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Discovering the Significance of Housing Neighbourhoods by Assessing Their Attributes With a Digital Tool

Lidwine Spoormans [1], Wessel de Jonge [1], Darinka Czischke [2], and Ana Pereira Roders [1]

[1] Department of Architectural Engineering + Technology, Delft University of Technology, The Netherlands
[2] Department of Management in the Built Environment, Delft University of Technology, The Netherlands

Correspondence: Lidwine Spoormans (l.g.k.spoormans@tudelft.nl)

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Abstract

Much of the building stock subjected to the upcoming European Renovation Wave is neither listed as heritage nor considered valuable architecture. This also applies to Dutch housing built between 1965 and 1985, more than 30% of the Dutch housing stock, for which there is no consensus on their cultural significance. Their successful renovation process requires broad support. What attributes do citizens consider significant in their neighbourhood? How do we include a multitude of stakeholders? And can digital methods help collect and process responses? This article reveals significant attributes of residential neighbourhoods from 1965 to 1985, assessed by various stakeholders with a digital tool based on case studies in Amsterdam and Almere. A mobile application allowed individuals to identify significant attributes at various scales while visiting the neighbourhood. By qualitative data analysis of survey and interview results, groups of tangible and intangible attributes were deduced. Results show that identifying attributes by current stakeholders broadens existing expert-led assessments on 1965–1985 neighbourhoods by including, for example, generic attributes not originally intended by the designers. Asking open-ended questions is considered essential to identify undiscovered attributes by alternative stakeholders, although dealing with large numbers of responses is recognised as a challenge to cluster and classify. Lastly, the mobile application appears to be a useful digital tool, but integrating scientific consistency and usability is recommended for further development. Engaging multiple stakeholders with such mobile applications allows for collecting opinions, anticipating conflicts, or shared interests between stakeholders and integration into renovation designs. It can empower citizens to preserve the neighbourhood attributes that are most significant to them.

Keywords
cultural significance; heritage attributes; housing neighbourhoods; participation; post-Second World War architecture

1. Introduction

The European Green Deal announced a Renovation Wave for 35 million residential and non-residential buildings by 2030 to foster deep energy renovations (European Commission, 2020, p. 3). "Respect for aesthetics and architectural quality" (European Commission, 2020, p. 4) is stated as one of the key building principles for this massive renovation operation, next to energy efficiency and affordability. It refers to the Davos Declaration that promotes the concept of a high-quality *Baukultur* in Europe, stressing the preservation of the quality of the built environment and the value of cultural heritage (Federal Office of Culture, 2018), hereinafter referred to as cultural significance. Making these high-quality renovations possible quickly and on a large scale requires broad support from both decision-makers and citizens. Support is necessary not only for legal and organisational reasons but also to create living environments that meet citizens' needs and preferences. Policies at the national and European level call for stakeholder participation and promote digital technology to encourage citizens' initiatives and the sharing of information (Council of Europe, 2005; Ministry of the Interior and Kingdom Relations, 2021).

A large part of the building stock to be renovated is not listed as heritage or considered valuable architecture by experts. In the Netherlands, almost a third of the residential stock dates from 1965 to 1985 (CBS, 2020). These buildings do not meet contemporary demands and are seldom listed as heritage properties. In recent years, academic and societal interest in younger buildings has increased, with national heritage institutes taking steps to assess their cultural significance. In particular, the Cultural Heritage Agency of the Netherlands (2019, pp. 6, 16) has defined 1965–1990 as the "Post 65" period and identifies it as a target for urgent research regarding the upcoming energy transition and demographic changes. Earlier research on the Dutch residential neighbourhoods built from 1965 to 1985 mainly addresses the intentions of original planners and architects and how these translated into urban and architectural attributes. Publications are available describing societal developments and design ideologies, including documented conferences and interviews from that time (De Haan & Haagsma, 1981; Leupen et al., 1990; Roegholt, 1984) as well as contemporary survey works of, for example, design themes (de Vletter, 2004), architects' retrospect (Scipio & Franke, 2007), urban typologies (Ubbink & van der Steeg, 2011, p. 11), and new towns (Reijndorp et al., 2012).

However, few scientific studies have researched the cultural significance of housing neighbourhoods from the 1965–1985 period from the perspective of residents and other non-expert stakeholders. Moreover, the evaluation of 1965–1985 architecture is often based on historic intentions (Abrahamse, 2019; Blom et al., 2021; de Vletter, 2004; Somer, 2020) but rarely on its current heritage significance (Provoost & Rots, 2023). This research reveals the significance of neighbourhood attributes, assessed by the stakeholders using a digital tool. By integrating significance assessment and digital participation methods, this research explores the potential and limitations of digital participation to engage a large group of stakeholders in identifying and assessing neighbourhood attributes on their cultural significance. It is qualitative research, taking neighbourhoods in Amsterdam and Almere as case studies. Stakeholders from different groups participated

by identifying significant attributes at different scales using a mobile application. Although previous research shows important differences between the assessments of various stakeholder groups (Spoormans et al., 2023), participant profiles and how they influence their assessment are not the focus of this article.

This article uses heritage theories and methods to study residential areas not listed as heritage. It adopts Fairclough's (2009) definition of "new heritage," which states that unlike the traditional definition of heritage based on the selection of buildings and areas, new heritage is "whatever people value in a wide range of ways." Heritage is not special but ordinary and includes everything we have inherited (Fairclough, 2009, pp. 30, 35, 41). Professional and civic engagement in heritage and renovation processes can improve mutual understanding, accelerate development processes, and increase civic engagement and empowerment.

The theoretical framework in Section 2 introduces the main concepts: attribute assessment and digital participation methods. The case studies and their history are illustrated in Section 3. Section 4 explains the methods used for the (digital) data collection and analysis, after which Section 5 presents the results. Section 6 discusses some challenges in identifying attributes through participation by digital methods, after which Section 7 presents the study's conclusions.

2. Theoretical Framework

The theoretical framework distinguishes two dimensions: first, attribute assessment through participation, and second, the use of digital participatory methods. In this research, a digital tool is employed to promote participation. Participation is deployed to identify significant attributes. By first unravelling purpose and means and then subsequently exploring their mutual influence we can explore whether digital participation engages a wider range of stakeholders in neighbourhood heritage assessment processes and how it influences the resulting attributes.

2.1. Attribute Assessment Through Participation

In heritage discourses, the term "attribute" is gaining ground and provoking debate. The distinction between values and attributes in relation to heritage was introduced in international documents by the Recommendation on the Historic Urban Landscape (UNESCO, 2011). In heritage studies, attributes were defined as *what* we value and values as the reason(s) *why* (Pereira Roders, 2007; Tarrafa Silva & Pereira Roders, 2012; Veldpaus, 2015). The publication *Attributes—A way of understanding OUV* contextualises the term attribute to a "world heritage site broken down into smaller parts" to operationalise the abstract concept of outstanding universal value (OUV) for managers, local populations, and various stakeholders (Kazuhiko et al., 2021, p. 10). In this publication, Cotte (2021, pp. 32–35) defines an attribute as a part of a whole, and reciprocally, a property consists of a set of attributes that form a coherent whole and carry specific meanings. Attributes exist in two complementary dimensions: as tangible features that physically describe the property or as bearers of associated intangible features. He sees no rigid boundary between tangible and intangible attributes, but intangible meanings complement tangible attributes. Similarly, van der Hoeven (2020, pp. 136–137) makes no distinction between tangible and intangible attributes because, for example, cultural activities always take place in a building or public place and are, therefore, inseparable. However, different approaches to attribute terminology are observed. Some regard attributes neutrally as all the attributes of a property, while others use the term evaluatively for only those attributes that contribute

to the outstanding universal value (Wataru, 2021, p. 106). Contrary to van der Hoeven's approach, Skounti (2021, p. 135) proposes further distinguishing the definition of the attribute, as something intangible (e.g., typology of elements), and the indicator as a tangible embodiment of the intangible definition (e.g., number of tangible accessories). One attribute can have several indicators. In the earlier article "Captain, Where Can We Find the Attributes," a similar distinction was explained (Sobhani Sanjbod et al., 2016, pp. 5–6). Aiming to identify and locate attributes of the Amsterdam Canal Zone (a World Heritage property in the centre of Amsterdam), they distinguish (a) attributes, (b) sub-attributes, (c) architectural indicators, and (d) values. "Attribute" is explained as an (in)tangible general theme (e.g., port city), "sub-attribute" to a specific embodiment of the main attribute (e.g., warehouses), "indicator" to a recognisable element of sub-attributes (e.g., spout gable), and "value" to categories of meaning (e.g., aesthetic, economic, or historical values).

The identification of attributes and other heritage processes should involve everyone in society, as advocated by the European Faro Convention (Council of Europe, 2005, p. 5). The development of legal, financial, and professional frameworks to enable joint action by stakeholders is stated as a public responsibility of national governments. It is recognised that including individuals and communities from various stakeholder groups enlarges the concept of cultural heritage. Besides the variety and multiplicity of people involved in development practices, non-experts' participation can change the definitions of heritage. The essential factor is the recognition, representation, and identification of heritage by a group of people and their wish to conserve it for future generations (Howard, 2003, p. 6). In "New Heritage Frontiers," Fairclough (2009, pp. 30–40) proposes a "new heritage" approach promoted by the Faro Convention. This includes adding new categories of objects, for example, recent buildings, and developing new practices based on recognising the importance of the local and the ordinary and embedding heritage values into social attitudes. By taking heritage out of its sectorial isolation and making it a part of the wider debate, the approach not only becomes more democratic but also more forward-looking, including present-day stakeholders in spatial developments for the future. In this all-encompassing concept of heritage, things that so far have been considered marginal, such as the neglected ordinary things, could become central.

In this article, the term "attribute" is used for the intangible quality or meaning, and "sub-attribute" is used for its multiple tangible embodiments or intangible manifestations. The definition and application of these terms evolved from Sobhani Sanjbod et al. (2016) and others. Attributes and sub-attributes can be all the things that participants mention for various reasons and can be positive or negative. In doing so, the article applies the broad "new heritage" approach adopted by Fairclough (2009, pp. 30, 35, 41), both in heritage as an object (recent, not listed stock) and in democratic methods. It includes the participation of both professionals from different fields related to heritage and renovation practices as well as non-expert stakeholders. Their assessment is open to all attributes.

2.2. Digital Participatory Methods

Although most participatory heritage practices use conventional methods such as meetings, interviews, and workshops, digital and automated methods for data collection are becoming more common (Foroughi et al., 2023, p. 5). Foroughi et al.'s (2023) literature review of articles from 1985 to 2019 shows that of the studies applying qualitative methods, 23% use digital methods and 7% use a mix of digital and analogue methods. Digital methods like collaborative online platforms or digital surveys are assumed to have advantages such as being easily accessible regardless of time and place (Shen et al., 2012, p. 202) and less time-consuming and

costly (Foroughi et al., 2023, p. 6). However, difficulties have also been seen, such as the lower response rate for digital surveys (Brown & Weber, 2012, p. 320), the inability to communicate directly and in person, and the need to possess and be able to use a computer (Shen et al., 2012, p. 202). Moreover, as discussed by Finka et al. (2017), general challenges for participatory processes also apply to digital methods, like declining public interest over time and the effect that people are more (or only) interested when personally confronted with a change or decision, the so-called NIMBY effect. The known problem of low trust in organising institutions and the participation process can be compounded by distrust in digital methods. Misunderstanding or different interpretations of terminology can also be particularly problematic with digital methods, as there is no direct interaction to clarify ambiguities (Finka et al., 2017, pp. 2, 6–7).

Besides practical reasons, digital methods are emerging to enhance citizens' experience or connection with heritage. Lewi et al. (2016, pp. 16–18) have distinguished three categories of digital tools that collect user-generated data (UGD) in relation to a specific place. The tools are mostly used by smartphones to guide exploration of a (historic) site. In "curated sites," an expert institution offers authoritative information, and the participant has the role of a visitor. In "content hosting sites," the citizen is a contributor. These tools are built to document and interpret heritage and offer a more open framework for contributions and exchange. The "social network sites" are fora for discussion on a particular place, for example, Facebook groups, and are usually not curated. Also, emerging studies on architecture built after 1965 in the Netherlands use digital participation to map unexplored architectures and opinions (e.g., the Post 65 photo competition by the Dutch Cultural Heritage Agency, the online public inventory of architecture 1965–1990 by the Rotterdam Municipality, and the online platform Love 80's architecture). In general, these digital methods, such as social media, polls, and surveys, are suggested by the Dutch government as contemporary methods to collect opinions (Cultural Heritage Agency of the Netherlands, 2019, pp. 22–23, 30). However, while these tools are widely used, integrating the the collected data in formal heritage processes is a challenge (Lewi et al., 2016, p. 22). However, automated processing of UGD is gaining importance and may provide solutions. Social media networks, including non-specific heritage initiatives, can be used to map attributes by collecting images, texts, and geographical locations referred to by online citizens (Alviz-Meza et al., 2022, p. 11). Moreover, UGD can also be combined into multi-modal datasets, revealing temporal, spatial, and social relationships. However, although working with well-trained machine learning and deep learning models, it is stated that for applications where more accurate conclusions are needed, human evaluations of the models' validity, reliability, and coherence are still needed (Bai et al., 2022, pp. 3, 24). The study by Sobhani Sanjbod et al. (2016, p. 9), conducted by researchers on a selected sample of attributes, also addressed the need for digital methods to support automated data collection to scale up the application of attribute identification for urban landscapes. For tangible attributes, the authors suggest using GIS data, other existing databases, or laser scanning may be feasible. However, how to find the meaning or intangible attributes in automated ways is an unresolved issue. Moreover, very precise descriptions of the attributes, including their relationships, which are intangible attributes, would be needed to establish a network of attributes that fully describes an urban landscape. To specify attributes in significance statements on a larger scale (e.g., for a district), in order to include them in management frameworks, automation of both data collection and data analysis seems to be required.

In the research discussed in this article, digital methods are applied for data collection, including visual and textual input, by a sample of invited participants. Although small scale, it has the character of "content hosting sites" relating to the categories by Lewi et al. (2016, pp. 16–18). The analysis of UGD is human work in this

research, but ideas on automated processing of UGD are discussed in this article as potential applications in future research.

3. Context and Case Studies

Housing in the Netherlands built after 1965 is known to have turned away from the urban planning and architecture of the post-Second World War reconstruction period. Modernist repetitive schemes were replaced by varied compositions of housing types, forms of streets, squares, and building blocks (Spoormans et al., 2021). The housing shortage had become less acute, and rising prosperity allowed for more attention to quality rather than quantity. In 1968, the Secretary of Housing and Spatial Planning set up an experimental housing programme to promote innovations that would contribute to a better quality of life through a highly varied range of housing and living environments. This development was sparked by a broad dissatisfaction with the monotony and uniformity of housing construction in the reconstruction period (Barzilay et al., 2018, pp. 9, 19). The pursuit of a better quality of life and identification has a variety of material and visual manifestations. During the 1980s, the rich variety was toned down when the economic crisis led to a more "no-nonsense" approach, lower budgets, and the emergence of market-oriented developments. Although low-rise is dominant (69%), midrise residential typologies embody an essential change in the ideology of the time. In 1976, an article was published describing the revival of midrise typology in alternative forms. Its title, "Stacked Low-Rise Buildings: Multi-Family Houses, but Cosy," expressed the idealisation of low-rise and the resistance to high-rises. The development of innovative midrise models is explained by a re-valuation of traditional urban and natural environments. However, new objectives are increased density, including commercial and community facilities and public transport, a mix of living and working, and opportunities for social contact (Steemers & Klaren, 1976, pp. 5, 9).

Goedewerf in the suburban new town Almere Haven (Section 3.1) and Bijlmerplein as the urban centre of Amsterdam Zuidoost (Section 3.2) are considered examples representing residential areas from the 1965–1985 period in the Dutch context (Spoormans et al., 2022). In the same period, the ideal model of garden cities was tested around European metropolises, such as the New Towns in the United Kingdom and the Villes Nouvelles in France (Gaborit, 2010, p. 24). Although there are important differences in planning policy, culture, and scale of the towns, these residential areas developed as a reaction to evolve from the large-scale developments of the earlier years. In his comparative study of Almere, Cergy-Pontoise, and Milton Keynes, Nio (2016) has described their characteristics as "suburban urbanity." In the European context, academic interest in the heritage significance of architecture from the 1960s onwards is emerging, for example by some German-speaking countries, discussing the characteristics and challenges of the "postmodern legacy" (Bauhaus-Universität Weimar, 2022) or the heritage value of the Brussels housing stock 1975–2000 by Parein in the project ArchBXL (VUB Architectural Engineering, 2021). Lastly, the citizen engagement in significance assessments of younger residential areas is studied in other European countries, for example, by Swiderski regarding the 1970s Polish town Ursynów (Ducci & Swiderski, 2022) or the iconic 1970s Byker Wall in Newcastle upon Tyne, United Kingdom (Pendlebury et al., 2009; Yarker, 2014).

3.1. Goedewerf, Almere Haven

De Werven was the first neighbourhood built in the new town of Almere, and in 1979, the first inhabitants, mainly from Amsterdam, arrived (TH Delft, 1977, p. 1). Almere Haven was designed as a suburban area with

mostly low-rise neighbourhoods. The urban plan for its centre refers to the traditional Dutch city with urban attributes like canals, canal houses, and narrow street profiles. The Goedewerf residential complex was designed by the architectural firm INBO and dates from the 1970s. It has a *woonerf* character, which involves traffic-free courtyards, clustered parking, private garages, a collective green area, and a playground in its centre (see Figure 1). The aim was to create an enclosed semi-public courtyard geared for use only by local residents. The architects aimed to avoid a smooth facade wall but envisaged human-scale dimensions and a diversity of balconies, loggias, stairwells, and galleries (Rijksdienst voor de IJsselmeerpolders, 1976, p. 1). The residential complex consists of diverse dwelling typologies and sizes, combining single-family houses and flats. The facades are in red brickwork complemented with various materials and colours, including wooden window frames, balcony railings, various panelling, exposed concrete lintels, and gravel concrete elements. Due to the organic shape of the block and the sloping roofs, the roof shape is complex. The houses in Goedewerf are partly owned by private homeowners and partly by social housing corporations.

Figure 1. Residential yard (*woonerf*) in Goedewerf (left) and surrounding area of Goedewerf (right).

3.2. Bijlmerplein, Amsterdam Zuidoost

The Bijlmerplein district in Amsterdam was built in the mid-1980s and consists of seven clusters designed by five architectural firms under the supervision of the architectural firm Van den Broek en Bakema. It is planned as a "city within a city," integrating a large number of functions, such as commercial and social facilities, housing, and offices (Stedenbouw, 1988, p. 13). As a counter-movement to the CIAM model for the Bijlmermeer as a whole, the public space was designed as a sequence of enclosed, intimate spaces, such as city squares of different proportions enclosed by perimeter blocks, narrow streets and stairs leading up to elevated decks with collective and private outdoor spaces (see Figure 2). The designers' aim to achieve urban vitality was inspired by traditional urban concepts (P. de Bruijn, interview, October 14, 2020). However, the infrastructural ideology of CIAM is still part of the mixture, separating slow and fast traffic at different levels, and separate parking zones in garages or courtyards. The elevated highways give access to elevated decks where the entrances to the housing units are located (ter Horst et al., 1991, p. 113). Housing types range from units for singles or couples to large family flats aimed at a diverse mix of households. The five-storey blocks on a retail plinth have flat roofs and feature white brick facades with white-yellow patterns in specific places. A strong relief characterised the facades due to canopies, balconies, and alcoves of different shapes.

Figure 2. Residential deck (*woondek*) in Bijlmerplein (left) and public square in Bijlmerplein (right).

4. Method

The study was conducted in the context of the Delft University of Technology project Respectful Renovation. As part of the research project, a smartphone application, Search for Values, was developed, and a varied group of stakeholders was invited to participate. The survey and focus group interviews took place between April and September 2021. A survey and focus group interview with residents of Bijlmerplein took place in March 2023. The entire process was considered a pilot project.

4.1. Participants

Various groups of stakeholders participated in the survey by app and follow-up interviews. All professionals involved work in housing renovation in their work: architects, sustainability consultants, staff of municipal government employees specialising in heritage or sustainability, representatives of a housing corporation, a housing union, and an owners' association (see Table 1). Heritage experts (municipal/national advisors, deciding on heritage listing and policies) are included in the governments group. Also, a group of architecture students from an MSc course in Heritage and Design participated. The research team saw an opportunity to involve these students, as an informed and critical group, in testing the digital tool while learning about heritage participation processes. Lastly, an invited group of residents participated. For the residents group, the app was improved, based on comments from the professionals and students, by adjusting the language and avoiding jargon and complexity, which are less familiar to other professional and non-professional

Table 1. Number of participants per stakeholder group.

	Case: Bijlmerplein	Case: Goedewerf	Focus group interview
Architects and advisors	4	5	3
Governments	4	4	3
Owners	2	2	2
Students	3	5	5
Residents	5	1	7

participants. All participants were informed about the goals and methods of the research. Moreover, the concepts of attribute, value, tangible, and intangible were explained and illustrated by a tangible (facade or balcony) and an intangible (atmosphere) example. The explanation emphasised the importance of voicing someone's individual contribution.

4.2. App and Focus Group Interviews

The survey was developed using Qualtrics software, to create a smartphone app (see Figure 3), which allowed participants to complete the survey on location while walking, watching, and experiencing. The Covid-19 restrictions prompted the development of this app, as group meetings were not allowed. The app-based survey contained the following questions and information:

1. Introduction, explaining the project and case studies, asking for the name (optional), stakeholder group, and consent;
2. Attribute assessment (asked for each case, on several scale levels):
    - *What* do you think is valuable?
    - *Why* do you think it is valuable?
    - Is there anything you would like to change?
    - Possibility to upload a photo (optional);
3. One open question about the general experience of the survey and comments

After completing the individual on-site survey, focus group interviews were conducted in a meeting (in most cases online). With each stakeholder group individually, their responses were discussed, and further clarification was sought by the researchers. These focus group interviews were recorded and transcribed using Amberscript transcription software.

Figure 3. Illustration of the digital tool Search for Values (app on smartphone).

4.3. Coding and Analysis

The results of both the survey by app and the follow-up focus group interviews were coded using Atlas.ti software. Attributes (what) and values (why) were deduced from the full dataset. Classifications from theory (Kamari et al., 2017; Pereira Roders, 2007) were used for coding, but "in vivo" codes were also developed, meaning that the content of the quotation was deduced and classified as a code. The latter category led to specified attribute codes, tangible and intangible, which are the focus of this article. An initial analysis was based on the frequency of occurrence, leading to ranked attributes. The co-occurrence of attributes was also studied, i.e., how often an attribute was mentioned in relation to another attribute. Attributes were also controlled for positive or negative sentiments, association with one or both case studies and distribution by stakeholder group. From these analyses, groups of related attributes were identified.

5. Research Results

The research results are divided into the outcome of attributes that emerged from the survey responses and their classification, followed by the functioning of participation with the app.

5.1. From Responses to Attributes

The participants' responses were clustered in groups relating to architectural and urban concepts. Seemingly very different sub-attributes at various scales were considered part of the same overarching attribute. For instance, private home entrances (dwelling level), open accessibility via stairs and gates (ensemble level), the residential yard or deck (ensemble level), and separation of infrastructure (neighbourhood level) are all a consequence (or a facilitator) of the intangible attribute of "semi-public residential atmosphere."

Several such groups of sub-attributes were identified and a selection is presented in Table 2. The names for the sub-attributes were derived from the data and indicate what the participants found valuable, although responses may have sometimes referred to them using different words or terms. The expressions "attic-like atmosphere," "all those angled corners and shapes," "organic," "sheltered," and "you can look to all directions" all refer to the attribute "45-degree design." Many attributes apply to both case studies, but some are specific, highlighting their differences, for example, a mixed-use program in the urban context of Bijlmerplein and only residential function in suburban Goedewerf.

Various intended attributes of 1965–1985 neighbourhoods, known from the literature, are recognised and valued by respondents. They mention, for example, "The small scale, the winding of the street and those little corners. That's so cosy," which was exactly the design ambition. However, responses often mention the sub-attributes, for example, midrise blocks, the mix of shops and homes, balconies, or the private home-entrances from yards and decks, but they rarely mention the overarching intangible attribute such as "traditional city" or "semi-public residential atmosphere."

Table 2. Selected attributes categorised and illustrated by quotations from the data.

Classification	Attribute	Sub-attributes tangible (t) or intangible (i)	Scale	Case study
Specific attributes, tradition-inspired	Traditional city	Mixed use program (i)	Neighbourhood	Bijlmerplein
		Midrise blocks (t)	Neighbourhood	Goedewerf + Bijlmerplein
		Formal architectural coherence (i)	Ensemble	Goedewerf + Bijlmerplein
	Traditional use of material	Masonry facades (t)	Component	Goedewerf + Bijlmerplein
		Brick applications and ornaments (t)	Component	Goedewerf + Bijlmerplein
Specific attributes, innovation-driven	Differentiation	Housing typologies (i)	Ensemble	Goedewerf
		Ownership structure (i)	Ensemble	Goedewerf
		Balconies and bay windows (t)	Building	Bijlmerplein
		Recesses, corners, and gates (t)	Building	Goedewerf + Bijlmerplein
		Mix of materials (t)	Component	Goedewerf
	Semi-public residential atmosphere	Separated infrastructure (i)	Neighbourhood	Goedewerf + Bijlmerplein
		Stairs and gates (t)	Ensemble	Bijlmerplein
		Residential yard/deck (t)	Ensemble	Goedewerf + Bijlmerplein
		Private home entrance (t)	Dwelling	Goedewerf + Bijlmerplein
	45-degree design	Complex roof shapes (t)	Building	Goedewerf
		Kinked shapes and spaces (t)	Building	Goedewerf
		Multi-sided orientation (i)	Dwelling	Goedewerf
Generic attributes	Pleasant public space	Benches on squares (t)	Neighbourhood	Bijlmerplein
		Trees, planters (t)	Neighbourhood	Goedewerf + Bijlmerplein
		Green areas (t)	Neighbourhood	Goedewerf + Bijlmerplein
	Quality housing	Good quality social housing (i)	Dwelling	Goedewerf + Bijlmerplein
		Open kitchen (t)	Dwelling	Goedewerf + Bijlmerplein

5.2. Attribute Classification

The attributes were further classified, relating them to spatial or societal concepts, which often have their basis in the original planning ambitions of the 1965–1985 housing neighbourhoods. The attributes "traditional city" and "traditional use of material" are categorised as specific to that time, representing the reintroduction of traditional architectural ideas. Other attributes are also specific for the time but instead represent the

innovation and experiment of the 1965–1985 architecture. These are "differentiation," "semi-public residential atmosphere," and "45-degree design."

Within the specific attributes, those that are tradition-inspired are predominantly viewed as positive, while the innovation-oriented attributes are more contested. For example, the assessment of the attribute "semi-public residential atmosphere," the innovative concept of "stacked low-rise buildings" (Steemers & Klaren, 1976) intended as a safe haven, is ambiguous. It is assessed as both safe and unsafe, sheltered and labyrinthine, cosy but also unwelcoming. Respondents state, for example: "It is open, but it feels private" or "The yard feeling is nice for children and the elderly because it is car-free. But for visitors, it is a maze." The use of brick as an example of tradition-inspired attributes is assessed positively because of its recognisable Dutch identity, craftsmanship, physical properties, low maintenance, and good condition. Addressing the masonry facades, a respondent stated: "Bricks are heavy, so it has a delaying effect when it is very hot outside. So that provides comfort." About brick applications and ornaments, it was said: "Those masonry facades have a kind of richness. It's reminiscent of the monumentality of the Amsterdam School," which is an interbellum architectural style.

Respondents also mentioned generic attributes not specific to 1965–1985 neighbourhoods, such as "pleasant public space" in the form of greenery and seating in squares that facilitate meetings. Residents say, for example: "The green areas make it pleasant to live in. And it makes it possible to walk in the greenery." At the dwelling scale, "quality housing" with various sub-attributes is listed as valuable, with one respondent stating: "Nowadays, they only build identical houses with all the same floor plans. So, I would definitely cherish the differentiation of this kind of housing." Attributes not originally aspired to but developed later, such as "mixed ownership" in Goedewerf, are also identified as significant. Respondents think that: "The mix of buyers and tenants ensures a healthy balance of social classes in the complex." The generic attributes were mentioned by all stakeholder groups, but particularly often by residents.

Assessments are broadly similar across stakeholder groups, as they largely mention the same attributes and do not show opposing views. Sub-attributes belonging to, for example, differentiation of traditional material are frequently mentioned by all professional stakeholder groups. Differences were found according to their disciplinary areas: Governments focused more on public space, whereas architects and consultants referred more to aesthetic and spatial attributes. Residents referred more to neighbourhood activities, culture, and social structures and much less to buildings.

5.3. Digital Participation Process

In response to the final open-ended question of the survey, participants formulated their feedback on the use of the app. The repeated wording of the questions ("What do you find valuable about …") was perceived as boring. This fatigue is also observed in formulating answers. Later, questions are answered more concisely or state "see above." Another observation mentioned by all groups is that the survey asks for "value," while participants sometimes did not see anything of value. However, many participants still mentioned negative assessments in their responses. Participants said they liked that the survey included the wider environment but regretted not being able to enter buildings and dwellings (which was impossible due to Covid-19 restrictions).

Completing the on-site survey using the app had both positive and negative aspects. It was an opportunity for professional stakeholders to explore the neighbourhood, confirming the result of unexpected findings.

Some residents, however, did not see the added value of walking around because they already knew their neighbourhood. Residents had more difficulty using the app than other groups. Some were excluded from participating because they did not have a smartphone or could not get the app to work; they did, however, participate in the focus group interview. Residents were also more likely to quit the survey early without completing it. Comparing the results of the app and the follow-up interview per stakeholder group, participants in the focus group interview were influenced by their peers, while the app functioned to collect individual responses and obtain more independent opinions, as participants were asked to go alone.

6. Discussion

In the research, digital participation is employed to identify significant neighbourhood attributes. This section discusses how digital methods can promote large-scale participation in attribute assessment and how digital participation affects the resulting attributes.

6.1. The Challenge of Identifying Attributes From a Multitude of Varied Responses

Open questions allowing participants to explain their choices are important when using digital methods, as it is the underlying motivation that enables understanding. Moreover, open-ended questions allow participants to indicate the places, events, practices, stories, and people they find meaningful as already concluded (Madgin, 2021, pp. 87, 90). This is essential in participation processes and was reflected in our participants' feedback. But how do we identify attributes from a multitude of varied responses?

While digital methods are generally believed to offer a solution to time-consuming and costly participation processes (Foroughi et al., 2023, p. 6), their broader adoption necessitates the processing of a greater volume of responses. Additionally, using open-ended questions can also lead to more diverse responses. In this research, the data collection used digital methods, but the data analysis process was mainly human work and, therefore, time-consuming and dependent on researchers' interpretation, knowledge, and skills. One way to avoid this challenge would be to standardise data collection, for example, through multiple-choice questions or classification, which simplifies the processing of answers but would not permit unexpected answers. Another direction would be to avoid human involvement in the data analysis by using artificial intelligence (AI) to identify attributes. Moreover, using UGD technologies in data collection and processing could provide a much wider audience and already available free data. Referring to Bai et al. (2022), AI and the combination of UGD in multi-modal datasets would even be able to identify attributes, relate them, and find their meaning. However, some attributes are likely to be more easily detectable than others, as for some attributes the terminology is more consistent. For instance, the codes for "masonry facades" could be programmed as masonry, brick, stone, traditional material, tiles, detailing, craftsmanship, etc. However, new patterns are harder to identify because AI is trained with existing digital data, which is so far incomplete because it does not cover, for example, all time periods, cultures, languages, or perspectives. Finka et al. (2017) already addressed the confusion between professionals and citizens, but also between different professional disciplines in the use of terminology as a risk in participation processes. But beyond that general risk, digital analysis of terms is an additional challenge (Finka et al., 2017, p. 7). Other research is already working to resolve terminology issues, for example, by training a "semantic word embedding model" to learn terminology in several languages (even as a way to discriminate stakeholder groups) for the instaBarcelona project (Gomez et al., 2019, pp. 530–544).

6.2. Known and Unknown Attributes

Besides terminology, the complexity of concepts also plays a role in automated data analysis. The question is whether AI can detect complex patterns, such as the attribute "semi-public residential atmosphere" with all its varied sub-attributes, if not specifically trained. Knowing the societal and design ideologies and wider context, a researcher can recognise its elements and how they are sub-attributes of the same concept. This can be considered the opposite direction of identifying attributes and sub-attributes by Sobhani Sanjbod et al. (2016). In their study, they search for sub-attributes (gables in merchants' houses) of an attribute (port city) known from historical research and statements of significance. The historical attribute is the starting point, and sub-attributes can be programmed and found relatively easily. However, a current assessment, including non-professional stakeholders, can reveal attributes that were not intended nor described in historical research and literature. As highlighted by van der Hoeven (2020, pp. 136–137), studying participatory heritage websites, citizens tend to mention attributes that involve social, economic, and cultural activities. This corresponds to our results showing that residents refer more to neighbourhood activities, cultures, and social structures and less to buildings and tangible attributes in general. In analysing possible relations known concepts from the literature and these new, hitherto unknown, attributes, one should be able to connect a variety of sub-attributes to a main overarching attribute. Identifying intangible attributes and their relations is difficult to automate and, as Bai et al. (2022) pointed out, still requires an educated, informed understanding of the concept. In this respect, the study by Clemetsen and van Laar (2000) offers a potential direction. Their research assessing landscape quality through a standardised checklist distinguishes subjective and objective appreciation. The questions assessing subjective appreciation relate to sensorial and personal perceptions, while the objective valuation relates to professional knowledge and functionality (Clemetsen & van Laar, 2000, pp. 135–138). While their study acknowledges the difficulty of separating the subjective from the objective, combining attribute theories with stakeholder surveys could be a two-way process where professional knowledge and current assessment complement each other.

7. Conclusion

This article discusses how the assessment of the cultural significance of attributes results from (a) a broad definition of "new heritage"; (b) assessments of current significance; and (c) a participatory process, (d) conduced by a broad group of stakeholders, (e) using a digital tool, (f) analysed by skilled researchers.

7.1. The Added Value of Current Attribute Assessment

Results show how the identification of significant attributes by current stakeholders differs from the assessment by (heritage) experts in the literature on the 1965–1985 neighbourhoods. Firstly, it reveals mainly sub-attributes, whereas the present literature mainly describes overarching original principles and concepts. This confirms that extracting attributes and sub-attributes as a "site broken down into smaller parts," indeed serves to operationalise the abstract concept of value for local populations and various stakeholders (Kazuhiko et al., 2021). Secondly, the current assessment also includes tradition-inspired attributes or attributes that emerged later and were not originally intended. The present literature mainly focuses on specific and innovation-driven ambitions, such as, for example, the evaluation of government promotion of experiments (Barzilay et al., 2018). The reintroduction of traditional concepts and materials is

less described in the literature, although reverting to tradition and neo-styles can be observed in many Dutch 1965–1985 projects (Spoormans et al., 2022). This confirms that by including current stakeholders from different groups, the concept of heritage is enlarged, as was acknowledged by the Faro Convention (Council of Europe, 2005). This research shows, as also concluded by van der Hoeven (2020, pp. 133, 141), that using digital participatory methods is a way to include citizen opinions "on their own terms" leading to a greater variety of attributes. Lastly, it shows a shift from specific and authentic to generic but relevant, illustrating that in the "new heritage" definition by Fairclough (2009, p. 35), "things that can be considered marginal, such as the neglected ordinary things we have inherited, become central." The current assessment of attributes, as carried out in this research, is therefore considered complementary to the existing expert assessment.

7.2. Potential and Limitations of the App

The app proves to be a promising tool for collecting authentic answers while engaging a wide audience in identifying unexplored (heritage) attributes. Digital tools, such as "content hosting sites," in which the citizen is a contributor (Lewi et al., 2016), can combine individual responses into collective responses and reflect the combination of voices on dealing with and recognising values in the built environment (Madgin & Lesh, 2021, pp. 11, 98). To achieve this, as the research shows, open-ended questions are needed to enable understanding and an open mind toward undiscovered attributes and alternative stakeholders. However, dealing with large numbers of free responses is acknowledged as a challenge. With the introduction of ChatGPT, the software Atlas.ti (used in this research) has also recently launched its Open AI GPT model, which promises higher coding speed. However, although using AI could offer possibilities, the fact that such systems are trained with existing digital knowledge is a limitation in finding unknown attributes and complex relationships.

Lastly, the app appears to be a useful digital tool that can be applied to any neighbourhood in which the involvement of a wide range of stakeholders in exploring neighbourhood attributes is desired, whether the neighbourhood or its buildings are protected as monuments or not. However, its format should be developed. The scientific consistency demanded by the researchers appeared to conflict with its usefulness for participants. This was evident from participants' feedback in which the succession of the same questions, albeit at different scales, was thought boring and even counterproductive to their participation. This feedback provides insight into possible reasons for lower response rates on digital surveys, as Brown and Weber (2012, pp. 320, 323) described. Both the advantages of digital methods, such as being able to access the survey unrestricted by place and time, and the disadvantages, such as some people's difficulty operating the app, as described by Shen et al. (2012, p. 202), were confirmed in this research. Developing a user-friendly and attractive digital tool that also provides accurate data for scientific research is a challenge for further development and crucial for disseminating it to a wide audience of non-professional users. Moreover, extensive testing on other case studies, national and international, and with larger numbers of participants, possibly with automated data processing, is recommended in future research. At a local level, this can provide input for upcoming renovations or area developments and increase support for interventions. For academic research, it would contribute to knowledge development in the field of heritage participation processes.

Although actual impact is not guaranteed with such a digital tool because it depends on subsequent decision-making processes, the app Search for Values is promising for stakeholder engagement and preparing neighbourhood renewal processes based on cultural significance and broad support.

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Conflict of Interests

The authors declare no conflict of interests.

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About the Authors

Lidwine Spoormans is a researcher and lecturer of Heritage & Design at the Delft University of Technology since 2011. After a career as a practising architect, she returned to TU Delft. Her research fields include housing renovation, building systems, intervention methods, and young heritage. She organised a series of graduation studios on the topic of housing transformation and is a Management Committee member of the COST Action European Middle-Class Mass Housing. In 2017, she launched the digital platform We Love 80's Architecture (www.love80sarchitecture.nl). Currently, she studies the gap between listed heritage and everyday residential neighbourhoods.

Wessel de Jonge is a practising architect and full professor of Heritage & Design at the Delft University of Technology. His firm WDJArchitecten specialises in the adaptive reuse and conservation of 20th-century heritage buildings, including various social housing schemes. Most noted is the rehabilitation of the 1928 Nelle Factory in Rotterdam, which has since been recognised as a UNESCO World Heritage Site in 2014. In 1988, Wessel was the founding Secretary of DOCOMOMO International. He has lectured and published internationally on the challenge of preserving recent architectural heritage.

Darinka Czischke is an associate professor in Housing and Social Sustainability at the Delft University of Technology. In 2014, she was awarded the Delft Technology Fellowship to develop her research on Collaborative Housing. She is the founder of the Co-Lab Research group at TU Delft and co-founder of the working group Collaborative Housing at the European Network for Housing Research. She has published extensively about social, affordable, and collaborative housing from an international comparative perspective. She leads Project Together!, a cross-sector initiative focused on realising the potential of collaborative housing forms in the Netherlands.

Ana Pereira Roders is a professor of Heritage & Values at the Delft University of Technology. The chair aims to further understanding of the values that define heritage, such as cultural, social, ecological, and economic, and how they impact the sustainability of cities. One of the main goals is to define, develop, and test new integrated assessment frameworks to better monitor and strengthen heritage conservation worldwide. Since 2008, Ana has cooperated closely with UNESCO and the World Heritage Centre in particular. Her work is most relevant to governance reforms in heritage and urban planning.