be rejected. This means, there is a significant difference between the revealed and the stated group.

Concerning the average floor area, including all housing types, 38% of the respondents appear to have a living space between 101-150m2, 31.8% of the respondents have a larger floor area than this and 30.2% of the respondents have a smaller floor area. For the stated group, the floor space requirement turned out to be much lower. 54.5% of the respondents mentioned how they prefer to have a floor area between 101 and 150m2. 31.3% of the respondents mentioned how they prefer to have a floor area between 76-100m2. Only 4.0% of the respondents answered that they prefer to have a floor area above 151m2.

$X^2(3) = 28.033$, p < 0.001

With a p-value below 0.001, the chi-square test shows there is a significant difference between the current floor space of the residential units within cultural-historical buildings and the preferred amount of floor space by the stated research group.

In the dataset with addresses, many addresses appear to be located in the village/city cores. Locations where parking can be more difficult. However, 86.8% of the redevelopment locations have their own (/common) parking areas, where private parking facilities are facilitated. This is because many locations have a private (-public) terrain, around the building. This meets the preference of the stated group, of which 80.8% of the respondents indicate that they would like to have on-site parking options.

$X^2(3) = 1.523$, p = 0.217

With a p-value of 0.217, the null hypothesis cannot be rejected. No association was found between on-site parking and the sample group variable. The difference between the expected and observed frequencies is small meaning that the revealed and stated groups have similar parking facility ratios.

The percentage of respondents who prefer to live in the city or a town also differs for the stated and the revealed group. It should be noted, however, that as discussed in the data preparation, the location is a less objective concept than expected. Whether the preferences of the stated and revealed group are as far apart as the chi-square test suggests is questionable. There are similarities between the two groups. For both groups, most people indicate that they live or prefer to live in the city centres or towns. These are both medium to high-density locations. The chi-square test gives the following result:

$X^2(4) = 24.545$, p < 0.001

With a probability below 0.001, an association is found between the residential area and the sample group variable. The null hypothesis will be rejected. There is a significant difference between the revealed and the stated group.

The number of shared facilities seems to differ greatly per project. Five categories are created (+ 1 category in which respondents could indicate that they do not have or do not want shared facilities). Concerning no communal space, this is favoured for a comparable percentage within the stated as the revealed group. In over 67% of the cases, there is a communal outside space, communal parking/ bike storage and a common entrance. In the case of the stated group, over 60% of the people indicated that they are open to communal parking or a communal garden as well. Also, a communal living room/ kitchen/ meeting room or conference room is viewed positively by 30.3%, something that is rarely seen at the locations within the study. Only the common entrance, which is present in approximately 70% of the projects is less preferred within the stated group. Within the survey, each respondent was asked to mark which shared facilities they currently have (revealed group) or which facilities they would prefer to share. A chi-square test was performed for each category. The more extensive frequency tables and chi-square tests are visualized in Appendix C. Below are the summarized results.

For having no communal space the chi-square score is as follows:

$X^2(1) = 0.386$, p = 0.534

With a p-value of 0.534 (> 0.05), the null hypothesis cannot be rejected. This means the results for having communal space within the revealed and the stated group are similar.

For having a common outside space, which includes gardens, balconies, (roof) terraces, balconies, BBQ spots, playgrounds and sitting spots (explained in Chapter 5, Data preparation). The chi-square test shows how the null hypothesis cannot be rejected.

$X^2(1) = 2.390$, p = 0.122

With a p-value of 0.122 (> 0.05), the results for having a communal outside space within the revealed and stated group are similar.

For having common parking or bike storage facilities the chi-square test shows the following results:

$X^2(1) = 1.644$, $p = 0.197$

With a p-value of 0.197 (> 0.05), the null hypothesis cannot be rejected at a 5% significance level. The results for having common parking or bike storage facilities within the revealed and stated group are similar.

For having a common entrance, hall or atrium, the chi-square test shows the following results:

$X^2(1) = 34.992$, $p < 0.001$

With a p-value below 0.001, the null hypothesis is rejected. A difference is seen in having/ preferring a common entrance, hall or atrium between the stated and the revealed group.

For having a common living room, where a kitchen, meeting room and conference room are added (explained in Chapter 5, Data preparation), the chi-square test shows the following results:

$X^2(1) = 14.973$, $p < 0.001$

With a p-value below 0.001, the null hypothesis is rejected. A difference is seen in having/ preferring a common living room between the stated and the revealed group.

For indoor facilities or recreation rooms, the chi-square test shows the following results:

$X^2(1) = 1.842$, $p = 0.175$

With a p-value of 0.175 (> 0.05), at a 5% significance level, the null hypothesis cannot be rejected. The results for having indoor facilities or recreation rooms within the revealed and the stated group are similar.

Subsequently, purchasing information was requested from the respondents. The first question is whether people currently live in an owner-occupied house. Next, the price that has been paid for the house, or that the respondent is willing to pay for a future house is asked. Then the question of whether this is the first (owner-occupied) home and the question in which year the home was purchased is asked.

76.2% of the respondents answered they bought their homes between 2014 and 2022 (Figure 6). 45.3% of the (answered) respondents indicated that they had bought a home for less than €345,000. 38.5% have indicated that they have bought a home above €460,000 (Table 30). This is not equal to the current house value, as described in the literature review, because of the large increase in housing prices over the last 10 years. This

makes it likely that the current housing value is much higher. Performing a chi-square test seems to provide little information. It shows how the stated and the revealed group do not match at this moment. Whether the house prices of cultural-historical properties exceed the amount that the stated group is currently prepared to pay cannot be said, since it is difficult to estimate with which percentage the houses have increased. In addition, it appears that 62.6% of the respondents indicate that this is the first house they have bought. While 93.3% of the respondents in the stated group indicate that they currently live in an owner-occupied home.
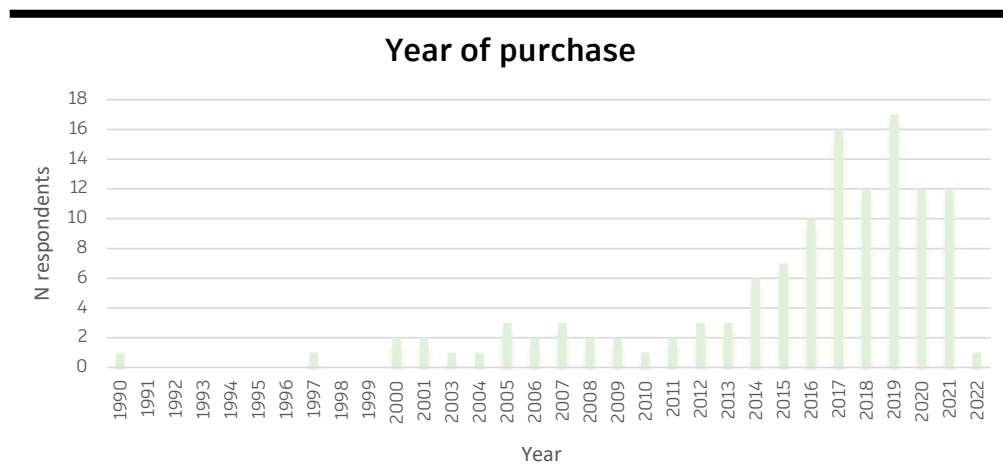
Figure 6
Year of purchase

Table 30
Purchasing details

Purchasing details attributes	Revealed group		Stated group	
	Frequency	Percentage	Frequency	Percentage
House price				
<€345.000	53	45.3	21	21.4
€345.000-€460.000	19	16.2	48	49.0
> €460.000	45	38.5	28	28.6
Total	117	100	98	100
First house bought				
Yes	77	62.6		
No	46	37.4		
Total	123	100		
Currently living in an owner occupied house				
Yes	123	95.3	93	93.9
No	6	4.7	6	6.1
Total	129	100	99	100

Concerning, the cultural-historical characteristics of cultural-historical buildings, the research provides limited answers. If a respondent marked one of the following attributes as important, the respondent was asked not only to explain this choice but the respondents was also asked to indicate which elements are present in the building. This information is not used for the CNET analysis but is used to define a cultural-historical property:

· (Visibility of) authentic structural elements
· Use/ preservation of authentic materials such as tiles and terrazzo floors
· The (unique) entrance (hall)
· (Authentic) windows
· Unique house with its own identity (architecture)

As later described as one of the shortcomings of the study, these questions are not asked in a general sense, so it is unknown to what extent cultural-historical buildings have certain cultural-historical building elements. We only know the data of the respondents who indicated that they value certain attributes (possible causing a biased result). An overview of the discussed results is combined in Table 29. Several attributes can be checked per category. At the bottom is always the total number of respondents that the question has been asked to.

Table 31
Distribution of cultural-historical attribute characteristics

Cultural-historical attribute categories	Revealed group	
	Frequency	Percentage
(Visibility of) authentic structural elements		
Wooden/ concrete beams	16	28.6
Rafters/ truss structure	13	23.2
Vaults	3	5.4
Arches	12	21.4
Columns/ pillars	20	35.7
Other:	26	46.4
Total	56	100
Authentic windows		
Large height/ dimensions of the windows	25	80.6
Stained glass	6	19.4
'Roedeverdeling' (slats dividing the window into smaller windows)	17	54.8
Other	2	6.5
Total	31	100

Exterior elements		
Wall anchors	2	2.9
Roller layers and arches above windows/ doors	31	44.9
Cementing	7	10.1
Façade decoration	29	42.0
Type of mortar joint	13	18.8
Type of brick + laying bond	34	49.3
Total	69	100
Authentic materials		
(Old) tiles on floor/ terrazzo floor	6	50.0
(Old) tiles on wall	4	33.3
Paneling (of tiles)	4	33.3
Other	4	33.3
Total	12	100
(Unique) entrance		
Spacious unique entrance hall	18	94.7
Wide corridor	8	42.1
Wide stairs	12	63.2
Terrazzo or tiled floor	5	26.3
Paneling (of tiles)	3	15.7
Other	2	10.5
Total	19	100

Of the 43.4% of the respondents who provided information about the structural elements in their homes, 35.7% indicated that they have visible structural columns and pillars. 28.6% have wooden and concrete beams in their home. Only 3% of the respondents indicate that they have vaults. Many respondents mention among the authentic structural elements that they have high ceilings, large windows (with stained glass) and a special roof/façade structure sometimes visible in the home. However, these elements have specific categories within the study.

31 respondents marked/ answered the authentic windows to be an important purchase motive. 80.6% answered the large dimension of the windows to be the reason for this and in more than 54% of the cases, the rod distribution was marked.

The uniqueness, identity and architecture of the home is an attribute often mentioned as well. Of the culture-historical characteristics, this element itself is the element most often mentioned, 69 times. When respondents are asked to attach a value to this element, other elements are experienced as more important. Nevertheless, this question generated many reactions about the façade elements present (and important) in the building (the follow-up question, associated with this attribute).

57.6% of the 69 respondents indicate that the building has a special type of brink + laying bond. 52.5% of the respondents indicate that they have roller layers and arches above windows/ doors and 49.2% of the respondents indicate that they have façade decoration.

Only 19 respondents indicated that they found a unique entrance to be important and only 12 respondents indicated the importance of the use/ preservation of authentic materials such as tiles/terrazzo floors. This does not mean that these are the only respondents with a unique entrance or where authentic materials such as tiles and terrazzo floors are present. From the shared facilities it can be seen that an entrance, hall or atrium is shared in 69.8% of the cases. Nevertheless, the priority of maintaining the height, structural elements, architecture and windows are higher.

To summarize, the conducted research shows that most cultural-historical transformed buildings have a monumental status. In addition, it appears that within the large-scale developments, the largest housing supply is apartments, followed by lofts and homes. The average living space within transformed cultural-historical buildings is likely far above the average living space in the Netherlands. The buildings are for the most part located in central locations in towns and city centres. Nevertheless, parking facilities are available in most locations. An entrance and outdoor space are also shared in most of the buildings. Concerning the cultural characteristics of cultural-historical buildings, the research provides limited answers. The buildings can often be recognized by facade decoration, the type of brick and bond used and arches above windows and doors. Windows often have large dimensions and in addition, a rod division is often used. Structural elements are also often visible in the buildings, which is highly appreciated. Which elements these are can be very different.

The preferred housing/ neighbourhood characteristics of the stated group do not match the current housing characteristics of the revealed group. Only the on-site parking options that many cultural-heritage complexes offer and having a shared outside space, parking facilities and/or indoor/ recreational facilities match the housing requirements of the stated group.

6.3 Preferred residential attributes and motives

For deriving the revealed and stated mental representations of home seekers for-cultural historical buildings, respondents were asked about the attributes and underlying motives (benefits) when choosing a cultural-historical building.

6.3.1 Preferred residential attributes

First, respondents were asked to fill in attributes that were/are important to them in an open format (with a maximum of 8). Within the revealed group, 581 attributes were filled in among 129 respondents. Which means an average of 4.50 attributes per person. Within the stated group, 460 attributes were filled in among 99 respondents, meaning on average 4.64 attributes per person. These averages are comparable. Larger differences are observable within the answered attributes. The answered attributes were manually categorized. Within the revealed group, 42 attribute categories have been drawn up and 32 attribute categories have been drawn up for the stated group. The top 12 open-ended attributes for the revealed group and stated group are shown in Table 32 and Table 33. The full list of 42 and 32 attributes is in Appendix B.2.3, Table B8 and B9.

Table 32
Top 12 open-ended attributes, revealed group

Mentioned attributes	Abbreviated	N
Location/ position (unspecified)	Location	60
Character / atmosphere / different / special	Character	57
Price/ affordability/ financially feasible/ cost	Price	48
architecture/ building style/ beautiful building/ stylish	Architecture	45
A cultural-historical building/historical value/a past/memorial value	Historical value	41
Location close to/within city/centrum	Residential density	35
Layout / self-renovation / self-influence	Flexibility	27
Space (spacious feeling) /floor surface	Floor surface	24
Environment/ preserved cityscape/neighbourhood	Direct neighbourhood	24
Green space nearby	Near greenery	24
Housing form (CPO)/ social contacts/ diversity	Residential diversity	21
Low maintenance/ convenience / single floor / easy to clean / future proof / downsizing	Future proof	18

Table 33
Top 12 open-ended attributes, stated group

Mentioned attributes	Abbreviated	N
Low maintenance/ convenience / single floor / easy to clean / future proof / downsizing	Future proof	81
Sustainability/ energy-neutral/ gasless/ hergebruik/ recyclen	Sustainability	41
Housing form (CPO)/ social contacts/ diversity/ amount of housing units	Residential diversity	40
Price/ affordability/ financially feasible/ cost	Price	32
Location/ position other	Location	30
Green space nearby	Near greenery	20
Character / atmosphere / different / special / appearance	Character	19
(Semi-)private outside space	Outdoor space	19
Proximity to services/ basic needs	Basic needs	18
Environment/ preserves cityscape/ neighbourhood	Direct neigbhourhood	16
Space (spacious feeling) /floor surface	Floor surface	14
Common facilities	Shared facilities	14

When manually categorizing the groups, an attempt was made to keep the same attribute names for both the revealed and stated groups. In this way, a chi-square test can be performed so that the top 12 attributes from both lists can be compared separately. Columns 2 and 3 of table 31 show whether an attribute is in the top 12 most mentioned attributes within the revealed or stated group (this is indicated by X). In total, 16 different attributes can be obtained from both top 12 attributes. However, the compiled list consists of 42 attributes for the revealed group and 32 attributes for the stated group (Appendix B.2.3, Table B8 and B9). All 16 different attributes appear in both attribute lists, which means that a chi-square test can be performed. To test if there is a relationship between the attributes that are considered important by the revealed and stated group. First, the 16 attributes resulting from the top 12 attributes from both the stated and revealed groups were compared with a chi-square test. The chi-square test performed gave the following result:

$$X^2(15) = 177.59, p < 0.001$$

It follows from this chi-square test that the revealed and stated groups are significantly different from each other. The complete cross-table with the observed and expected values is placed in Appendix C.3, Table C3. Besides the chi-square test including all attributes in the top 12, chi-square tests have been performed for all attributes individually. This makes it possible to discover where exactly the differences that have been demonstrated with the previously performed chi-square test can be found. Table 34, column 4 lists the chi-square results of the individual attributes. The extensive calculation in which the cross-table is visualized can be found in Appendix C.3. Table C4.

Table 34
Chi-square results purchasing attributes open-ended

Purchasing attributes open-ended	Revealed group	Stated group	
	Top 12	Top 12	Chi-square test
Location	X	X	$X^2(1) = 6.407$, p = 0.011
Character	X	X	$X^2(1) = 16.094$, p < 0.001
Price	X	X	$X^2(1) = 0.656$, p = 0.418
Architecture	X		$X^2(1) = 15.752$, p < 0.001
Historical value	X		$X^2(1) = 15.413$, p < 0.001
Residential density	X		$X^2(1) = 7.879$, p = 0.005
Flexibility	X		$X^2(1) = 4.945$, p = 0.026
Floor surface	X	X	$X^2(1) = 0.851$, p = 0.356
Direct neighbourhood	X	X	$X^2(1) = 0.258$, p = 0.612
Near greenery	X	X	$X^2(1) = 0.075$, p = 0.784
Residential diversity	X	X	$X^2(1) = 16.636$, p < 0.001
Future proof	X	X	$X^2(1) = 104.212$, p < 0.001
Sustainability		X	$X^2(1) = 51.492$, p < 0.001
Outdoor space		X	$X^2(1) = 2.448$, p = 0.118
Shared facilities		X	$X^2(1) = 11.215$, p < 0.001
Basic needs		X	$X^2(1) = 7.836$, p = 0.005

The purchasing motives, price, floor surface, direct neighbourhood, near greenery and outdoor space appear to be important purchasing motives in both the revealed and the stated sample group. With a p-value above 0.05, the null hypothesis cannot be rejected. This means, there is a similarity in the respective buying motive for the revealed and the stated group.

For location, character, architecture, historical value, residential density, flexibility, living near greenery, residential diversity, future proof, sustainability, shared facilities and basic needs, there appears to be a significant difference between the revealed and the stated group.

Despite the open-ended CNET provoking a spontaneous response, it lacks detailed information. For example, within the revealed preferences, the most frequently mentioned attribute is location, followed by the character, price and architecture. The closed-ended CNET has attempted to provide more granularity by further parsing location and architecture attributes. For performing the closed-ended CNET, respondents were asked to indicate the attributes that most influenced (or will influence) their purchase choice (apartment/house in which they (want to) live). For the revealed research group, this resulted in 924 marked attributes, which means 7.16 attributes on average per respondent. For the stated group 716 attributes were marked, which means 7.23 answers on average per respondent. This means both respondent groups marked a similar

amount of answers. For both groups, the 12 most marked attributes could be determined.

Next, respondents were asked to rank the attributes, marked as important in order of influence as has been explained in chapter 5.2.4. The first ranked attribute had the greatest influence and the last ranked attribute had the least influence. Not all respondents rank (all) the attributes. In the end, 780 attributes were ranked for the revealed group (84.4%) and 660 attributes were ranked for the stated group (92.2%). This means slightly more attributes were assigned a rank within the stated group. For both the revealed as well as the stated group, by combining the weight with the number of times the attribute has been answered (within a certain rank), a new top 12 attributes could be created. The calculations for this can be found in Appendix B.2.4.

The attributes in the top 12 are the same as the top 12 where no weight is applied. However, the order, on the other hand, changes significantly. Table 35 and Table 36 show the top 12 results. The second column shows the top 12 rankings based on the number of times an attribute has been mentioned. The third column shows the top 12 attribute ranking when applying a weight based on the importance respondents gave this attribute (Appendix, Table B10 and B11). The complete list of attributes, with their scores and their ranking (when and without a weight has been applied), can be seen in Appendix B.2.4, Tables B12 and B13.

Table 35
Top 12, closed-ended attributes, revealed group

Rank	N market attributes (fixed CNET)	N market attributes + weight applied
1	Surface of the house	Surface of the house
2	Unique home with its own identity	Green space nearby
3	Green space nearby	Ceiling height
4	Ceiling height	Price (+6)
5	Authentic building elements	Authentic building elements
6	Housing type	Housing type
7	Modernity of the house (kitchen/bathroom etc.)	Unique home with its own identity (-5)
8	Parking on-site	Modernity of the house (kitchen/bathroom etc.)
9	Outdoor space	Monumental status (+4)
10	Price	Outdoor space
10	Rich history	
11		Rich history
12	Monumental status	Parking on-site (-4)

Table 36
Top 12, closed-ended attributes, stated group

Rank	N market attributes (fixed CNET)	N market attributes + weight applied
1	Sustainability of the property	Sustainability of the property
1	Green spacy nearby	
2		Green space nearby
3	Surface of the house	Surface of the house
4	Shared facilities	Shared facilities
4	Outdoor space	
5		Price
6	Price	Outdoor space
7	Modernity of the house (kitchen/bathroom etc.)	Housing type
7	Safety within neighbourhood	
8		Modernity of the house (kitchen/bathroom etc.)
9	Type of houses/ mix of functions in the neighbourhood	Level of pollution
10	Housing type	Safety within neighbourhood
11	Level of pollution	Type of houses/ mix of functions in the neighbourhood
12	Distance to basic needs	Distance to basic needs
12		Parking on-site

Based on table 35, when a weight is applied, the surface of the house, green space nearby, ceiling height, price, authentic building elements and housing type appear to play the largest role for the revealed group in their previous decision of buying their house. Table 36 shows that for the stated group, sustainability of the property, green space nearby, the surface of the house, shared facilities, price and outdoor space will play the largest role in purchasing a future dwelling.

In addition, Table 37 summarizes using bar charts how often attributes are mentioned within the stated and revealed groups. This also indicated how great of an effect an attribute has played or would play within a purchase. It is important to refer back to the sample group size and the number of marked attributes. Within the revealed group, the response was higher resulting in 120 more attributes being marked.

Nevertheless, chi-square tests can be performed. These scores take into account the total number of attributes marked and the number of times an attribute could have been marked, as will be specified later in this chapter. Chi-square tests were performed to find out whether the same attributes are perceived as important in the revealed and stated research group.

Table 37
Amount of marked attributes per sample group

Times marked

Attributes	

Property attributes
- Surface of the house
- Outdoor space
- Housing type
- Number of bedrooms
- Parking on-site
- Modernity of the house (kitchen/bathroom…
- Good maintenance of the public space
- Sustainability of the property
- Monumental status
- Authentic building elements
- Ceiling height
- Use/ preservation of authentic materials
- (Unique) entry area (hall)
- Reuse of original interior/ exterior doors
- Preservation of details, ornaments and…
- Characteristic windows
- Unique home with its own identity
- Rich history

Accessibility attributes
- Distance to basic needs
- Distance to recreation
- Distance to school work

Environmental attributes
- Pollution
- Security/ safety
- Density
- Type of housing/ functional mix
- Green space nearby
- Shared facilities

Financial attributes
- Price
- Taks benefits

■ N marked revealed   ■ N marked stated

From both top 12 attribute lists (the revealed and the stated group), 18 attributes follow. These attributes are marked by respondents from both groups, but only 7 attributes appear in the top 12 attributes of both groups. Before the attributes were compared individually, a chi-square test has been performed that compares all attributes with each other. Unlike in the open-ended method, there is a list predefined. As a result, all attributes in both the revealed and the stated group are equal and a chi-square test can be performed in which all attributes are compared. Nevertheless, the attributes of distance to school and work and tax benefits are ultimately not included in the chi-square scoring. These attributes have an expected value smaller than 5. The chi-square test performed gave the following result:

$$X^2(26) = 169.59, p < 0.001$$

It follows from this chi-square test that the revealed and stated groups are significantly different from each other. The complete cross-table with the observed and expected values is placed in Appendix C.3, Table C5.

Table 38 shows an overview of the attributes followed by the chi-square scoring and the probability in the order in which they were presented in the questionnaire. These scores are based on how often the attribute is mentioned, the weight is not taken into account. More extensive calculations with the used cross-tables are listed in Appendix C.3, Table C6. Except for the green space nearby, for all attributes listed in the top 12 by both categories, the probability is greater than 0.05, meaning that the null hypothesis cannot be rejected and the importance of the attribute is comparable to the revealed and the stated sample group.

Table 38
Chi-square results purchasing attributes

Purchasing attributes	Revealed group	Stated group	
	Top 12	Top 12	Chi-square test
Property characteristics			
Surface of the house	X	X	$X^2(1) = 0.462, p = 0.497$
Outdoor space	X	X	$X^2(1) = 3.132, p = 0.077$
Housing type	X	X	$X^2(1) = 0.849, p = 0.357$
Parking on-site	X	X	$X^2(1) = 1.028, p = 0.311$
Modernity of the house	X	X	$X^2(1) = 0.091, p = 0.763$
Sustainability of the property		X	$X^2(1) = 48.229, p < 0.001$
Monumental status	X		$X^2(1) = 28.285, p < 0.001$
Authentic building elements	X		$X^2(1) = 17.718, p < 0.001$
Ceiling height	X		$X^2(1) = 27.560, p < 0.001$
Unique home with its own identity	X		$X^2(1) = 15.792, p < 0.001$
Rich history	X		$X^2(1) = 19.649, p < 0.001$

Accessibility			
Distance to basic needs		X	$X^2(1) = 12.447$, p < 0.001
Neighbourhood characteristics			
(low) level of pollution		X	$X^2(1) = 10.999$, p < 0.001
Security (safety) within neighbourhood		X	$X^2(1) = 12.076$, p < 0.001
Type of housing/ functional mix in the neighbourhood		X	$X^2(1) = 6.344$, p = 0.012
Green space nearby	X	X	$X^2(1) = 6.231$, p = 0.013
Common facilities in and around the property		X	$X^2(1) = 21.763$, p < 0.001
Financial characteristics			
Price	X	X	$X^2(1) = 3.030$, p = 0.082

To summarize the findings, the revealed group often indicates building-related attributes to influence the choice for their cultural-historical building. In addition to the surface of the house, type of house and modernity of the house, many attributes related to characteristics of cultural-historical buildings are considered important, such as high ceilings, authentic building elements, having a unique home with its own identity, a monumental status and rich histories. Furthermore, the price, distance to greenery, outdoor space and parking facilities are important attributes.

The importance of price, distance to greenery and parking facilities are also shared by the stated research group. However, it appears that within this sample group many environmental and social-oriented attributes are experienced as important, such as low pollution, safety, shared facilities, a good mix of functions and types of housing in the neighbourhood and the distance to basic needs. For property-related properties, it appears that mainly the surface area of the house, type of house, modernity and sustainability play an important role.

6.3.2 Underlying motivations behind the residential purchase

An essential part of mapping the mental representations behind a purchasing choice are the underlying motivations behind the important gained attributes within a purchase. For the six most frequently mentioned attributes of both sample groups (the revealed and the stated group), the underlying motives (benefits) behind the residential purchase were analysed. Respondents were asked per marked attribute to indicate why this attribute is considered important for them. However, to make the underlying motives analysable, it was decided to only analyse the underlying purchasing motives of the six most frequently mentioned attributes.

Some attributes may have shared benefits. For example, character, aesthetics and uniqueness are benefits of multiple attributes referring to cultural-historical building properties. In addition, some benefits are specific to certain attributes. Benefits are drawn up according to the attributes, with the possibility of an own contribution ('other') of benefits up to a maximum of three. Tables 39 and 40 show for the revealed and stated group the percentage in which a benefit is named within the six most frequently mentioned attributes. In addition, in Appendix C.3, Tables C7 and C8, it is indicated how many specific benefits are stated behind the purchasing attributes.

For the revealed group, the underlying advantages behind the choice appear to be mainly focused on appearance and atmosphere-related advantages. The aesthetics, character and uniqueness of the property appear to be an important underlying purchase motive. Spaciousness and openness also appear to be important advantages arising from the attributes, high ceilings and the relatively large floor area. In addition to these appearance-related advantages, health/well-being and the financial situation appear to be important underlying motives behind the purchase of cultural-historical properties.

For the stated group, the social benefits of a property appear to be much more important. Homes with home/location attributes that positively influence mental and physical health and well-being are receiving more attention. Social contacts are considered important as well. Many considerations are made with a futuristic view. A sustainable home is considered very important. In addition to the reduction in CO_2 emissions, the financial and lower maintenance costs appear to be important considerations behind the importance of this attribute.

Table 39
Benefits from top 6 attributes revealed preferences

Purchasing motives and benefits

Other (m² of the house)	N
Living space fits	10
Future proof	5
No downsizing	3
Flexible/ open lay-out	2
Mobility	2
Segregation of duties	1
Feeling	1
Investment	1

Other (housing type)	N
Unique	3
History	2
Surface	2
Aesthetics	1
Maintenance	1
No garden	1

Other (ceiling height)	N
Spacious	9
Less oppresive	2
Tall residents	1

Other (green space)	N
Recreation	10
Living environment	1

Other (price)	N
Affordability	3
Lifestyle	3
Low price	2
Price/ quality	1
Mortgage free	1
Investment	1

Surface of the house (N=71): More living space, Less living space, Less maintenance, Freedom of movement, Other

Housing type (N=52): Social contacts, Social control/ safety, Close to amenities, Increase of mobility, Other

Authentic building elements (N=56): Aesthetics, Unique, Building quality, Character

Ceiling height (N = 59): Aesthetics, Large incidence of light, Open lay-out, Unique, Character, Other

Green space nearby (N=62): Well-being/ happiness, Health, Social contacts, Other

Price (N=44): Mortgage, Interest rate, (Current) level of income, Other

Table 40
Benefits from top 6 attributes stated preferences

Purchasing motives and benefits

Other (m² of the house)	N
Living space fits	10
Recreational/ logé space	5
Future proof	3
Comfort	2
No compromising on space	2
Less energy costs	1
Communal living form	1

Other (outdoor space)	N
Room to move	3
Enjoy the sun	2
Freedom	2
Hobby/recreational space	1
Privacy/ peace	1

Green space nearby	N
Recreation	4
Peace	2
Environment	1

Common facilities	N
Saving energy/ costs/ space	6
Support eachother	5

Other (price)	N
Affordability	7
Lifestyle	3
Low price	1
Price/ quality	1
Retirement benefits	1

Surface of the house (N=50)
- More living space
- Less living space
- Less maintenance
- Freedom of movement
- Other

Outdoor space (N=46)
- Need for outside space
- Maintenance
- Fresh air
- Gardening
- Other

sustainability (N=64)
- Good indoor climate
- Reduce maintenance
- Reduce energy consumption/ costs
- Reduction carbon footprint

Green space nearby (N=64)
- Well-being/ happiness
- Health
- Social contacts
- Other

Common facilities (N=46)
- Mobility
- Social contacts
- Lower commuting time
- Other

Price (N=44)
- Mortgage
- Interest rate
- (Current) level of income
- Other

6.4   Mental representation model

Based on the performed online CNET survey, the mental representations behind the purchase of cultural-historical properties have been mapped. These findings have been combined into a mental model. The mental representation model visualizes the attributes and benefits taken into account when making the residential purchase decision. The decision made is the decision for the current cultural-historical building in which people live (revealed sample group) or the decision for a future home (stated sample group).

Not all attributes and benefits can be visualized in the (mental representation model) CNET model. Firstly, the attributes and benefits are not given the same level of importance everywhere. In addition, for the sake of clarity, it is good to limit oneself to the most preferred attributes. The top six attributes for both sample groups were examined. Depending on the attribute group, benefits were presented to the respondents as explained. Since choosing standard options yields much more of the same answers, it was decided to only include benefits if they were included by more than 40% of the respondents (who were presented with this question) (Appendix C.3). This works differently for the option 'other' since the chance of getting the same answer many times is much lower. If the same answer is given in the open-format questionnaire part by 10% of the respondents, the benefit is included.

In addition, it may be that certain benefits do not have a strong relationship with one attribute, but are included in the final CNET model because of a strong relationship with another attribute. If there is a relationship mentioned by multiple people, even if this was not given by 40% of the respondents, but the benefit is listed in the table with a percentage over 40% in another category, a causal link will still be made between the attribute and the benefit. Within Appendix C.3., Tables C7 and C8 the benefits marked in green are the pre-defined benefits that have been named by more than 40% of the respondents or the benefits self-defined by more than 10% of the respondents. This is also visible in Tables 39 and 40. Tables 39 and 40 show a bar chart of the benefits of the six most mentioned purchasing attributes. The black vertical line indicated the 40% mark. In addition, within Appendix C.3 in Tables C7 and C8, several benefits are marked in yellow. These are benefits that have not been filled in/marked by 40% (or 10% self-defined) within certain attributes but have achieved these percentages in other attribute categories. As just explained, there is a relationship between the attribute and the benefit (only less strong). An example of this is the benefit of 'unique', which is mentioned by over 40% of the respondents in the context of the visibility of structural elements and by 28.9% of the respondents as a benefit of the ceiling height. Finally, all green and yellow marked attributes and benefits (Tables C7 and C8) are combined in a mental representation (CNET) model for both the revealed and stated sample group. This can be seen in Figure 8 and Figure 10.
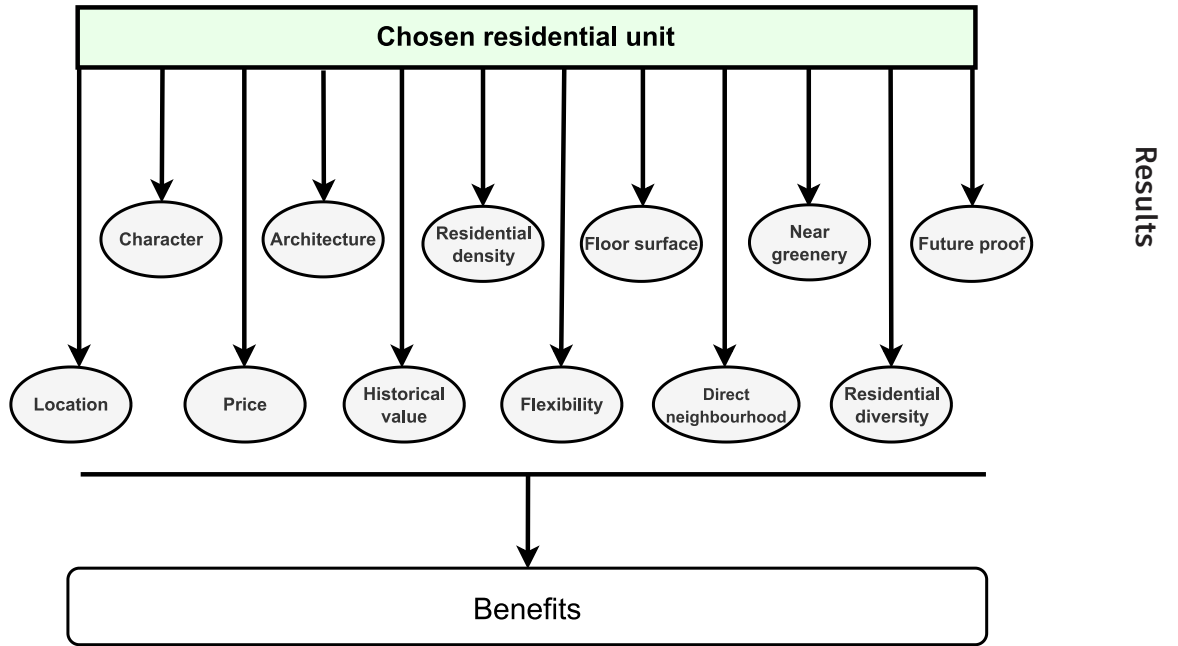
Figure7
Open-ended CNET, revealed preferences
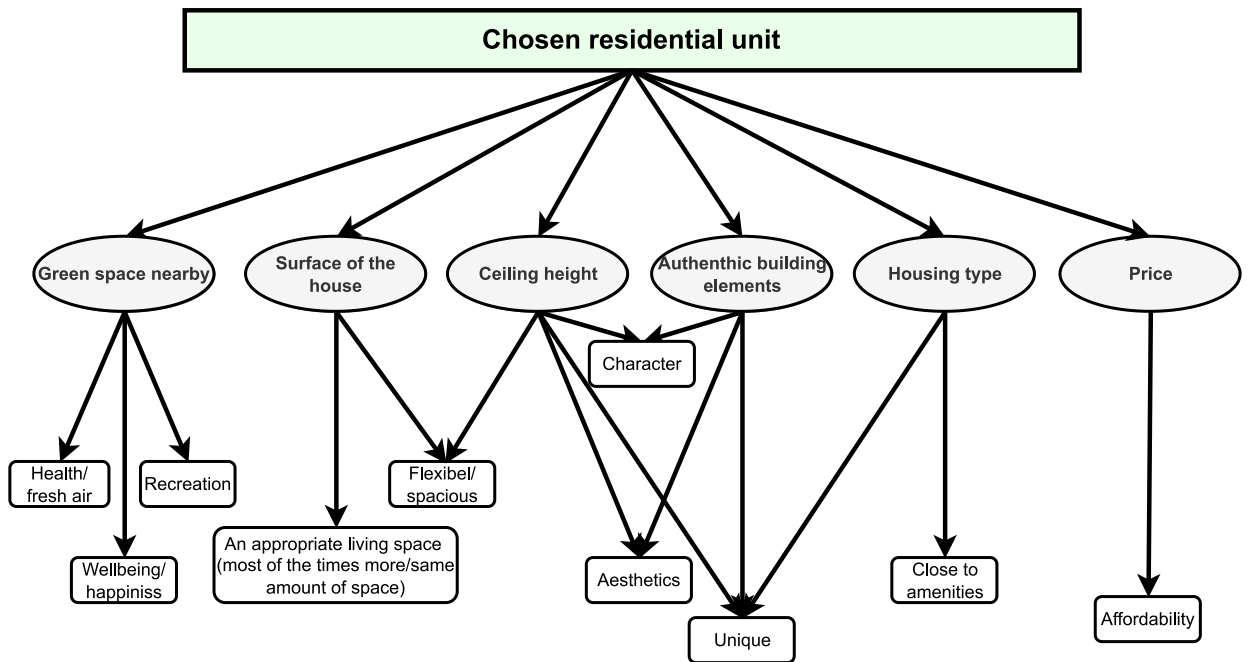
Figure 8
Closed-ended CNET, revealed preferences

Revealed choice
Attributes
Benefits
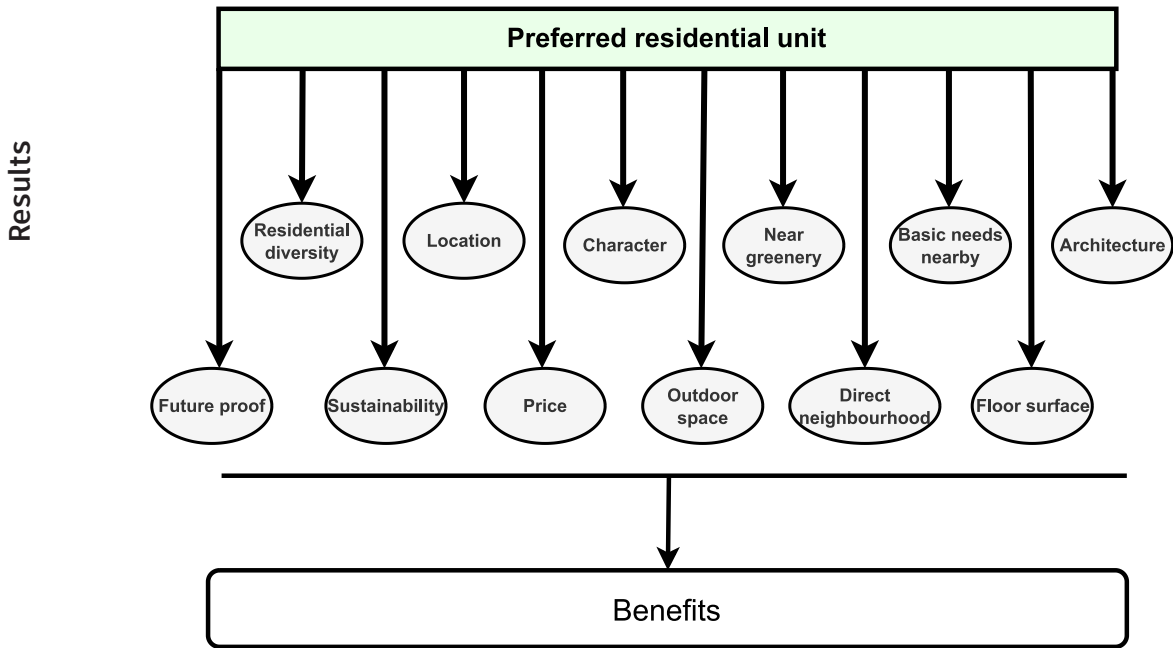
Figure 9
Open-ended CNET, stated preferences
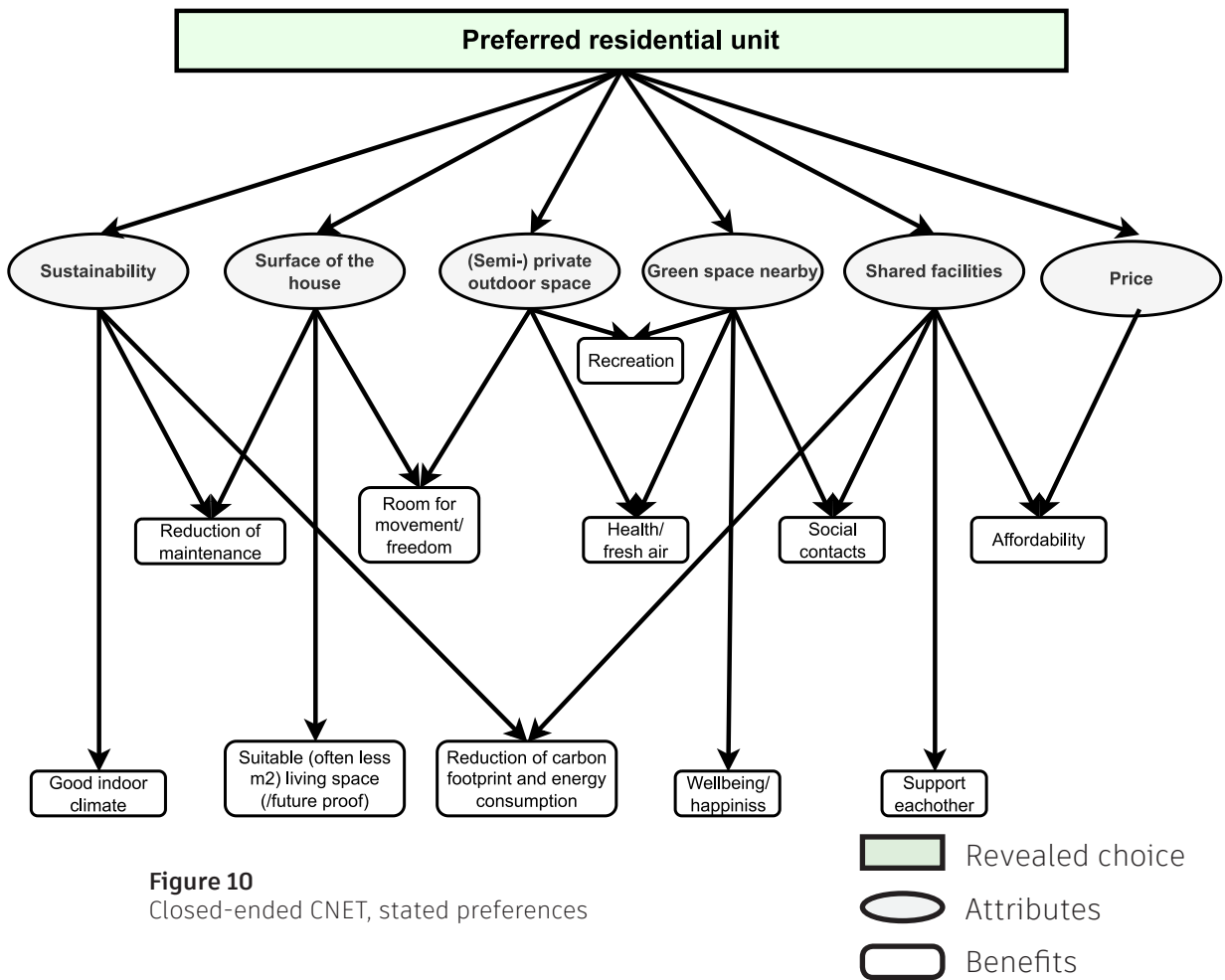
Figure 10
Closed-ended CNET, stated preferences

The results show that the mental models differ greatly for the revealed and stated groups. Property-related attributes such as the surface of the house, type of house, on-site parking facilities, outdoor space, modernity of the house, high ceilings, authentic structural elements, the identity of the house, monumental status and the rich history are generally considered important for people in the revealed research group. When looking at the considerations behind this choice, it appears that mainly spaciousness, the flexibility of the space, aesthetics/appearance, character and uniqueness are reasons for this. In addition, greenery and price are also seen as important attributes. The reasons for this lie mainly in the mental and physical benefits that this provides through, among other things, relaxation options and the affordability of the home.

On the other hand, environmental (and social) attributes appear to be more important for the stated research group. Low pollution, high safety, shared facilities, a good mix of functions and types of housing in the neighbourhood and the distance to basic needs are important attributes. Social contacts and the supportive role shared facilities provide are important considerations. In addition, mental and physical well-being/ health, just like in the revealed group, play a role in the importance given to certain attributes such as greenery in the environment and outdoor space. In addition, sustainability is seen as an important attribute in the reduction of CO_2 emissions, lowering maintenance and energy costs and creating a good indoor climate.

Finally, within the attributes that are considered important by both the revealed and stated group, there is a difference in the considerations behind the choice of the attributes. In the revealed group, for example, the importance of the floor space is chosen from a spatial point of view, while within the stated group the importance of this attribute is chosen because there is a need for less maintenance and an increase in mobility benefits.

Discussion and Conclusion

7.   Discussion and Conclusion

This research studied the mental representations behind a residential purchasing choice (revealed sample group) or a hypothetical residential purchase choice (stated sample group) of a cultural-historical property, through online-CNET interviews. The attributes and underlying motives for choosing a cultural-historical building were mapped to answer the main research question:

What are the revealed and stated mental representations of home seekers for cultural-historical transformed buildings?

The main research question was answered based on four sub-questions. First, how can the profile of a buyer of cultural-historical buildings be described? Second, what are the characteristics that describe a cultural-historical building? Third, which attributes are taken into account when choosing a cultural-historical building? And fourth, what are the underlying motives (benefits) for choosing a cultural-historical building? Based on the literature study a cultural-historical building is defined as:

A building of regional or national importance that is considered worthy of preservation and can be protected through a monumental status.

From this definition, it was decided to focus the research on transformed buildings built between approximately 1850 and 1950.
In the next section, the main research question will be answered based on four sub-questions.

First, the research outlined the buyer's profile (based on the socio-demographic data of the current homeowners of cultural historical properties) as well educated, having a middle-high level of income, being relatively old and having a relatively small household size. The largest demographic differences between the revealed and stated groups are observable in the age distribution and level of income (75.2% > 45 years old, revealed sample group vs 99.0% > 45% stated sample group and 61.0% middle high-high income, revealed sample group vs 50.5% middle high-high income, stated group).

Second, following the definition of a cultural-historical building, most transformed cultural-historical buildings within this study have a monumental status. The largest housing supply is apartments, followed by lofts and homes. The average living space is likely above the average floor space within the Netherlands of 105m2. The buildings often have a central location within the town or city. Facilities such as parking, outdoor spaces and the entrance are shared in most of the buildings. The survey provided limited answers concerning the cultural-historical attributes. However, based on the attribute valuation, the ceiling height is the most

sought-after cultural-historical attribute for cultural-historical buildings, followed by the visibility of authentic structural elements, the uniqueness and identity of the home (architectural features) and the large window dimensions and rod distribution (window frame).

Third, the revealed group considered the surface of the house, green space nearby, ceiling height, price, authentic building elements, and housing type as important. Concerning exterior architectural elements, the type of brick, the laying bond, facade decoration, roller layers and arches above windows and doors appeared to be highly valued.
For the stated sample, sustainability is considered most important followed by green space nearby, the surface of the house, shared facilities, price and outdoor space.

Fourth, for the revealed group, the focus was mostly on appearance and atmosphere, resulting in aesthetics, character, uniqueness, spaciousness and flexibility being considered as important benefits. In addition, health/ well-being and affordability were important decision considerations.
For the stated group, social contacts/ social control were more important. Future orientation plays a major role, so affordability but also less maintenance were important considerations. In addition, the importance of health and well-being benefits was also put forward within this group.

Focussing on the main research question, the mental model for the revealed sample groups showed that the decision for a cultural-historical property was mainly based on the visual characteristics of the home and immediate surroundings. High ceilings, visible structural elements and architectural details such as the type of brick, the laying bond, facade decoration, roller layers and arches above windows and doors, appeared to be appreciated by many respondents. This shows the aesthetic, characteristic and unique elements of the house were important considerations. In addition, spaciousness and flexibility in the design appeared to be important benefits of the building attributes high ceilings and the surface area of the house. Concerning the home surface, many people stated that they wanted more space or that they did not want to sacrifice (much) space when moving to their current apartment. This was in accordance with the large average housing size of the revealed group. Next, the proximity to green appeared to be an important attribute, which has health and recreational benefits. Finally, the price of the property was important, influencing the affordability of the property.

For the stated group, environmental and social factors were more important within the mental representations. The living form, social contact, less maintenance and health benefits were often mentioned. Therefore, much attention was paid to the attributes that promote health, well-being and social control. Shared facilities, outdoor space, and greenery in the area were the six most mentioned attributes. Shared facilities played a major role in the affordability of the home consideration. Keeping

enough money for retirement was often mentioned as a motivator. This also contributed to the great appreciation for sustainability. Furthermore, low pollution , high safety, a good mix of functions and types of housing in the neighbourhood and the distance to basic needs were important attributes. Nevertheless, cultural-historical attributes such as high ceilings, large windows and authentic elements were experienced as less important, compared to other attributes.

Differences were observed between the mental representations of the revealed and stated groups. First, shared facilities and the central location mentioned as characteristics of cultural-historical buildings were not considered as important within the revealed group as it was among the stated sample. Second, in both groups the importance of the floor surface was mentioned, however, the considerations were different. Within the revealed group, spaciousness was important while less maintenance and better mobility were important considerations for the stated group. This is in accordance with the large average housing sizes of the revealed group. This difference may have been caused by the fact that the stated group had a relatively slightly lower income and is slightly older according to the demographics. Finally, the appreciation of architectural attributes of cultural-historical buildings is much higher within the revealed group.

The comparison of mental models with the expectations based on the literature review indicated several differences as well. Contrary to the research by Harahap *(2018)* and Dath Datta, price did not appear to be the most important attribute influencing the purchase. In addition, research showed that good housing conditions, security and energy efficiency are often perceived as important for older people. Environmental facilities appear to be the dominant factor in housing choice. The greenery around the house, basic needs within walking distance, a safe living environment and a future-proof house are important *(Blijie et al., 2009; Mulliner et al., 2020)*. Literature also states that additional space around the house and a garden are generally perceived as less important *(Mulliner et al., 2020)*. This corresponds with the results of the stated group but contrasts with the results of the revealed group. The relatively older target group and small household size created the expectation that the revealed group would prefer to live in a smaller house, within walking distance of basic needs. Contrary to this belief, the people living in cultural-historical buildings appeared to be a specific target group whose housing preferences do not entirely match the expected attributes based on the literature. Visual features had the dominant factor.

The study conducted in this paper does come with its limitations influencing the interpretations of the results and the conclusion. First, the revealed research sample consists of 129 respondents, which is rather small. This sample is too small to draw strong conclusions about socio-demographic characteristics. A larger sample group is also needed to be able to determine the characteristics defining a cultural-historical

building with more certainty. To do this, the survey would have to be distributed within other provinces. In addition, a larger research sample would also make it possible to compare different types of heritage.

The gender distribution within the revealed research sample could have also skewed the outcome of the research. The revealed sample consists of more men (62%) than women (38%). Research by Shawki *(2007)* indicated that men and women have similar housing preferences, but can have different considerations . They state that women more often attach a higher value to social networks and the home and men more often have practical considerations. Since it cannot be said with certainty whether there are more men than women living in cultural-historical buildings, this may have caused a bias within the results.

Lastly, it is possible that the research location, Klokkenberg influenced the outcome of the research. This location provided approximately 10% of the sample group. Respondents to the survey indicated that this is medical heritage (an old sanatorium), within the theoretical framework, however, no previous research has been performed on this type of heritage. This type of heritage may have different characteristics compared to religious, industrial and school heritage. Klokkenberg is located on an estate and therefore has different environmental attributes. This may have influenced the research results. Other attributes and benefits could be perceived as important by respondents within this group.

This research showed that the residents of cultural-historical buildings value other attributes than was expected based on the literature. Furthermore, it showed that the mental representations of the stated sample differed greatly from those of the revealed sample group. Therefore, it could be concluded that the residents of cultural-historical buildings are a group in themselves. The recommendations were based on the mental models of the revealed sample since this is the group that has decided to live in cultural-historical buildings.

Knowing that a large part of the revealed group has chosen to live in a transformed cultural-historical building for the reasons of having high ceilings, visible structural elements and larger living spaces, it is recommended to designers and real estate developers to not make large changes that would limit the spaciousness of the building, as this seemed to be favoured. In addition, it is recommended to preserve the structural elements and the old aesthetically pleasing elements where possible as well, since the aesthetics and character are frequently named benefits. Finally, if the property is located on a larger plot, the parties involved in this design should strive to facilitate/maintain enough greenery around the building, besides, maintaining parking facilities where possible. Nevertheless, when a choice needs to be made between maintaining green or creating parking facilities, green seemed to be favoured over parking facilities.

For future research, it could be beneficial to find out how many of the Dutch population are interested in living in cultural-historical buildings. Subsequently, questioning a larger sample group about the cultural-historical characteristics that are still present in their home, could make the mental representation model more accurate. This could also lead to the opportunity to match a mental representation model to specific types of real estate properties.

Reflecting on the conducted research, the willingness to participate, enthusiasm and hospitality within the research was higher than expected. What may have helped with the high response rate was the personal information, mail address or the QR code on the flyer. In addition to the possible trust that was created with this, it gave the possibility to send an email when the questionnaire failed to open (something that has been used extensively). It was also noticed that the response time in which people fill out the survey mainly focuses on the first three days of delivery. However, it is important to give people enough time to complete the survey because even at the end of the four weeks (after which the survey was closed), responses kept coming.

Concerning the research method, some suggestions for improvement could be made. First, it would be better to first ask the respondents to select the attributes matching the open-ended attributes and second, to ask the respondents to mark additional important attributes. Then, the manual analysis of the attributes in the open-ended format will have a smaller bias. Because it can be checked which attributes match the respondent their previously written attributes.

Next, within the current research, the attributes that may influence a purchase choice are based (in the closed-ended part) on a literature study that has been conducted. Since no literature could be found that showed that certain cultural-historical attributes influenced the purchase choice, the attributes were now based on flyers/brochures and online sales advertisements. The assumption was made that if certain motives were mentioned they were possibly considered important. Therefore, the chance of missing important attributes and benefits was high. Now, in the closed format, certain attributes such as influence in the design, flexibility and open layout are not included. It is therefore impossible to say with certainty whether these attributes would ultimately belong to the most important attributes.

In retrospect, it might have been better to conduct two separate studies, knowing that the response rate was relatively high. By first asking a group in an open format about the important attributes that influenced the sale and then drawing up a new list of attributes from this list, covering all the mentioned attributes.

O.L.V. v.d BOSCH

(HRS Wonen 2022)

Appendix

9.   Appendix

Appendix A, research method

A.1   Questionnaire

Step 1, the respondents will receive the following welcome message:
"Welcome to the graduation thesis research on the purchasing motives of individuals for houses/apartments in a cultural-historical transformed building.
You have been selected because you currently live in a cultural-historical transformed building or because you are subscribed to the KilimanjaroWonen newsletter. Within the survey, you will be asked about the motives that led to the purchase of your current home or will influence the purchase of a future house/apartment.
Your answers will be treated confidentially and will be used for academic purposes only. You are completely free to participate in this survey or to end the survey early. Filling out the entire questionnaire is expected to take circa 10 minutes.
If you have any questions about the survey and/or the research, you can contact me online at: e.m.r.stark@student.tue.nl."

The respondent is asked to give consent to the use of their data by agreeing with the concent form:

"Consent form for participation
You are invited to take part in the master thesis research on **Purchasing reasons/ motives of individuals for dwellings/ apartments in a cultural-historical transformed property.**
Participation in this research project is entirely voluntary: you decide if you wish to take part. Before you decide to participate, we kindly request you to read the following information letter (click here), so you know what the research project is about, what we expect from you and how we will process your personal data. Based on this information, you can use the consent form to indicate if you consent in participating in the research project and consent with the processing of your personal data.

You may of course always ask questions to the research project manager via e.m.r.stark@student.tue.nl or discuss this information with your acquaintances.

Through this consent form I recognize the following:

·   I am sufficiently informed about the research through a separate information sheet. I have read the information sheet and have subsequently had the opportunity to ask questions.

These questions have been answered satisfactorily.
· I take part in this research project voluntarily. I do not take part under any kind of explicit or implicit duress. It is clear to me that I can cancel my participation at any moment without having to provide any reason. I do not have to answer a question against my wish.

Besides the above, you can below give your specific permission for various parts of the research.
I permit to process the personal data that are collected from me during the research in the way described in the attached information sheet (read more under section 7 of the information letter).
· Yes
· No

The respondent will be asked how he/she received the questionnaire, since for the two samples a mental representation model will be created.

How did you receive the invitation letter to participate in this research?

· I did receive this invitation letter by post. This means I am currently living in a transformed cultural historical building.
· I did receive the invitation letter since I am subscribed to the KilimanjaroWonen newsletter. (In case you live in a cultural-historical transformation object, please tick the box above instead of this box.)

Transformed means that the building was originally built and used for other purposes. This can among other things, mean religious purposes, educational purposes, and industrial purposes.
In case you live in a cultural-historical transformation object, mark the top box (living in a cultural-historical transformed object

The next steps show the questions submitted to the revealed sample group

Step 2: The respondent will be asked to answer some socio-demographic personal questions.

How would you describe your gender?
What is your age?
What is your family composition?
How many (family) members does your household consist of?
What is your highest achieved level of education?

Step 3: The respondent is asked to create an open list of attributes (with a maximum of eight) which will be important for their future residential purchase (stated group) or have been important within their last residential purchase (revealed group), in order to gain the spontaneous reaction (open-ended CNET).

What are your main buying motives that played a role in the choice of your current home?

Please fill in at least 4 answers

Step 4: The respondent is asked to mark the attributes matching the attributes filled in earlier and to mark potential other attributes, they now see, but did not think of. There are four categories of attributes, property, accessibility, environmental and attributes. First, the respondents will be asked to mark the attribute categories they find the most important. Next, a list of all attributes will be shown (Table 15) and the respondent will be asked which attributes are considered important. A minimum of four attributes must be marked and a maximum of 12 attributes.

First of all we would like to know which main categories you found important when buying your dwelling?

Check all that apply
Please select at least 2 answers

When you were asked to make a list of purchasing motives, you mentioned the following purchasing motives:

A list will be shown with four to eight purchasing motives.

Could you mark the decision variables you gain most important?

Please select from 4 to 12 answers.
Please choose all that apply:

Step 5: The respondent will be asked to order the marked attributes based of importance for them. This order will be used to give a weight to the attributes, as will be explained in the chapter results.

In the last question you mentioned the attributes listed on the left side as important variables. Can you rank these attributes?

Step 6: The underlying benefits are determined, by asking for each marked attribute the question: Why is this attribute important to you?. The option is always given to mention three considerations/ benefits, besides the ones given (Table 17 and 18).

In the last question you mentioned [...]. to have played a role within the purcahse of your current living. Why is this attribute important to you?

Step 7: The respondent will be asked to fill in information about their current housing attributes and income. These information will be used to determine the attributes of a cultural-historical building.

Does the building you live in have a monumental status?
What type of heritage best describes the building you live in?
What best descrbes your house type?
What size is your house?
How many bedrooms does your house has?
Do you have on-site parking options?
How would you descibe your residential location?
Which facilities/ rooms are shared at your residential location?
Are you the owner of the house?
        IF YES
Is this the first house you have bought?
In what year dit you buy your current home?
In which price range did you originally buy your house?
        IF NO
What price do you pay for rent per month?

In which price range is your family income?

A.2 Selection of locations

The locations under which the questionnaire will be distributed have been systematically selected. Table A1 shows the places in which a search was made for transformed buildings with a religious, industrial or school original character that have been transformed. It has been decided to select only buildings that were built during the time of the industrial revolution in the Netherlands (~1850 - ~1950). Furthermore, only larger projects (at least three residential units) will be included in the research.

Table A1
Analysed municipalities

Municipalities North Brabant		
Region Noord-Oost Brabant	**Region Midden Brabant**	**Region Eindhoven**
Bernheze	Dongen	Best
Boekel	Gilze en Rijen	Eindhoven
Boxmeer	Goirle	Geldrop-Mierlo
Boxtel	Heusden	Oirschot
Cuijk	Hilvarenbeek	Nuenen
Grave	Oisterwijk	Son en Breugel
's-Hertogenbosch	Loon op Zand	Veldhoven
Landerd	Tilburg	Waalre
Meierijstad	Waalwijk	
Mill en Sint Hubert	**Large cities/towns around the three regions that will be included**	
Oss		
Sint Anthonis		
Sint michielsgestel	Breda	
Uden	Oosterhout	
Vught	Helmond	

Religious heritage

According to the BHIC archive, North-Brabant had almost 700 (mostly former) monasteries *(Huismans, 2022)*. The BHIC archive has been used to select monasteries, brother houses and boarding houses. Rectories were often excluded, since there has been no large transformation if the residential function did not change.

The BHIC archive often did not provide detailed information concerning rental or owner-occupied. Apartments/ dwellings up for sale on Funda helped with retrieving this information. Second, the monumental status is not always given. Since each municipality has a list of their monuments, the monumental status could be determined. Subsequently, other religious buildings such as places of worship were examined. For obtaining these locations, the list of national and municipal monuments per municipality has been investigated.

Two notable findings were made during the location selection phase of this research. Firstly, there are almost only Catholic churches in Brabant. In addition, it appears that many transformation projects are currently under construction. To cite as an example 'Hemels Wonen' and 'SacreCoeur'. Residential projects in which a church is transformed into owner-occupied apartments/houses. These projects are currently in construction in both Breda and Boxtel *(Provincie Noord-Brabant, 2022; SacreCoeur - Het Project, n.d.)*. Also within Heusden, there is currently a church being transformed into apartments *(JYB architecten, 2022)*. Finally, in Grave, a monastery is being transformed into apartments (RHO, 2020).

Below the complete list of religious redevelopment projects after which a survey will be sent is shown.

(Arendse, 2019)

Religious heritage

Place of joy, reflection, repentance, wonder, mourning and as a final resting place

Religious heritage with a monumental status

's-Hertogenbosch
De Kloostertuynen (monastery)
Orthen 113-117
Construction year: 1887-1920
Transformation year: 2005
31 dwellings
Status of a municipal monument

(Cornelis Huygens, c. 2022)

's-Hertogenbosch
Heilig Hartkerk (church)
Rubensstraat 62
Constrution year: 1951
Transforation year: 2020
12 dwellings
Status of a Municipal monument

(Wijnen architectuur, c. 2020)

's-Hertogenbosch
Kweekschool Concordia en H. Hartmulo (Monastery)
Papenhulst + Choorstraat
Construciton year: 1910-1911
Transformation year 2003
40 apartments
Status of a National monument

(Woonhub Makelaars, 2022)

▪ *Religious heritage municpality 's-Hertogenbosch*

's-Hertogenbosch
Marokkaans consultaat (rectory)
Kapelaan Koopmansplein 113 A-E
Construciton year: 1922
Transformation year 2017
5 apartments
(Bouwmij makelaars, 2021) Status of a National monument

's-Hertogenbosch
Mariënburg (monastery)
Sint Janssingel 200-246
Construciton year: ~1900
Transformation year 2004-2005
23 apartments
(Floris Makelaars, 2021) Status of a National monument

Religious heritage municpality Breda

Breda
Monastery, Klokkenberg
Construction year: 1925
Transformation year: 2017-2022
44 (175) apartments/ dwellings
(Klokkenberg, c. 2022) Status of a National monument

Religious heritage municpality Tilburg

Tilburg
Monastery
Goirkestraat 72-74
Construction year: 1842
Transformation year 2008
26 apartments
(Huisman, 2013) Status of a National monument

Tilburg
Saint Denis (brother house)
Kruisvaardersstraat 32
Construction year:
Transformation year
24 apartments
(Lelieveld makelaardij et al., c. 2022) Status of a municipal monument

Tilburg
Monastery
Cenakel 1-14 Tilburg
Construction year: 1907
Transformation year: 1998
11 apartments
(Lemmens Makelaardij, 2022) Status of a municipal monument

Religious heritage towns/ villages

Boekel
De Cantoreije – church/ chapel
Daniël de Brouwerstraat 17-41
Construction year: 1839-1897
Transformation year: 2004
13 apartments
(Broeckx makelaars, 2022) Status of a national monument

Esch (municipality Boxtel)
Sancta Monica (monastery)
Gestelsweg 8-10
Construction year: 1895
Transformation year: ~2005
16 apartments + 4 dwellings
(Broeckx makelaars, 2022) Status of a Municipal monument

Grave
Monastery
Ruyterstraat 2-28
Construction year: 1828 - 1885
Transformation year: after 1995
14 apartments
Status of a National monument

(Huisman, c. 2020)

Gemert
7th heaven (Nazareth monastery)
Binderseind 32-36
Constrution year: 1847-1852
Transformation year: 2017-2019
25 apartments
Status of a municipal monument

(BL Huisvesting & A. van Schijndel beheer, c. 2022)

Vught
Mariaoord (monastery)
Park Glorieux
Construction year: 1910
Transformation year: -2017
38 apartments
Status of a National monument

(Synchroon, c. 2022)

Waalwijk
Van Kesselkwartier (church)
Pastoor van Kesselhof 18
Constrution year: 1927
Transformation year: 2012
18 apartments
Status of a National monument

(WOONPROJECT KESSELKWARTIER, 2015)

Religious heritage without a monumental status

Dongen
KICKSTRT (pastory)
Sint Josephstraat 114
Constrution year: unknown
Transformation year: 2016-2018
8 tiny apartments
No monumental status

(Klerx, 2017)

Goirle
Fratersveste
Fraterstuin 18
Constrution year: 1850
Transformation year: 2009
6 apartments
No monumental status

(K3 architectuur, c. 2022)

Oosterhout
Kapucijnenhof (monastery)
Kapucijnenhof 36-78
Constrution year: 1954
Transformation year: 2009
22-24 apartments
No monumental status

(Kapucijnenhof 56, c. 2022)

(Gemeente Geldrop-Mierlo-Team Strategie en beleid, 2021)

Industrial heritage

Industrial heritage

Since industrial heritage transformation projects are difficult to find, it was decided to conduct research differently. The largest (industrial) cities/towns within the research area were examined. The large cities in North Brabant such as 's-Hertogenbosch, Tilburg, Eindhoven and Breda generally appeared to contain a lot of former industry. Helmond, Oss, Dongen, Hilvarenbeek, Waalwijk and Oosterhout also turned out to be large industrial cities/villages. Within these cities, a specific search was made for the repurposing of industrial objects, including objects without monumental status.

As described in Chapter 2, Theoretical framework, the textile and tannery industry was large in the cities of Brabant. Dongen, Oosterhout and Waalwijk all have transformed tanneries and textile factories. In Waalwijk, during the transformation of both the steam shoe factory and the chrome leather factory, only the front facade was preserved *(Allround makelaardij, 2022)*. Industrial objects where this is the case were not included in the study, because not enough elements were preserved, after which the respondent can be asked. For a similar reason, it was also decided not to include 'Het Patroon' in Oss in the study *(Kreule, 2020)*.

The complete list of industrial redevelopment projects after which a survey will be sent is shown in a list below.

Industrial heritage with a monumental status

's-Hertogenbosch
PNEM-industry
van Diepenbeeckstraat 2-?
Construction year: 1922
Transformation year: 1996
11 apartments
(Van Goeden Huyze, 2022)   Status of a Municipal monument

Tilburg
Wine warehouse
Poststraat 29
Construction year: 1923
Transformation year: 2005
5 apartments
(Van Oers makelaardij, 2021)   Status of a municipal monument

Eindhoven
Lichttoren (Philips building)
Mathildelaan 1
Construction year: 1909-1921
Transformation year: 2005-2009
128-177 apartments
(BNA Onderzoek, c. 2022)   Status of a National monument

Eindhoven
Bread factory
De Vriesstraat 24A-E
Construction year: 1924
Transformation year: unknown
(Hendrix and Huybregts   5 apartments
makelaardij, z.d.)   Status of a Municipal monument

Eindhoven
NRE twee
Nachtegaallaan 13A-J
Construction year: unknown
Transformation year: 2014-2018
12 dwellings
Status of a municipal monument

(MAC architecten, z.d.)

Dongen
Tannery
Hoge Ham 7-9 Achter den Ham
1 t/m 15
Construction year: 1866
Transformation year: 2005
8 apartments
Status of a National monument

(BOEi, c. 2022)

Dongen
Shoe factory
Kardinaal Van Rossumstraat 84-116
Construction year: 1905-1935
Transformation year: unknown
15 apartments + 2 dwellings
Status of a National monument

(JF FRANKEN ARCHITECTUUR, z.d.)

Waalwijk
wallpaper warehouse
Kerkstraat 4-8
Construction year: 1887
Transformation year: 1998
3 dwelling
Status of a National monument

(rijksmonumenten.nl, 2020)

Geldrop-Mierlo
wool fabric factory
Parallelweg 25A-F
Construction year: 1913
Transformation year: unknown
6 dwellings
Status of a National monument

(Gemeente Geldrop-Mierlo-Team Strategie en beleid, 2021)

Oosterhout
Tannery
Pastoor De Bresserstraat 1-3
Construction year: 1917
Transformation year: unknown
3 dwellings
Status of a National monument

(Moons, z.d.)

Industrial heritage without a monumental status

Dongen
De Hoogt (Tannery)
Jan Willemstraat 13
Construction year: unknown
Transformation year: unknown
6 dwellings
No monumental status

(Luypen & Hoefnagel totaalbouw, z.d.)

Oisterwijk
Paint factory
Almystraat 20-64
Construction year: 1924
Transformation year: 2009
26 dwellings
(Boei & Nico en de Bont, z.d.) No monumental status

Tilburg
Post office
Kuiperstraat 1A-C..
Construction year: 1906
Transformation year: 2004
(Jurgens en van Bemmelen, 11 apartments
z.d.) No monumental status

Tilburg
Iron foundry (later church)
Piushaven
Construction year: 1899
Transformation year:2016
20 apartments
(J.A. van Gisbergen, c. 2016) No monumental status

School heritage

School heritage is the smallest category within these three categories of heritage. School buildings often have no monumental status, which means that they are less often repurposed. As discussed earlier, Dongen is an example of a municipality with a well-ordered list of cultural heritage (and monuments) *(Dongen, 2016)*. As a result, many transformed objects without monumental status could be found in Dongen. In addition, Funda has also been used for this category. In this way, the old craft drawing school in Oss has been found as a redevelopment project (without monumental status).

The complete list of industrial redevelopment projects after which a survey will be sent is shown below.

School heritage

School heritage with a monumental status

's-Hertogenbosch
School
Geldersedam 29-34
Construction year: 1924-1929
Transformation year: 2014-2018
10 dwellings
Status of a municipal monument

(KilimanjaroWonen, z.d.)

's-Hertogenbosch
School
Jan Schöfferlaan 10-14
Construction year: 1931
Transformation year: unknown
4 apartments
Status of a municipal monument

(VDH wonen, z.d.)

Eindhoven
School
Jan Smitzlaan 9-01 - 9-39
Construction year: 1932
Transformation year: 2009
20 apartments
Status of a National monument

(Janssen Steijlen, z.d.)

Eindhoven
School
Akkerstraat 30
Construction year: 1932
Transformation year: 2009
21 apartments
Status of a municipal monument

(MAC architecten, z.d.)

Uden
School
Walterus Pijnenborghhof
Construction year: 1921-1922
Transformation year: unknown
33 apartments
Status of a National monument

(Van der Krabben Makelaardij Uden, 2022)

Helmond
Carolus Residentie, School
Mierloseweg 5 - 9D
Construction year: 1925
Transformation year: 1992
16 apartments
Status of a municipal monument

(van Santvoort makelaars, 2022)

School heritage without a monumental status

Dongen
School
Pastoor Dirvenstraat 1 t/m 11
Construction year: 1950
Transformation year: 2015
14 apartments/ dwellings
No monumental status

(This side up the builders company et al., z.d.)

Dongen
Music school
Julianastraat 122
Construction year: 1939
Transformation year: 2015
5 dwellings
No monumental status

(The side up b.v., 2014)

Tilburg
Maria Mavo (MULO)
Norbertijnerpoort 4
Construction year: 1921
Transformation year: 2007
8 apartments
No monumental status

(Hart van Brabant Makelaardij, z.d.)

Oss
Ambachts en Teekenschool
Monsterstraat 4 A-K
Construction year: 1906
Transformation year: unkown
11 apartments
No monumental status

(Akker Makelaardij, 2021)

Distribution of questionnaires

The questionnaires were sent on the following days:

Questionnaire to subscribers of KilimanjaroWonen
Date: 6-16-2022

Questionnaire to people living in cultural-historical buildings:
Day 1: Date: 5-31-2022
The questionnaires within 's-Hertogenbosch, Oss,
Uden, Boekel, Gemert, Helmond, Gelderop and Eindhoven
is delivered
Day 2: Date: 6-2-2022
The questionnaires within Tilburg is delivered
Day 3: Date: 6-3-2022
The questionnaires within Esch and Vught are delivered
Day 4: Date: 6-4-2022
The questionnaires within Waalwijk, Dongen, Oosterhout,
Breda and Goirle are delivered
Day 5: Date: 6-6-2022
The questionnaires within Oisterwijk is delivered
Day 6: Date: 6-7-2022
The questionnaires within Grave is delivered

The flyer below was sent to the adresses.:
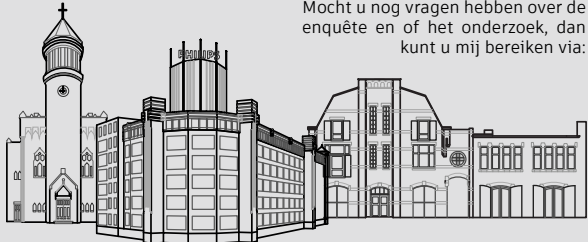
Online enquête

Beste bewoner(s) van dit adres,

Mijn naam is Eva Stark en ik ben een masterstudent bouwkunde aan de Technische universiteit Eindhoven. Voor mijn **afstudeeropdracht**, doe ik onderzoek naar de koopmotieven van mensen die in een cultuurhistorisch pand wonen. U krijgt deze enquête omdat u in een cultuurhistorisch herbestemt pand woont. Uw antwoorden kunnen bijdragen aan kennis voor het behoud en herbestemming van cultureel erfgoed.

De vragenlijst is online bereikbaar en zal naar verwachting ongeveer **10 minuten** in beslag nemen.

Mocht u nog vragen hebben over de enquête en of het onderzoek, dan kunt u mij bereiken via:

e.m.r.stark@student.tue.nl

Ga naar:

https://tueindhoven.limequery.com/775346?lang=nl

Scan mij

of

Alvast bedankt!

TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY

Appendix B, data preparation

B.1 Removing missing values

The number of responses was filtered back from 336 to 234, by removing the incomplete questionnaires.

Table B1
Survey dropout

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	4	1.2	1.4	1.4
	1	2	0.6	0.7	2.1
	2	6	1.8	2.1	4.1
	3	5	1.5	1.7	5.8
	4	13	3.9	4.5	10.3
	5	11	3.3	3.8	14.0
	6	11	3.3	3.8	17.8
	7	1	0.3	0.3	18.2
	8	2	0.6	0.7	18.8
	9	2	0.6	0.7	19.5
	10	1	0.3	0.3	19.9
	11	234	69.6	80.1	100.0
	Total	292	86.9	100.0	
Missing	System	44	13.1		
Total		336	100.0		

44 people stopped the questionnaire without answering a question. Then 58 respondents stopped during the questionnaire.

Subsequently, three responses were removed, as these respondents had indicated that they did not agree with the privacy statements.

B.2 Recoding variables

Several variables are recoded.

B.2.1 Recoding socio-demographic variables
To perform the analysis, variables must be recoded. The recoding of the variables: the highest level of education, family composition and level of income will be explained.

Table B2
Regrouping + re-categorizing of the achieved level of education for the revealed and stated group

Old categories	N revealed group	N stated group	New categories	N revealed group	N stated group
None	-	-	Low	6	5
Elementary school (special education)	-	-			
Lower vocational education or secondary special education	2	1			
Vmbo or learning path support education (inclusive theoretical learning path)	1	1			
Mavo	3	3			
Havo	4	5	Middle	16	19
Pre-university education, gymnasium, athenaeum	4	3			
Mbo	8	11			
Hbo	62	53	High	107	77
University, inclusive post graduate training, PHD education	43	23			
Other	2	2	Missing	0	1

For the revealed group:
· HTS bouwkunde, has been recoded into HBO
· WO, exclusive PHD, has been recoded into University, inclusive post graduate training, PHD education
·
For the stated group:
· University without PHD, has been recoded into University, inclusive post graduate training, PHD education.

Table B3
Re-categorizing the family composition for the stated group

Categories	N	New N
Single without children	27	28
Single with children	3	3
With partner without children	57	58
Multi-person household without children	1	1
Family/ multi-person household with children	20	21
Other	3	
Total	102	102

· A LAT relationship (no children involved) has been recoded into single without children.
· Senior/ no children has been recoded into single without children.
· Remarried with 2 children living at home and two not living at home anymore has been recoded into family/ multi-person household with children.

Table B4
Regrouping level of income for the revealed and stated group

Old categories	N revealed group	N stated group	New categories	N revealed group	N stated group
< € 28,080	4	9	Low	4	9
€ 28,080 - € 46,800	30	31	Low-Middle	30	31
€ 46,800 - € 93,600	47	41	Middle-High	47	41
> € 93,600	33	11	High	33	11
Missing	15	11	Missing	150	11

B.2.2 Recoding living and housing variables

The recoding of the variables: type of heritage and residential location will be explained.

Table B5
Regrouping + re-categorizing type of heritage for the revealed group

Old categories	N revealed group	New categories	N revealed group
Religieus heritage	53	Religieus heritage	54
Industrial heritage	34	Industrial heritage	34
School heritage	25	School heritage	26
		Medical heritage	13
Other:	17	Missing	2

·   Responses indicating that they live on Klokkenberg are recoded into medical heritage.
·   An old office has been recoded into missing. (This respondent probably lives in the former PNEM industry building 's-Hertogenbosch. This building has been included in the research as industrial heritage.)
·   A building that is both a religious and school heritage has been recoded into religious heritage. (Literature research shows that many buildings were first built for religious purposes, after which they were transformed into school buildings and later housing.)
·   Old school ("identity-determining object") will be regrouped under school heritage.

Table B6
Regrouping + re-categorizing residential location for the revealed and stated group

Old categories	N revealed group	N stated group	New categories	N revealed group	N stated group
City centre	47	22	City centre	49	22
City (outside the ring)	17	21	City (outside the ring)	14	21
Suburb	6	9	Suburb	5	10
Town (>5000 inhabitants)	36	37	Town (>5000 inhabitants)	36	37
Village	8	6	Village	10	7
			Barton		
Other	17	3			
			Missing		2

For both the revealed and stated group:
· Responses indicating that they live on Klokkenberg or describing their residential location as 'barton' are recoded into a new added group barton.
· Outside the city centre (but within the ring), will be reclassified into city centre. (Respondents probably want to indicate they live outside the 'often car-free' city centre, but within the ring road.)
· Rural areas outside built-up areas are regrouped under village
· Small village will be regrouped under village
· Outside the built-up area will be reclassified under village.
· Outside the city will be reclassified under suburb.
· Answer of respondent answering 'outside' will be marked as missing.
· Answer of respondent answering 'no preference' will be marked as missing.

Table B7
Regrouping + re-categorizing shared facilities

Old categories		N revealed group	N stated group	New categories		N revealed group	N stated group
Shared facility 1	Communal garden	78	76	Shared facility 1	Communal outside space (garden, barton, (roof)terrace, balcony,BBQ, playground and sitting spots	87	76
Shared facility 2	Communal parking	90	61	Shared facility 2	Communal parking/ bike sorage	90	61
Shared facility 3	Common entrance	88	30	Shared facility 3	Common entrance/ hall/ atrium	90	30
Shared facility 4	Commonal living room	6	22	Shared facility 4	Communal living room/ kitchen/ meeting room/ conference room	13	30
				Shared facility 5	Common indoor facilities/ recreation room (fitness, workshop, guest room, laundry room and storage)	5	8
Other:		25	15				
No answer	No communal space	21	11	No answer	No communal space	10	10

B.2.3   Recoding open-ended CNET

For the open-ended CNET, 581 buying motives were entered in the revealed group, which were manually regrouped into 42 categories. for the stated group, 460 buying motives have been entered, which have been manually regrouped into 32 categories. Table B8 and B9 show the regrouped categories and the number of respondents who filled in certain purchasing motives.

Table B8
Full list of open-ended attributes, revealed group

Mentioned attributes	Abbreviated	N
Location/ position (unspecified)	Location	60
Character / atmosphere / different / special	Character	57
Price/ affordability/ financially feasible/ cost	Price	48
architecture/ building style/ beautiful building/ stylish	Architecture	45
A cultural-historical building/historical value/a past/memorial value	Historical value	41
Location close to/within city/centrum	Residential density	35
Layout / self-renovation / self-influence	Flexibility	27
Space (spacious feeling) /floor surface	Floor surface	24
Environment/ preserved cityscape/neighbourhood	Direct neighbourhood	24
Green space nearby	Near greenery	24
Housing form (CPO)/ social contacts/ diversity	Residential diversity	21
Low maintenance/ convenience / single floor / easy to clean / future proof / downsizing	Future proof	18
Availability/ own house/ ability to buy (in future)/ tipped by friend		17
(Semi-)private outside space		15
Modern/ new inside-old outside		15
Combination of old exterior and modern interior		15
Close to the station/ accessibility		12
Ceiling height		11
Building quality/ quality of renovation		10
Windows		10
Rust/ privacy		9
Proximity to services/ basic needs		8
Financial motive/ investment/ value retention		8
Parking on-site (/close to)		7
Monumental		7
Authentic building elements		7
Location close to family/friends		7
Felt right/ positive/ right moment/ something new		7
Housing type		5
Child friendliness/ social control/ safety		5
Sustainability/ energy-neutral/ gasless		4
Number of bedrooms/ family composition		3
Shared facilities		3
VVE		2
Living (comfort)		2
VVE no effort outdoor maintenance		1
Entre		1
Status		1
water		1
House itself (unspecified)		1
Building (unspecified)		1
Project setup		1

Top 12 attributes

Table B9
Full list of open-ended attributes, stated group

Mentioned attributes	Abbreviated	N
Low maintenance/ convenience / single floor / easy to clean / future proof / downsizing	Future proof	81
Sustainability/ energy-neutral/ gasless/ hergebruik/ recyclen	Sustainability	41
Housing form (CPO)/ social contacts/ diversity/ amount of housing units	Residential diversity	40
Price/ affordability/ financially feasible/ cost	Price	32
Location/ position other	Location	40
Green space nearby	Near greenery	20
Character / atmosphere / different / special / appearance	Character	19
(Semi-)private outside space	Outdoor space	19
Proximity to services/ basic needs	Basic needs	18
Environment/ preserves cityscape/ neighbourhood	Direct neigbhourhood	16
Space (spacious feeling) /floor surface	Floor surface	14
Common facilities	Shared facilities	14
architecture/ building style/ beautiful building/ stylish		12
Location close to/ within city/ centrum		12
Close to the station/ accessibility		11
Living in a cultural-historical building/historical value/home with a past/memorial value		10
Rust/ privacy		8
Modern/ new inside-old outside		7
Child friendliness/ social control/ safety		7
Housing type		7
Light/ sun		7
Building quality/ quality of renovation/ quality of materials		6
Location close to family/friends		6
Availability/ own house/ (possible future) ability to buy/ tipped by someone		6
Living (comfort)		5
Financial motive/ investment/ value retention		3
Number of bedrooms/ family composition/ room for logés		3
Ceiling height		2
Monumental		2
Parking on-site (/close to)		1
(close to public)water		1
Ease		1

Top 12 attributes

B.2.3   Recoding closed-ended CNET

The closed-ended CNET already has defined attributes. However, an extra score is calculated depending on the ranking that the respondents assigned to the attribute. This could not be directly displayed, such as the number of times an attribute was marked. The calculation behind the score the attributes have received depending on the ranking and the number of times the attribute was mentioned is indicated in Table B10 and B11. In addition, a legend of the attribute abbreviations is shown below:

A1	=	Surface of the house
A2	=	Outdoor space
A3	=	Housing type
A4	=	Number of bedrooms
A5	=	Parking on-site
A6	=	Modernity of the house (kitchen/bathroom etc.)
A7	=	Good maintenance of the public space
A8	=	Sustainability of the property
A9	=	Monumental status
A10	=	Authentic building elements
A11	=	Ceiling height
A12	=	Use/ preservation of authentic materials as tiles/ terrazzo floors
A13	=	(Unique) entry area (hall
A14	=	Reuse of original interior/ exterior doors
A15	=	Preservation of details, ornaments and elements referring to the former function
A16	=	Characteristic windows
A17	=	Unique home with its own identity
A18	=	Rich history
A19	=	Basic needs
A20	=	Distance to recreation
A21	=	Distance to school work
A22	=	Pollution
A23	=	Security/ safety
A24	=	Density
A25	=	Type of housing/ functional mix
A26	=	Green space nearby
A27	=	Shared facilities
A28	=	Price
A29	=	Tax benefits

Table B10
Total attribute score after applying a weight - revealed group

Attributes	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Rank 7	Rank 8	Rank 9	Rank 10	Rank 11	Rank 12	Formula for total score when applying a weight	Total score
A1	18	19	9	8	4	2	5	1	1	0	0	0	=18*12+19*11+9*10+8*9+4*8+2*7+5*6+1*5+1*4+0*3+0*2+0*1	672
A2	3	8	9	0	6	5	2	2	0	0	0	0	=3*12+8*11+9*10+0*9+6*8+5*7+2*6+2*5+0*4+0*3+0*2+0*1	319
A3	19	5	4	0	3	3	1	2	1	0	0	0	=19*12+5*11+4*10+0*9+3*8+3*7+1*6+2*5+1*4+0*3+0*2+0*1	388
A4	0	5	5	2	0	1	0	0	1	2	0	0	=0*12+5*11+5*10+2*9+0*8+1*7+0*6+0*5+1*4+2*3+0*2+0*1	140
A5	0	3	6	6	3	8	4	3	1	1	1	1	=0*12+3*11+6*10+6*9+3*8+8*7+4*6+3*5+1*4+1*3+1*2+1*1	276
A6	3	4	12	4	6	3	4	2	2	1	0	0	=3*12+4*11+12*10+4*9+6*8+3*7+4*6+2*5+2*4+1*3+0*2+0*1	350
A7	0	1	2	1	2	4	2	0	1	0	1	1	=0*12+1*11+2*10+1*9+2*8+4*7+2*6+0*5+1*4+0*3+1*2+1*1	103
A8	4	3	3	3	0	2	3	3	1	0	0	0	=4*12+3*11+3*10+3*9+0*8+2*7+3*6+3*5+1*4+0*3+0*2+0*1	189
A9	10	6	2	4	4	3	3	1	1	0	1	0	=10*12+6*11+2*10+4*9+4*8+3*7+3*6+1*5+1*4+0*3+1*2+0*1	324
A10	3	5	8	14	4	2	3	3	3	1	0	2	=3*12+5*11+8*10+14*9+4*8+2*7+3*6+3*5+3*4+1*3+0*2+2*1	393
A11	2	7	6	9	5	7	7	4	2	0	2	0	=2*12+7*11+6*10+9*9+5*8+7*7+7*6+4*5+2*4+0*3+2*2+0*1	405
A12	0	0	1	0	2	1	0	0	3	1	1	0	=0*12+0*11+1*10+0*9+2*8+1*7+0*6+0*5+3*4+1*3+1*2+0*1	50
A13	0	1	3	1	2	2	1	2	0	0	3	0	=0*12+1*11+3*10+1*9+2*8+2*7+1*6+2*5+0*4+0*3+3*2+0*1	102
A14	0	0	1	0	2	0	1	0	2	1	0	0	=0*12+0*11+1*10+0*9+2*8+0*7+1*6+0*5+2*4+1*3+0*2+0*1	43
A15	0	4	4	5	3	3	2	3	1	1	1	1	=0*12+4*11+4*10+5*9+3*8+3*7+2*6+3*5+1*4+1*3+1*2+1*1	211
A16	1	1	4	3	6	5	3	0	3	1	1	0	=1*12+1*11+4*10+3*9+6*8+5*7+3*6+0*5+3*4+1*3+1*2+0*1	208
A17	0	12	7	5	8	3	4	1	2	0	0	0	=0*12+12*11+7*10+5*9+8*8+3*7+4*6+1*5+2*4+0*3+0*2+0*1	369
A18	0	9	4	4	5	4	3	2	0	5	1	1	=0*12+9*11+4*10+4*9+5*8+4*7+3*6+2*5+0*4+5*3+1*2+1*1	289
A19	3	1	4	6	0	1	2	0	0	1	0	0	=3*12+1*11+4*10+6*9+0*8+1*7+2*6+0*5+0*4+1*3+0*2+0*1	163
A20	1	1	1	1	0	0	0	1	0	1	0	1	=1*12+1*11+1*10+1*9+0*8+0*7+0*6+1*5+0*4+1*3+0*2+1*1	51
A21	0	1	0	1	0	0	0	0	0	1	0	0	=0*12+1*11+0*10+1*9+0*8+0*7+0*6+0*5+1*4+0*3+0*2+0*1	24
A22	1	5	2	7	1	0	0	0	1	0	1	1	=1*12+5*11+2*10+7*9+1*8+0*7+0*6+0*5+1*4+0*3+1*2+1*1	165
A23	2	2	2	5	3	1	3	2	0	0	0	0	=2*12+2*11+2*10+5*9+3*8+1*7+3*6+2*5+0*4+0*3+0*2+0*1	170
A24	1	1	1	1	0	1	0	0	0	0	0	0	=1*12+1*11+1*10+1*9+0*8+1*7+0*6+0*5+0*4+0*3+0*2+0*1	49
A25	5	4	1	2	3	0	1	0	1	0	0	1	=5*12+4*11+1*10+2*9+3*8+0*7+1*6+0*5+1*4+0*3+0*2+1*1	167
A26	5	4	13	8	8	7	3	2	3	3	1	0	=5*12+4*11+13*10+8*9+8*8+7*7+3*6+2*5+3*4+3*3+1*2+0*1	470
A27	2	4	3	2	2	3	0	2	0	0	0	0	=2*12+4*11+3*10+2*9+2*8+3*7+0*6+2*5+0*4+0*3+0*2+0*1	163
A28	16	6	4	6	3	1	1	2	0	0	1	1	=16*12+6*11+4*10+6*9+3*8+1*7+1*6+2*5+0*4+0*3+1*2+1*1	402
A29	0	0	0	1	0	1	0	0	0	0	0	0	=0*12+0*11+0*10+1*9+0*8+1*7+0*6+0*5+0*4+0*3+0*2+0*1	16

Table B11

Total attribute score after applying a weight - stated group

Attributes	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Rank 7	Rank 8	Rank 9	Rank 10	Rank 11	Rank 12	Formula for total score when applying a weight	Total score
A1	15	12	7	7	3	2	2	0	0	0	0	0	=15*12+12*11+7*10+7*9+3*8+2*7+2*6+0*5+0*4+0*3+0*2+0*1	495
A2	4	6	8	5	4	4	3	2	2	0	1	1	=4*12+6*11+8*10+5*9+4*8+4*7+3*6+2*5+2*4+0*3+1*2+1*1	338
A3	15	5	3	4	2	1	0	0	0	0	1	0	=15*12+5*11+3*10+4*9+2*8+1*7+0*6+0*5+0*4+0*3+1*2+0*1	326
A4	1	4	0	1	0	3	3	0	1	2	0	0	=1*12+4*11+0*10+1*9+0*8+3*7+3*6+0*5+1*4+2*3+0*2+0*1	114
A5	1	3	0	4	3	1	3	1	5	0	1	0	=1*12+3*11+0*10+4*9+3*8+1*7+3*6+1*5+5*4+0*3+1*2+0*1	157
A6	1	8	0	8	3	1	1	5	2	0	0	0	=1*12+8*11+0*10+8*9+3*8+1*7+1*6+5*5+2*4+0*3+0*2+0*1	242
A7	0	1	0	0	2	2	0	0	2	3	1	0	=0*12+1*11+0*10+0*9+2*8+2*7+0*6+0*5+2*4+3*3+1*2+0*1	60
A8	1	10	0	11	8	1	0	1	1	1	0	0	=1*12+10*11+0*10+11*9+8*8+1*7+0*6+1*5+1*4+1*3+0*2+0*1	304
A9	1	0	0	2	0	0	0	1	0	0	0	0	=1*12+0*11+0*10+2*9+0*8+0*7+0*6+1*5+0*4+0*3+0*2+0*1	35
A10	1	0	2	1	1	1	2	1	2	1	0	1	=1*12+0*11+2*10+1*9+1*8+1*7+2*6+1*5+2*4+1*3+0*2+1*1	85
A11	1	1	2	1	1	2	2	0	1	0	0	0	=1*12+1*11+2*10+1*9+1*8+2*7+2*6+0*5+1*4+0*3+0*2+0*1	90
A12	1	1	0	0	1	2	1	3	0	0	0	1	=1*12+1*11+0*10+0*9+1*8+2*7+1*6+3*5+0*4+0*3+0*2+1*1	67
A13	0	0	0	0	0	0	0	0	0	0	0	1	=0*12+0*11+0*10+0*9+0*8+0*7+0*6+0*5+0*4+0*3+0*2+1*1	1
A14	0	0	0	0	1	1	1	2	0	1	0	0	=0*12+0*11+0*10+0*9+1*8+1*7+1*6+2*5+0*4+1*3+0*2+0*1	34
A15	1	1	2	2	1	2	1	3	0	0	1	1	=1*12+1*11+2*10+2*9+1*8+2*7+1*6+3*5+0*4+0*3+1*2+1*1	107
A16	0	0	0	1	0	2	0	0	0	0	0	0	=0*12+0*11+0*10+1*9+0*8+2*7+0*6+0*5+0*4+0*3+0*2+0*1	23
A17	4	2	3	1	5	5	2	1	0	0	2	0	=4*12+2*11+3*10+1*9+5*8+5*7+2*6+1*5+0*4+0*3+2*2+0*1	205
A18	0	1	1	1	1	0	1	2	0	0	1	0	=0*12+1*11+1*10+1*9+1*8+0*7+1*6+2*5+0*4+0*3+1*2+0*1	56
A19	3	5	3	2	5	5	1	2	0	2	0	0	=3*12+5*11+3*10+2*9+5*8+5*7+1*6+2*5+0*4+2*3+0*2+0*1	236
A20	0	2	0	0	0	1	0	0	1	0	1	0	=0*12+2*11+0*10+0*9+0*8+1*7+0*6+0*5+1*4+0*3+1*2+0*1	35
A21	0	1	0	2	0	0	0	0	0	0	0	0	=0*12+1*11+0*10+2*9+0*8+0*7+0*6+0*5+0*4+0*3+0*2+0*1	29
A22	0	4	2	7	7	1	5	2	2	2	0	1	=0*12+4*11+2*10+7*9+7*8+1*7+5*6+2*5+2*4+2*3+0*2+1*1	245
A23	0	3	3	9	5	3	3	5	2	1	1	0	=0*12+3*11+3*10+9*9+5*8+3*7+3*6+5*5+2*4+1*3+1*2+0*1	261
A24	0	0	1	2	0	3	3	0	0	2	1	0	=0*12+0*11+1*10+2*9+0*8+3*7+3*6+0*5+0*4+2*3+1*2+0*1	75
A25	5	5	5	6	1	0	3	2	2	0	0	0	=5*12+5*11+5*10+6*9+1*8+0*7+3*6+2*5+2*4+0*3+0*2+0*1	263
A26	9	8	10	5	4	10	5	3	4	1	1	0	=9*12+8*11+10*10+5*9+4*8+10*7+5*6+3*5+4*4+1*3+1*2+0*1	509
A27	11	5	3	7	7	4	4	1	0	2	1	0	=11*12+5*11+3*10+7*9+7*8+4*7+4*6+1*5+0*4+2*3+1*2+0*1	401
A28	12	7	7	4	2	2	2	2	1	2	0	2	=12*12+7*11+7*10+4*9+2*8+2*7+2*6+2*5+1*4+2*3+0*2+2*1	391
A29	0	0	1	0	1	0	0	0	0	1	0	0	=0*12+0*11+1*10+0*9+1*8+0*7+0*6+0*5+0*4+1*3+0*2+0*1	21

Table B12
Full list of closed-ended attributes, revealed group

Rank	N market attributes (fixed CNET)	N	N market attributes + weight applied	N
1	Surface of the house	71	Surface of the house	672
2	Unique home with its own identity	69	Green space nearby	470
3	Green space nearby	62	Ceiling height	405
4	Ceiling height	59	Price (+6)	402
5	Authentic structural building elements	56	Authentic structural building elements	393
6	Housing type	52	Housing type	388
7	Modernity of the house (kitchen/ bathroom etc.)	47	Unique home with its own identity (-5)	369
8	Parking on-site	46	Modernity of the house (kitchen/ bathroom etc.)	350
9	Outdoor space	45	Monumental status (+4)	324
10	Price	44	Outdoor space	319
10	Rich history	44		
11			Rich history	289
12	Monumental status	42	Parking on-site (-4)	276
13	Preservation of details, ornaments and elements referring to the former function	33	Preservation of details, ornaments and elements referring to the former function	211
14	Characteristic windows	32	Characteristic windows	208
15	Sustainability	25	Sustainability	189
16	Security/ safety in the neighbourhood	23	Security/ safety in the neighbourhood	170
16	Shared facilities	23		
17			Type of housing/ functional mix	167
18	(low) level of pollution	21	(low) level of pollution	165
18	Type of housing/ function mix in the neighbourhood	21		
19			Distance to basic needs	163
19			Shared facilities	163
20	Good maintenance of the public space	20		
21	(Unique) entrance (hall)	19	Number of bedrooms	140
22	Number of bedrooms	18	Good maintenance of public space	103
23	Distance to basic needs	14	(Unique) entrance (hall)	102
24	Use/ preservation of authentic materials as tiles/ terrazzo floors	12	Distance to recreation	51
25	Reuse of original interior/ exterior doors	8	Use/ preservation of authentic materials as tiles/ terrazzo floors	50
26	Distance to recreation	6	Density within residential area	49
26	Density within residential area	6		
27			Reuse of original interior/ exterior doors	43
28	Distance to school/ work	3	Distance to work/ school	24
28	Tax benefits	3		
29			Tax benefits	16

Table B13
Full list of closed-ended attributes, stated group

Rank	N market attributes (fixed CNET)	N	N market attributes + weight applied	N
1	Sustainability of the property	64	Sustainability of the property	550
1	Green spacy nearby	64		
2			Green space nearby	509
3	Surface of the house	50	Surface of the house	495
4	Shared facilities	46	Shared facilities	401
4	Outdoor space	46		
5			Price	391
6	Price	45	Outdoor space	338
7	Modernity of the house (kitchen/ bathroom etc.)	38	Housing type	326
7	Safety within neighbourhood	38		
8			Modernity of the house (kitchen/ bathroom etc.)	312
9	Level of pollution	35	Level of pollution	263
10	Housing type	34	Safety within neighbourhood	261
11	Type of houses/ mix of functions in the neighbourhood Housing type	30	Type of houses/ mix of functions in the neighbourhood	245
12	Distance to basic needs	29	Distance to basic needs	236
12	Parking on-site	29		
13			Unique home with its own identity	205
14	Unique home with its own identity	27		
15	Number of bedrooms	19	Number of bedrooms	154
16	Preservation of details, ornaments and elements referring to the former function	17	Authentic structural building elements	107
17	Ceiling height	16	Preservation of details, ornaments and elements referring to the former function	107
18	Authentic structural building elements	14	Density	75
19	Density	13	Good maintenance of public space	70
19	Ceiling height	13		
20			Use/ preservation of authentic materials as tiles/ terrazzo floors	67
21	Use/ preservation of authentic materials as tiles/ terrazzo floors	12		
22	Rich history	9	Rich history	56
23	Characteristic windows	6	Monumental status	35
23	Reuse of original interior/ exterior doors	6	Distance to recreation	35
25	Distance to recreation	5	Reuse of original interior/ exterior doors	34
26	Monumental status	4	Distance to school/ work	29
27	Distance to school/ work	3	Characteristic windows	23
27	Tax benefits	3		
28			Tax benefits	21
29	(Unique) entrance (hall)	1	(Unique) entrance (hall)	1

Top 12 attributes

Appendix C, results

C.1 Socio-demographic characteristics

The demographic characteristics of both the revealed and the stated group were examined. From this, a profile could be made of the current inhabitants of cultural-historical buildings. Chi-square tests were performed to see whether the demographic characteristics of the stated group and revealed group match. These results are shown in Table C1. The scores, degrees of freedom, probability and expected values are shown.

Table C1
Chi-square test socio-demographic characteristics

Socio-demographic characteristics	Revealed group		Stated group		
	Count	Expected count	Count	Expected count	Chi-square
Gender					
Male	80	73.0	49	56.0	$X^2(1) = 3.574$, $p = 0.059$
Female	49	56.0	50	43.0	
Total	129	129	99	99	
Age					
18-44	30	18.67	1	14.33	$X^2(1) = 25.628$, $p < 0.001$
45-64	50	56.6	50	43.4	
>65	44	53.8	47	41.3	
Total	129	129	99	99	
Family composition					
Single without children	38	36.8	27	28.2	$X^2(3) = 1.1782$, $p = 0.758$
Single with children	2	2.8	3	2.2	
With partner without children	68	70.6	56	56.4	
Family/ multi person household with/ without children	21	18.9	13	14.3	
Total	129	129	99	99	
Highest level of education					
Low	6	6.3	5	4.7	$X^2(2) = 2.172$, $p = 0.098$
Middle	16	19.9	19	15.1	
High	107	102.9	74	78.1	
Total	129	129	98	98	
Family income					
Low	4	7.3	9	5.7	$X^2(3) = 10.752$, $p < 0.013$
Middle-low	30	33.7	30	26.3	
Middle-high	47	48.3	39	37.7	
High	33	24.7	11	19.3	
Total	114	114	89	89	

C.2 Characteristics of cultural-historical buildings

The characteristics of cultural-historical buildings were deterined based on the housing and locational attributes of the respondents within the revealed sample. Subsequently, it was tested whether the building and location attributes of the stated group matched the answers of the revealed group. This was done by means of a chi-square test. Table C2 shows the extended version of the chi-square test.

Table C2
Chi-square test housing and neighbourhood attributes

Housing and neighbourhood attributes	Revealed group		Stated group		
	Count	Expected count	Count	Expected count	Chi-square
Monumental status					
Yes	106	67.6	11	49.4	$X^2(1) = 111.385$, p < 0.001
No	20	58.4	81	42.6	
Total	126	126	92	92	
Type of heritage					
Religious heritage	54	39.9	17	31.1	$X^2(2) = 33.579$, p < 0.001
Industrial heritage	34	41.6	40	32.4	
School heritage	26	38.2	42	29.8	
Medical heritage	13	7.3	0	5.7	
Total	127	114	99	99	
Housing type					
Loft	25	18.8	7	13.2	$X^2(3) = 15.569$, p < 0.001
Apartment	69	63.3	39	44.7	
Dwelling	25	36.9	38	26.1	
Total	129	129	99	99	
House size					
≤ 75m2	13	13.0	10	10.0	$X^2(3) = 28.033$, p < 0.001
76-100m2	26	32.3	31	24.8	
101-150m2	49	58.3	54	44.7	
≥ 151 m2	41	25.5	4	19.5	
Total	129	129	99	99	
Residential density					
City centre	49	40.5	22	30.5	$X^2(4) = 24.545$, p < 0.001
City (outside the ring)	14	20.0	21	15.0	
Suburb	5	8.6	10	6.4	
Town	37	42.2	37	31.8	
Village	9	9.1	7	6.9	
Barton	15	8.6	0	6.4	
Total	129	129	97	97	

On-site parking

Yes	112	108.6	80	83.4	X²(1) = 1.523, p = 0.217
No	17	20.4	19	15.6	
Total	129	129	99	99	

Common facilities

Outside space (garden, barton, (roof)terrace, balcony, BBQ, playground and sitting spots)	87	92.2	76	70.8	X²(1) = 2.390, p = 0.122
Total	129	129	99	99	
Parking/ bike storage	90	85.4	61	65.6	X²(1) = 1.644, p = 0.197
Total	129	129	99	99	
Entrance/ hall/ atrium	90	67.9	30	52.1	X²(1) = 34.992, p < 0.001
Total	129	129	99	99	
Living room/ kitchen/ meeting room/ conference room	13	24.3	30	18.7	X²(1) = 14.973, p < 0.001
Total	129	129	99	99	
Indoor facilities/ recreation room (fitness, workshop, guest room, laundry room and storage)	5	7.4	8	5.6	X²(1) = 1.842, p = 0.175
Total	129	129	99	99	
No communal space	10	11.3	10	8.7	X²(1) = 0.386, p = 0.534
Total	129	129	99	99	

- For the common facilities, the total is the sum of the respondents who were given the question to mark the facilities they share or would prefer to share. Therefore, this total also includes the respondents who do not share or prefer this facility.

C.3 Preferred residential attributes and motivations

C.3.1 Preferred residential attributes

To find out on which attributes a customer judged a residential product, respondents were asked to fill in attributes in an open-ended format that they consider important. 128 respondents for the revealed group did this and 99 respondents for the stated group did this. This means that each attribute could have been filled in by this number of people. The fact that only a total number of 8 attributes could be entered is not taken into account. A chi-square is performed to see if the top 12 attributes of the revealed and stated group match. That slightly more attributes were entered on average by the stated group is not taken into account, since this number is almost equal (revealed = 4.50 and stated = 4.64).

Table C3
Chi-square results purchasing attributes open-ended

Purchasing attributes	Revealed group		Stated group		
	Count	Expected count	Count	Expected count	Chi-square test
Location	60	48.5	30	41.5	
Character	57	41.0	19	35.0	
Price	48	43.1	32	36.9	
Architecture	45	30.7	12	26.3	
Historical value	41	27.5	10	23.5	
Residential density	35	25.3	12	21.7	
Flexibility	27	20.0	10	17.0	
Floor surface	24	20.5	14	17.5	$X^2(15) = 177.59$, p < 0.001
Direct neighbourhood	24	21.6	16	18.4	
Near greenery	24	23.7	20	20.3	
Residential diversity	21	32.9	40	28.1	
Future proof	18	53.4	81	45.6	
Sustainability	4	24.3	41	20.7	
Outdoor space	15	18.3	19	15.7	
Shared facilities	3	9.2	14	7.8	
Basic needs	8	14.0	18	12.0	

Table C4
Chi-square results individual purchasing attributes open-ended

Attributes	Revealed group		Stated group		
	Count	Expected count	Count	Expected count	Chi-square
Location					
Filled in	60	50.75	30	39.25	$X^2(1) = 6.407$, $p = 0.011$
Non filled in	68	77.25	69	59.75	
Character					
Filled in	57	42.85	19	33.15	$X^2(1) = 16.094$, $p < 0.001$
Non filled in	71	85.15	80	65.85	
Price					
Filled in	48	45.11	32	34.89	$X^2(1) = 0.656$, $p = 0.418$
Non filled in	80	82.89	67	64.11	
Architecture					
Filled in	45	32.14	12	24.86	$X^2(1) = 15.752$, $p < 0.001$
Non filled in	83	95.86	87	74.14	
Historical value					
Filled in	41	28.76	10	22.24	$X^2(1) = 15.413$, $p < 0.001$
Non filled in	87	99.24	89	76.76	
Residential density					
Filled in	35	26.50	12	20.50	$X^2(1) = 7.879$, $p = 0.005$
Non filled in	93	101.50	87	78.50	
Flexibility					
Filled in	27	20.86	10	16.14	$X^2(1) = 4.945$, $p = 0.026$
Non filled in	101	107.14	89	82.86	
Floor surface					
Filled in	24	21.43	14	16.57	$X^2(1) = 0.851$, $p = 0.356$
Non filled in	104	106.57	85	82.43	
Direct neigbhourhood					
Filled in	24	22.56	16	17.44	$X^2(1) = 0.258$, $p = 0.612$
Non filled in	104	105.44	83	81.56	
Near greenery					
Filled in	24	24.81	20	19.19	$X^2(1) = 0.075$, $p = 0.784$
Non filled in	104	103.19	79	79.81	
Residential diversity					
Filled in	21	34.51	40	94.49	$X^2(1) = 16.636$, $p < 0.001$
Non filled in	108	94.49	59	72.51	

Future proof					
Filled in	18	25.63	81	72.18	X²(1) = 104.212, p < 0.001
Non filled in	110	19.82	18	55.82	
Sustainability					
Filled in	4	24.37	41	23.28	X²(1) = 51.492, p < 0.001
Non filled in	124	102.63	58	79.37	
Outdoor space					
Filled in	15	19.17	19	14.83	X²(1) = 2.448, p = 0.118
Non filled in	113	108.83	80	84.17	
Shared facilities					
Filled in	3	9.59	14	7..41	X²(1) = 11.215, p < 0.001
Non filled in	125	118.41	85	91.59	
Basic needs					
Filled in	8	14.66	18	11.34	X²(1) = 7.836, p = 0.005
Non filled in	120	113.34	81	87.66	

Respondents were also asked to mark attributes they consider important in a closed-ended form. A chi-square test was also performed between the revealed and the stated group. This is first a general chi-square test for all attributes, except the distance to school/ work and tax benefits, since the expected value is below 5 (Table C5). Next chi-square test were performed for the top 12 marked attributes individually. Here, each attribute could be marked by 129 respondents within the revealed group. For the stated group each attribute could be marked by 99 respondents. Table C6 shows the chi-square results.

Table C5
Chi-square results purchasing attributes closed-ended

Purchasing attributes	Revealed group		Stated group		
	Count	Expected count	Count	Expected count	Chi-square test
Surface of the house	67	61.0	50	56.0	
Outdoor space	35	42.2	46	38.8	
Housing type	38	37.5	34	34.5	
Number of bedrooms	16	18.2	19	16.8	
Parking on-site	37	34.4	29	31.6	
Modernity of the house (kitchen/ bathroom etc.)	41	41.2	38	37.8	
Good maintenance of the public space	15	15.1	14	13.9	
Sustainability of the property	22	44.8	64	41.2	
Monumental status	35	20.3	4	18.7	
Authentic building elements	48	33.9	17	31.1	
Ceiling height	51	33.4	13	30.6	
Use/ preservation of authentic materials	9	10.9	12	10.1	
(Unique) entry area (hall)	15	8.3	1	7.7	
Reuse of original interior/ exterior doors	7	6.8	6	6.2	$X^2(26) = 169.59$, $p < 0.001$
Preservation of details, ornaments and elements referring to the former function	28	22.9	16	21.1	
Characteristic windows	28	17.7	6	16.3	
Unique home with its own identity	42	36.0	27	33.0	
Rich history	38	24.5	9	22.5	
Distance to basic needs	18	24.5	29	22.5	
Distance to recreation	7	6.3	5	5.7	
Distance to school work	3	3.1	3	2.9	
Pollution	19	28.2	35	25.8	
Security/ safety	20	30.2	38	27.8	
Density	5	9.4	13	8.6	
Type of housing/ functional mix	18	25.0	30	23.0	
Green space nearby	57	63.1	64	57.9	
Shared facilities	18	33.4	46	30.6	
Price	41	44.8	45	41.2	

Table C6
Chi-square results individual purchasing attributes closed-ended

Purchasing attributes	Revealed group		Stated group		
	Count	Expected count	Count	Expected count	Chi-square test
Property characteristics					
Surface of the house					$X^2(1) = 0.462$, $p = 0.497$
Marked	71	68.5	50	52.5	
Not marked	58	60.5	49	46.5	
Outdoor space					$X^2(1) = 3.132$, $p = 0.077$
Marked	45	51.5	46	39.5	
Not marked	84	77.5	53	59.5	
Housing type					$X^2(1) = 0.849$, $p = 0.357$
Marked	52	48.7	34	37.3	
Not marked	77	80.3	65	61.7	
Parking on-site					$X^2(1) = 1.028$, $p = 0.311$
Marked	46	42.4	29	32.6	
Not marked	83	86.6	70	66.4	
Modernity of the house					$X^2(1) = 0.091$, $p = 0.763$
Marked	47	48.1	38	36.9	
Not marked	82	80.9	61	62.1	
Sustainability of the property					$X^2(1) = 48.229$, $p < 0.001$
Marked	25	50.4	64	38.6	
Not marked	104	78.6	35	60.4	
Monumental status					$X^2(1) = 28.285$, $p < 0.001$
Marked	42	26.0	4	20.0	
Not marked	87	103.0	95	79.0	
Authentic building elements					$X^2(1) = 17.718$, $p < 0.001$
Marked	56	41.3	17	31.7	
Not marked	73	87.7	82	67.3	
Ceiling height					$X^2(1) = 27.560$, $p < 0.001$
Marked	59	40.7	13	31.3	
Not marked	70	88.3	86	67.7	
Unique home with its own identity					$X^2(1) = 15.792$, $p < 0.001$
Marked	69	54.3	27	41.7	
Not marked	60	74.7	72	57.3	
Rich history					$X^2(1) = 19.649$, $p < 0.001$
Marked	44	33.0	9	23.0	
Not marked	85	99.0	90	76.0	
Accessibility					
Distance to basic needs	14	24.3	29	18.7	$X^2(1) = 12.447$, $p < 0.001$
Marked	115	104.7	70	80.3	
Not marked					

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Neighbourhood characteristics					
(low) level of pollution					X²(1) = 10.999, p < 0.001
Marked	21	31.7	35	24.3	
Not marked	108	97.3	64	74.7	
Security (safety) within neighbourhood					X²(1) = 12.076, p < 0.001
Marked	23	34.5	38	26.5	
Not marked	106	94.5	61	72.5	
Type of housing/ functional mix in the neighbourhood					X²(1) = 6.344, p = 0.012
Marked	21	28.9	30	22.1	
Not marked	108	100.1	69	76.9	
Green space nearby					X²(1) = 6.231, p = 0.013
Marked	62	71.3	64	54.7	
Not marked	67	57.7	35	44.3	
Common facilities in and around the property					X²(1) = 21.763, p < 0.001
Marked	23	39.0	46	30.0	
Not marked	106	90.0	53	69.0	
Financial characteristics					
Price					X²(1) = 3.030, p =0.082
Marked	44	50.4	45	38.6	
Not marked	85	78.6	54	60.4	

C.3.2 Underlying motivations behind the residential purchase

For the mental representation model the underlying motives behind the purchase choice are mapped. Questions were asked about the reason why certain purchasing attributes were considered important. Tables C5 and C6, show the mentioned benefits, for the top 6 purchasing motives of both the stated and the revealed group.

More living space and living space fits are grouped together under: An appropriate living space (most of the times more/same amount of space)

Table C7
Attribute benefits, revealed sample group

Other (m² of the house)	N
Living space fits	10
Future proof	5
No downsizing	3
Flexible/ open lay-out	2
Mobility	2
Segregation of duties	1
Feeling	1
Investment	1

Surface of the house (N = 71)	N
More living space	29
Less living space	20
Less maintenance	19
Freedom of movement	15

Other (housing type)	N
Unique	3
History	2
Surface	2
Aesthetics	1
Maintenance	1
No garden	1

Housing type (N = 52)	N
Social contacts	18
Social control/ safety	14
Close to amenities	28
Increase of mobility	20

Authentic structural building elements (N = 56)	N
Aesthetics	23
Unique	44
Building quality	8
Character	49

Spacious and open-layout will be grouped together under spacious/ flexibel

Other (ceiling height)	N
Spacious	9
Less oppresive	2
Tall residents	1

Ceiling height(N = 59)	N
Aesthetics	22
Large incidence of light	28
Open lay-out	19
Unique	17
Character	39

Other (green space)	N
Recreation	10
Living environment	1

Green space nearby (N = 62)	N
Well-being/ happiness	57
Health	38
Social contacts	10

Mortgage and level of income are grouped together under affordability.

Other (price)	N
Affordability	3
Lifestyle	3
Low price	2
Price/ quality	1
Mortgage free	1
Investment	1

Price (N = 44)	N
Mortgage	20
Interest rate	5
(Current) level of income	24

Table C8
Attribute benefits, stated sample group

Surface of the house (N = 50)	N		Other (m² of the house)	N
More living space	10		Living space fits	10
Less living space	24		Recreational/ logé space	5
Less maintenance	24		Future proof	3
Freedom of movement	6		Comfort	2
			No compromising on space	2
			Less energy costs	1
			Communal living form	1

Outdoor space (N = 56)	N		Other (outdoor space)	N
Need for outside space	36		Room to move	3
Maintenance	1		Enjoy the sun	2
Fresh air	25		Freedom	2
Gardening	20		Hobby/recreational space	1
			Privacy/ peace	1

Sustainability (N = 64)	N
Good indoor climate	25
Reduce maintenance	19
Reduce energy consumption/ costs	31
Reduction carbon footprint	28

Green space nearby (N = 64)	N		Green space nearby	N
Well-being/ happiness	55		Recreation	4
Health	50		Peace	2
Social contacts	15		Environment	1

Common facilities (N = 56)	N		Common facilities	N
Mobility	5		Saving energy/ costs/ space	6
Social contacts	42		Support eachother	5
Lower commuting time	8			

Price (N = 44)	N		Other (price)	N
Mortgage	23		Affordability	7
Social contacts	7		Lifestyle	3
(Current) level of income	32		Low price	1
			Price/ quality	1
			Retirement benefits	1

Less living space and living space fits are grouped together under: Suitable (often less m2) living space (/future proof)

Appendix

Gardening is regrouped under: Recreation

Need for outside space is regrouped under room for movement/ freedom

Mortgage and level of income are grouped together under affordability.

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