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MEASURING RESIDENTS' EVALUATIONS OF THEIR CURRENT AND POTENTIAL FUTURE DWELLINGS

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Abstract

In most western European countries urban regeneration policies are an important topic. Post-war neighborhoods no longer satisfy the housing needs of the residents and there are problems. Many policy-makers agree that urban regeneration should not only improve the physical quality of the neighborhood but also the (social) well-being of their residents. One way to increase the well-being of residents is by restructuring the neighborhood in such a way that the problems witch are perceived by the current residents to be the most dissatisfying and the most important are given priority. Furthermore, restructuring existing dwellings or developing new ones according to residents' preferences might also enhance their well-being. This paper introduces a multi-attribute utility method that can be used to prioritize problems and to measure dwelling (environment) preferences.

Streszczenie

W większości zachodnich europejskich krajów ważnym tematem są zagadnienia odnowy miasta. Powojenne dzielnice mieszkaniowe już nie zaspokajają potrzeb mieszkańców i stwarzają problemy. Wielu decydentów jest zgodnych, że ta miejska regeneracja powinna nie tylko ulepszyć fizyczną jakość miejsc zamieszkania, ale też społeczne zadowolenie ich mieszkańców. Jedynym rozwiązaniem, by zwiększyć zadowolenie, usatysfakcjonować mieszkańców jest restrukturyzacja zabudowy mieszkaniowej w taki sposób, by najważniejsze problemy, które zostały dostrzeżone przez obecnych mieszkańców a wywołujące ich niezadowolenie stały się pierwszoplanowe. Ponadto, restrukturyzując istniejące mieszkania lub rozwijając nowe budownictwo, odnoszące się do preferencji mieszkańców, istnieje możliwość wpłynięcia na poprawę jakości ich zamieszkania i zadowolenia. Artykuł ten ukazuje korzystną pod wieloma względami metodę, która może być użyteczna, by uznać priorytety dotyczące tego problemu i wykazać preferencje dla środowiska mieszkalnego.

Keywords: **Multi-Attribute Utility Theory; Preference; Housing.**

1. INTRODUCTION

Bad neighborhood conditions, such as noise, graffiti and trash, can affect physical and mental health (see, for example, *Kruger et al.*, 2007). Through restructuring urban areas well-being might be promoted. But which conditions are perceived as being bad by its inhabitants and which conditions are not? Which dwelling (environment) characteristics are the most important and should obtain priority? And, what is the most efficient way to increase housing satisfaction? Housing concerns many aspects at the same time. These factors include dwelling-related characteristics such as dwelling type and the number of rooms and environmental-related factors such as perceived crime in the neighborhood and vandalism. When providing a general evaluation of a dwelling and its environment, all of these factors have to be valued at the same time. Thus, the evaluation problem has multiple value dimensions, which may be in conflict (*Von Winterfeldt and Edwards*, 1986, p.259). For example, the current dwelling might be relatively large and cheap but it is old and badly insulated whereas a renovated dwelling is more comfortable but this comes at the cost of a higher rent. Should the dwelling be renovated? Multi-criteria decision making techniques can be used to facilitate such complex decisions.

Within a multi-criteria decision context, all the factors (so-called criteria or attributes) that are relevant to the decision problem are evaluated and weighted for their relative importance by the decision-maker. It is assumed that the more important attributes will have a greater impact in determining preferences and choices. Combining the importance that respondents assign to different attributes with their evaluation of those attributes may be achieved using Multi-Attribute Utility Theory (MAUT). This paper describes an application of the multi-attribute utility method in practice.

One of the topics within urban restructuring is to keep or attract households with an (above) average income. It is said that these residents generate the social capital of the city and might be important to the social rise of other residents (VROM-raad, 2006). However, these residents often leave the city as there are no attractive dwelling alternatives available to them. The study described in this paper provides an insight into the priorities and preferences of residents with an (above) average income.

2. MULTI-ATTRIBUTE UTILITY METHODOLOGY AND TECHNIQUES

Important concepts of the multi-attribute utility methodology are described in Table 1. Formally, the multi-attribute utility methodology is a technique to support decision-making in the case when a decision-maker has to choose from a limited number of available alternatives. For example, these alternatives could be actual dwellings (alternatives) that are available at a particular date in a particular region. With the use of the method, a numeric value, the multi-attribute utility, which usually ranges between 0 and 100, is obtained for every alternative. The alternative with the highest multi-attribute utility should be the preferred one.

However, the method can also be used to explore respondents' preferences in a more general way in order to describe and predict priorities, preferences and choices. For each dwelling profile, consisting of a particular combination of attribute levels, the multi-attribute utility can be calculated. Thus, dwelling profiles that are deemed to be of interest can be compared with regard to their multi-attribute utilities. Furthermore, the impact of changing one or more attribute levels on the total perceived utility can be determined. For example, one can calculate how much additional "utility" is generated if the problem of graffiti on walls in the neighborhood should be resolved and compare this to the "utility" of solving the problem of litter on the street.

Although the practical application of MAUT might differ between occasions, all procedures include the following steps (*Von Winterfeldt and Edwards*, 1986, p.273):

1) Define alternatives and value-relevant attributes;
2) Evaluate each alternative separately on each attribute;
3) Assign relative weights to the attributes;
4) Aggregate the weights of attributes and the single-attribute evaluations of alternatives to obtain an overall evaluation of alternatives;
5) Perform sensitivity analyses and make recommendations.

In the remainder of this paper these steps will be described more elaborately in the context of a recent study into housing preferences.

3. BACKGROUND OF THE STUDY

The data for the study presented in this paper are collected in the context of the large study "Huizenkopers in Profiel" (HIP; *Boumeester et al.*, 2008a) that is performed every one or two years since 1995. In this study, data on housing preferences and current housing situation are collected from respondents who have at least an average income. A representative sample consisting of 6169 addresses was obtained from a marketing bureau. The data were collected though telephone interviews from February to April 2008. Beforehand, respondents were sent a letter with detailed information about the study.

Of the 6169 respondents, 3000 (49%) cooperated in the study. Because of special requirements of the Huizenkopers In Profiel study with regard to the representativeness of the respondent sample, 921 respondents were presented with a very brief interview that did not include the multi-attribute utility questions. Furthermore, respondents living in a detached dwelling (n = 437) and those living in a ground-floor flat (n = 60) were omitted from the analyses because these types of dwellings had not been incorporated as attribute levels (see Table 3), so the multi-attribute utility for their current dwelling could not be assessed. The multi-attribute utility questions were ultimately analyzed for 1582 respondents. The characteristics of these respondents are shown in Table 2.

Table 1.
Important Concepts in the Multi-attribute Utility Methodology

Concept	Description
Alternatives	Options where the decision-maker has to choose from, for example various available dwellings.
Attributes	Important ("salient") characteristics of the alternatives, for example "dwelling type" and "number of rooms".
Attribute level	Levels of the attributes. For example, 2 and 3 are levels of the attribute "number of rooms".
Value	The numerical value that is attached to a particular attribute level. For example, a dwelling with 5 rooms may obtain a high value (it is attractive).
Importance score	The numerical importance of each attribute. For example, the attribute "number of rooms" may be deemed more important than "architectural style".
Weight	The importance score after transformation such that, for each respondent, all attribute weights taken together add up to 1.
Single-attribute utility	Strength of preference for a single attribute level on a scale from 0 to 100. It results from the multiplication of the numerical value with the weight.
Combination rule	The rule that is used to aggregate over the single-attribute utilities. Usually, the simple additive rule is applied: This implies that the single-attribute utilities are simply added to obtain the multi-attribute utility.
Multi-attribute utility	Strength of preference for an alternative on a scale from 0 to 100. It results from the aggregation of single-attribute utilities.

Table 2.
Respondents' Characteristics

Gender (n = 1555)	
Female	834 (54%)
Age (n = 1562)	
Mean (std)	52 (13)
Range	19 – 89
Number of persons in household (n = 1563)	
One	244 (16%)
Two	682 (44%)
Three or more	637 (41%)
Paid job (n = 1561)	
Yes	1030 (66%)
Education (n = 1477)	
Lower	339 (23%)
Middle	557 (38%)
Higher	581 (39%)
Residential environment (n = 1559)	
Urban	205 (13%)
Suburban	651 (42%)
Rural	696 (45%)

3.1. Step 1: Define alternatives and value-relevant attributes

The first step in the multi-attribute analysis is to determine the available alternatives and their most salient attributes. In this study there are no particular alternatives available. Instead, various dwelling profiles can be constructed on the basis of the combination of attribute levels. The set of attributes considered in this study are based on the literature and on a previous study (*Floor and van Kempen*, 1994; *Goetgeluk*, 1997; *Heins*, 2002; *Boumeester et al.*, 2005; *Boumeester et al.*, 2008b; *Jansen et al.*, 2009). As the multi-attribute utility questions were part of a larger survey into residents' housing preferences, we could only include 8 attributes, because otherwise the interview burden for the respondents would be too high (fatigue, boredom, no more time). We included seven attributes that pertained to characteristics of the dwelling and one attribute that pertained to the dwelling environment. The attributes and attribute levels are presented in Table 3. The Figures 1 to 3 provide examples of what is meant by dwelling type, architectural style and residential environment. Note that each study has to choose its own salient attributes according to the goal of the particular study. For a study into urban restructuring these attributes could be dwelling characteristics, but also factors concerning problems, such as vandalism and graffity, and amenities such as the presence of greenery and shops and public transport.

Terraced house / corner house

Apartment

Semi-detached house

Figure 1.
Example of dwelling type

Traditional

Modern

Experimental

Figure 2.
Example of architectural style

Urban

Suburban

Rural

Figure 3.
Example of residential environment

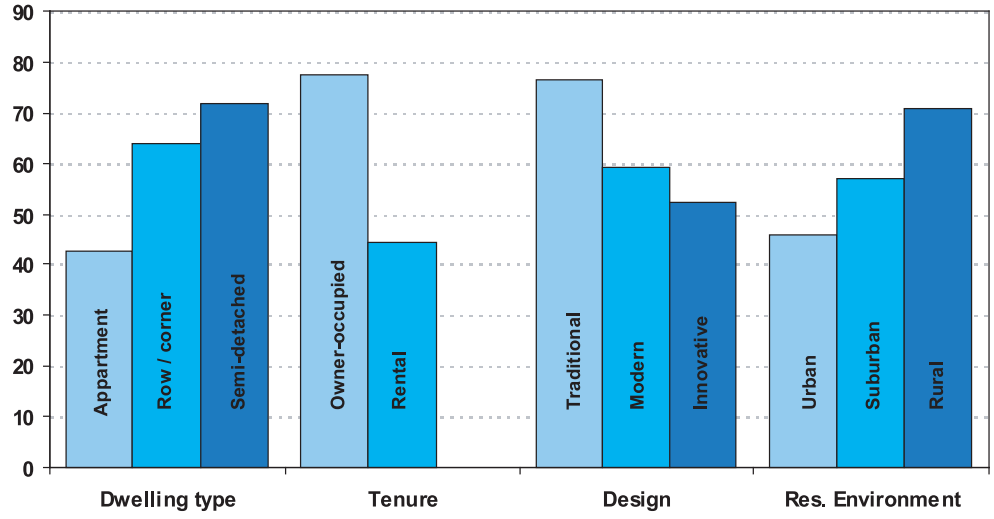

Figure 4.
Mean Values for all Respondents (Higher Score = More Attractive; range = 0 to 100)

In the current study, respondents answered questions on either rental costs or purchase costs depending upon their current living circumstances with regard to tenure. The same applies to the size of the garden and the balcony. Respondents were also asked about their current housing situation with regard to the eight attributes. Thus, they where asked which type of dwelling they occupied, the availability and size of the garden they had, the architectural style of their

Table 3.
Attributes and Attribute Levels

Dwelling type	Purchase costs / Rental costs
Apartment	€ 140000 / € 338 per month
Terraced house/corner house	€ 220000 / € 532 per month
Semi-detached house	€ 300000 / € 725 per month
Tenure	Size of the living room
Rental house	20 m^2
Owner-occupied house	30 m^2 40 m^2
Architectural style	Number of rooms
Traditional	2
Innovative	3
Modern	4
Residential environment	Backyard size / size balcony
Urban	5 meters / 4 m^2
Sub-urban	10 meters / 7 m^2
Rural	15 meters / 10 m^2

3.2. Step 2: Evaluate each alternative separately on each attribute

Numerical values for the attribute levels were obtained directly with the use of rating scales. Respondents were asked to indicate their likes or dislikes with regard to each level of every attribute on a scale with two anchors: on one side "extremely unattractive" with an assigned value of 0 and on the other side "extremely attractive" with a value of 100. The questions were introduced by explaining these endpoints and by stating that a higher appointed number was related to more attractiveness. Furthermore, the interviewer explained that the respondent had to take his/her current situation and household income as a starting point in answering the questions.

Figure 4 presents the mean values of the dwelling attributes with categorical attribute levels. Note that the results present the values of all respondents for all attribute levels, irrespective of their own actual housing situation (n = 1538 to 1551).

The Figure shows that, in general, semi-detached houses are more appreciated than the other two dwelling types. Furthermore, respondents prefer an owner-occupied dwelling with a traditional design in a rural residential environment.

Next, the mean values for the respondents' current housing situation were calculated. Thus, for respondents living in an apartment, their value for an apartment was taken, for respondents living in a row/corner house their value for a row/corner house was taken, and so on. The mean values are presented in Figure 5.

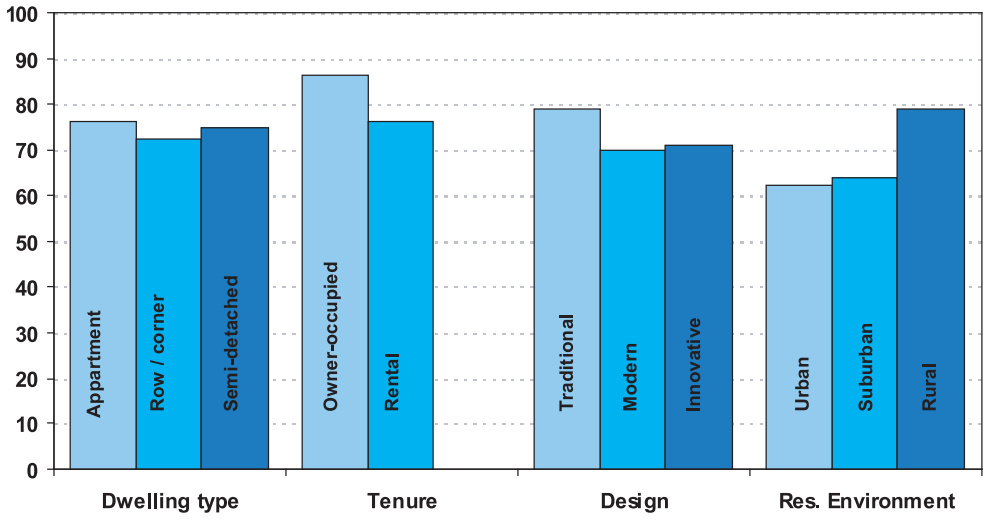

Figure 5.
Mean values for Respondents Living in the Particular Situation (Higher Score = More Attractive; range = 0 to 100)

Now a very interesting picture emerges. An owner-occupied house (n = 1129) with a traditional architectural design (n = 1193) and located in a rural environment (n = 703) is still favored, but the differences are much smaller than in the general situation. Residents living in an urban (n = 205) or suburban (n = 651) residential environment are about equally satisfied with the environment they live in, but residents living in a rural environment are still more positive. Furthermore, an apartment (n = 242) is equally appreciated as single-family homes. These results show that in interpreting preferences it is very important to keep in mind whom you asked. It seems that the respondents in this study are relatively satisfied with their particular housing situation.

Figure 6 shows the mean values for the numerical attributes obtained from all respondents, irrespective of their actual housing situation (n = 233 to 1551).

The results show that, in general, more rooms or larger size is related to more value and that less rental costs is related to more value. For the attribute of costs the results showed that both lower (€ 140.000) and higher costs (€ 300.000) are related to less attractiveness, whereas medium costs (€ 220.000) are related to higher attractiveness. The finding that a cheaper dwelling is related to less value does not make sense logically when it concerns the single and presumably independent attribute of costs. It is likely

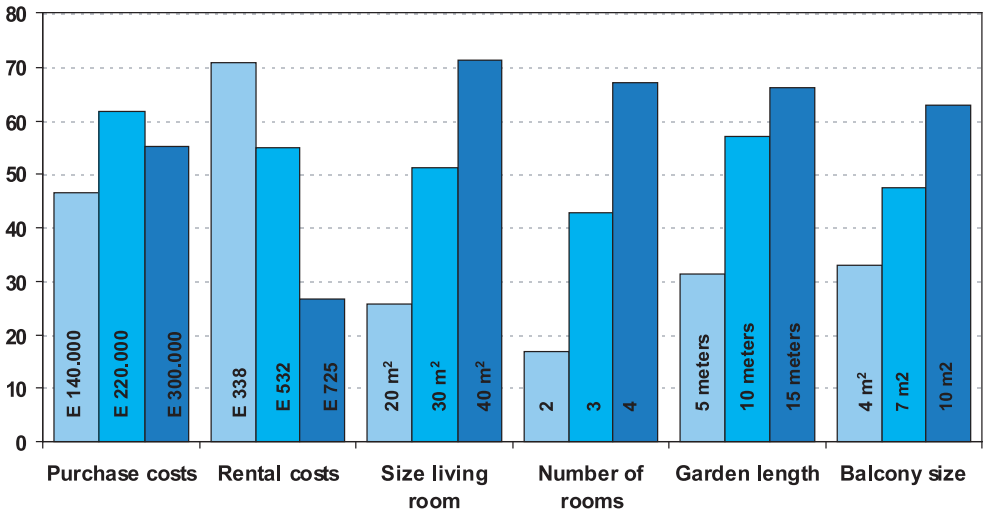

Figure 6.
Mean Values for Numerical Attributes for all Respondents (Higher Score = More Attractive; range = 0 to 100)

Table 4.
Mean Values for Actual "Quantitative" Dwelling Attributes

	Mean Value	Standard deviation	Number of respondents	Actual mean quantity
Size of the living room	65.07	24.3	1486	38.2 m²
Number of rooms	70.37	26.7	1532	4.7
Garden length	64.08	27.7	1240	13.2 m
Balcony size	56.13	31.3	223	11.1 m²

that the lower attribute level of € 140.000 was set too low in this study and was probably deemed as not being a realistic price by the respondents. For this reason, the attribute of costs was omitted from further analyses when calculating the multi-attribute utility for the actual housing situation (see below).

For calculating the value of the numerical attributes for the respondents' actual housing situation the following procedure was followed. Firstly, for respondents with dwelling characteristics exactly the same as the questioned attribute level, for example two rooms, a garden of ten meters length and so forth, the appropriate values were copied. Next, for respondents with dwelling characteristics in between the questioned attribute levels, for example a garden of 12 meters length, values were interpolated on the basis of the responses provided for the subsequent levels. For respondents with dwelling characteristics outside the scope of the survey questions, values were extrapolated with the use of ordinary least squares regression analyses, on the individual level and for each attribute separately. Thus, for every respondents a regression analysis was performed for each attribute with the numerical values as the dependent variable and the attribute levels as the predictors. The individual coefficients obtained in this way were used to estimate values for attribute levels that lay outside the scope of the questioned attribute levels (extrapolation).

Table 4 shows the mean values for the quantitative attributes according to the respondents' actual situation. Note that individual respondents' values apply to different quantities of the dwelling attribute. Thus, the results show how satisfied the respondents are with their current dwelling characteristics, which may be different for every respondent. The actual mean quantity is presented in the last column. Generally, respondents are the least appreciative of their current balcony size and the most satisfied with the number of rooms in their dwelling.

3.3. Step 3: Assign relative weights to the attributes

In the third step of the multi-attribute utility procedure, respondents are asked how important they find the various attributes on a rating scale with numerically scaled units from 0 (not important at all) to 100 (extremely important). The mean importance ratings are presented in Figure 7 (n = 232 to 1547).

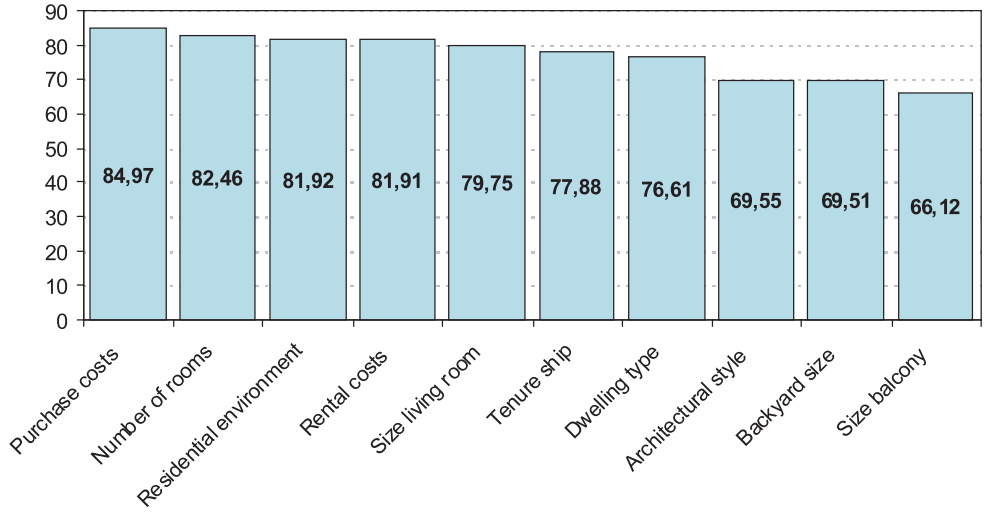

Figure 7.
Mean Importance Ratings (Range 0 to 100)

All attributes are deemed to be relatively important, as the lowest mean score was 66 on a 100-point scale. This means that no superfluous attributes were chosen in this study. Purchase costs and number of rooms are perceived as being the most important dwelling characteristics. Size of the balcony and the garden and architectural style are deemed to be the least important dwelling characteristics.

The importance ratings are transformed into weights by dividing, for every respondent, the rating of each attribute by the sum of all ratings (*Von Winterfeldt and Edwards*, 1986, p.281):

$$w_i = \frac{w_i'}{\sum_{i=1}^{n} w_i'}$$

Where w_i' is the not-normalized ratio weight and w_i the normalized weight. Hereby individual weights for each attribute are obtained that add to 1, as is conventional in multi-attribute utility theory (*Von Winterfeldt and Edwards*, 1986). Assume, for example, that a respondent has the following importance ratings for eight attributes: 20, 30, 40, 50, 30, 60, 70, 20. The sum of these ratings is 320. The weight for the first attribute then is: 20/320 = 0.06. The other weights are calculated in the same way.

3.4. Step 4: Aggregate the weights and the attribute evaluations of alternatives to obtain an overall evaluation of alternatives, the multi-attribute utility

Single-attribute utilities are obtained for every respondent by multiplying the values with the weights for each attribute level. The single-attribute utilities represent the value that is added to the subjective value of a dwelling, keeping all other attribute levels constant. The mean single-attribute utilities are presented in Table 5. They are calculated for all respondents irrespective of the respondents' own actual housing situation.

Next, the multi-attribute utility for every alternative can be calculated. The most commonly applied aggregation method to calculate multi-attribute utilities is the linear additive preference function (*Von Winterfeldt and Edwards*, 1986, p.275). This method was applied in the current study. It simply means that for every respondent the multi-attribute utility for a particular profile (combination of attribute levels) is calculated by multiplying the weight for each attribute with the corresponding evaluation score and adding up the resulting single-attribute utilities over all attributes. The multi-attribute utility for alternative x is:

$$v(x) = \sum_{i=1}^{n} w_i v_i(x_i),$$

where $v_i(x_i)$ is the value of alternative x on the ith attribute, w_i is the importance weight of the ith

Table 5.
Mean Single-Attribute Utilities, Standard Deviation (Std) and Number of Respondents (n)

Attribute (level)	Mean	Std	n		Mean	Std	n
Dwelling type				Purchase costs / Rental costs			
Apartment	5.41	4.72	1548	€ 140000 / € 338 per month	6.48 / 9.94	4.72 / 4.68	1098 / 427
Terraced house / corner house	7.81	3.75	1546	€ 220000 / € 532 per month	8.51 / 7.60	4.23 / 4.46	1102 / 427
Semi-detached house	8.76	3.62	1545	€ 300000 / € 725 per month	7.54 / 3.63	4.93 / 4.23	1102 / 427
Tenure				Size of the living room			
Rental house	5.24	4.43	1542	20 m²	3.26	3.11	1548
Owner-occupied house	9.78	4.66	1545	30 m²	6.62	3.58	1546
				40 m²	9.22	3.52	1546
Architectural style				Number of rooms			
Traditional	8.55	3.16	1543	2	2.24	2.70	1548
Innovative	5.75	3.34	1538	3	5.74	4.09	1547
Modern	6.46	3.28	1540	4	8.98	3.90	1547
Residential environment				Backyard size / size balcony			
Urban	6.01	4.08	1543	5 meters / 4 m²	3.42 / 3.43	2.94 / 3.20	1259 / 232
Sub-urban	7.53	3.50	1543	10 meters / 7 m²	6.50 / 5.08	3.57 / 3.51	1257 / 232
Rural	9.40	3.93	1544	15 meters / 10 m²	7.72 / 6.72	4.08 / 4.02	1257 / 232

attribute, and *n* is the number of different attributes (*Von Winterfeldt and Edwards*, 1986, p. 263, p.275). Since the weights add to 1 and the values are bounded between 0 and 100, all multi-attribute utilities fall between 0 and 100. A higher multi-attribute utility score is related to more preference (both higher values and deemed important). Note that this procedure should be applied to individual respondents' single-attribute utilities and not to the mean single-attribute utilities as presented in Table 5 because the weights are personalized and slight differences may appear between mean aggregated individual utilities and aggregated mean group utilities.

3.5. Step 5: Perform sensitivity analyses and make recommendations

In the last step of the multi-attribute utility procedure, sensitivity analyses can be carried out to examine the stability of the resulting multi-attribute utilities. Different numerical values and weights can be obtained by using different elicitation methods. For example, another weighting procedure can be used such as the equal weight rule. The equal weights method assumes that there is no information about weights and thus all attributes have equal weight (*Jia et al.*, 1998). For example, for eight attributes, the weight of each attribute is 1/8 = 0.125. Multi-attribute utilities can be recalculated using the new weights and the stability of the results can be explored. This will not be performed here.

4. EXAMPLES OF APPLICATIONS

The attribute level values, the importance ratings, the single-attribute utilities and the multi-attribute utilities can be applied in a large number of interesting analyses.

One way in which the information on satisfaction and importance scores can be used is in analyses such as Importance-Performance (IPA) analysis (Martilla and James, 1977) and other types of analyses that measure strengths, weaknesses, opportunities and threats (SWOTs). IPA is an instrument for understanding customer satisfaction and prioritizing service quality improvements. The attributes are graphed according to their mean satisfaction and importance scores.

One of the goals of urban restructuring is to keep residents with an (above) average income in the city. For this option, it is important to have an overview of the dwelling (environment) characteristics on which the attention should be focused in order to satisfy the needs and wishes of these residents with respect to housing. Figure 8 shows an IPA analysis for residents with an (above) average income living in an urban residential environment (n = 201).

Attributes that are deemed important and obtain a (relatively) low satisfaction score should obtain priority. In the current study this applies to the attributes of residential environment, size of the living room and number of rooms. If these results would apply to

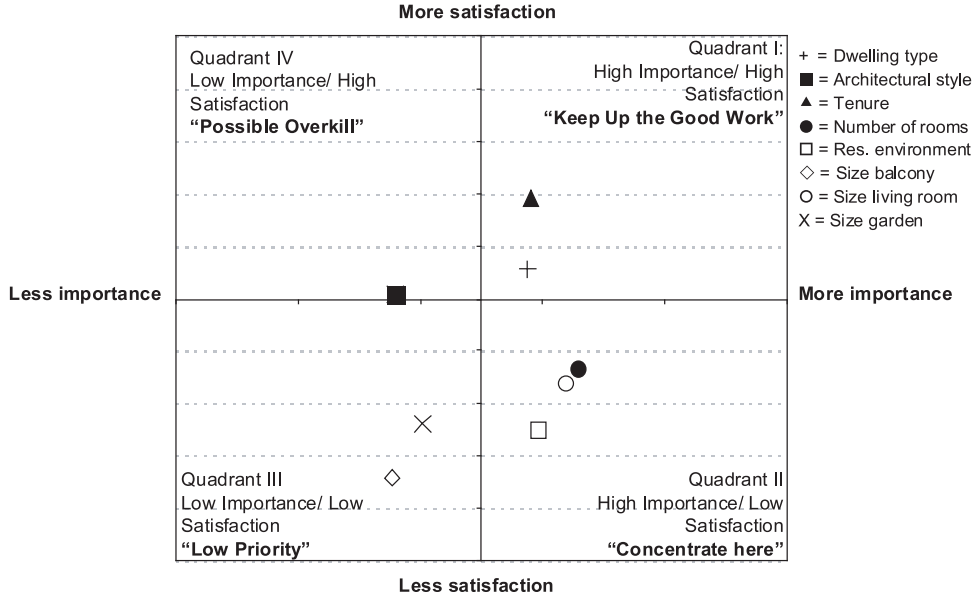

Figure 8.
IPA Analysis of Attributes for Residents Living in an Urban Residential Environment

the restructuring of urban areas (which they don't) these points would be kept in mind in the restructuring process in order to keep or attract middle income residents. Of course, residential environment cannot be influenced but both number of rooms and the size of the living room can be adapted in order to meet the preferences. The IPA analysis also shows that although citizens with an (above) average income are not entirely satisfied with the size of their garden or balcony, this point is of lesser importance to them. Note that in urban restructuring studies, topics such as graffiti and litter on the streets could be included in the analysis to determine the relative importance of solving various problems.

Another type of analysis can be performed using the multi-attribute utilities. The multi-attribute utility for the respondents' actual housing situation can be calculated by adding their single-attribute utilities. Note that the attribute of costs has been omitted from these analyses because of the problems with this attribute with regard to calculating the value of the actual housing costs as mentioned before. Due to some missing answers, multi-attribute utilities were eventually obtained for 1386 respondents. The mean multi-attribute utility score is 72.25 (standard deviation = 12.22; range = 2 to 100). This implicates that the current dwelling has a relatively high utility (72 on a 100-point scale) and that respondents are generally satisfied with their current dwelling.

Groups of respondents can be compared with regard to their actual housing situation. For example, respondents living in rural, urban and suburban residential environments can be compared. Results from these analyses show that respondents living in a rural residential environment (mean multi-attribute utility = 74.02; n = 629) are statistically significantly more satisfied with their current general housing situation than respondents living in an urban (mean = 71.60; n = 172) or suburban (mean = 70.55; n = 585) residential environment. A comparison of the single-attribute utilities shows that respondents living in a rural environment are generally more satisfied with the architectural design of their dwelling and with the residential environment they are living in than respondents living in the other types of residential environment. See Figure 9 for an overview of the single-attribute utilities for respondents living in an urban, suburban or rural environment.

Multi-attribute utilities can also be calculated for every hypothetical combination of dwelling attribute levels, irrespective of the respondents' actual situation. For example, the "best" alternative, i.e., an owner-occupied semi-detached dwelling with a traditional architectural design, located in a rural residential environment, with four rooms, a size of the living room of 40 m^2 and a garden of 15 meters has a mean multi-attribute utility of 72.76 (std = 13.06, n = 1249). Notice that this mean multi-attribute utility is about the same as the mean multi-attribute utility present-

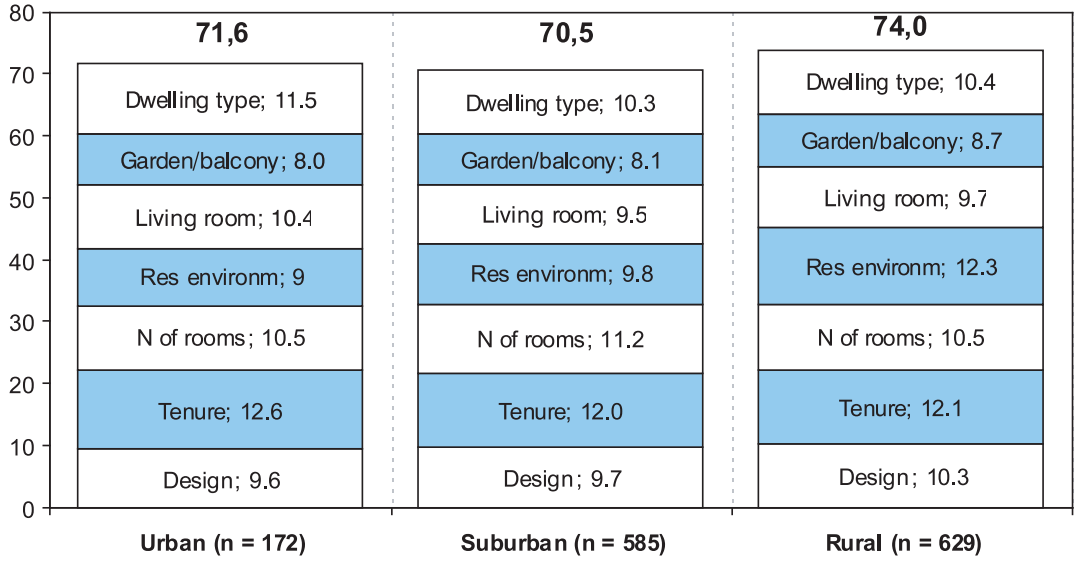

Figure 9.
Single-attribute Utilities of Residents Living in an Urban, Suburban or Rural Residential Environment

ed for the respondents' actual housing situation. This result reflects the fact that there are large differences in preferences between respondents. For example, a semi-detached dwelling may not be the ideal dwelling for everyone, as was also shown in Figure 5.

Furthermore, the impact of changing one level of a particular attribute on the multi-attribute utility can be calculated by comparing the multi-attribute utilities in both situations. A dwelling alternative with the same characteristics except for the size of the garden, i.e., 10 meters instead of 15 meters, would lead to a decrease in utility of 2% (difference = 1.4, mean = 71.35, std = 12.56, n = 1249). Instead, an dwelling alternative with the same characteristics except for tenure, would lead to a decrease in utility of 8% (difference = 5.99, mean = 66.77, std = 13.25, n = 1248).

5. DISCUSSION

Good interventions with regard to urban restructuring start with obtaining a correct notice of what residents in the particular neighborhood find important for their well-being and for a satisfactory housing situation. If so, there is more chance that the interventions will provide positive results. Multi-attribute utility theory is one of the techniques that can be used for this purpose. Note, however, that its use has a number of limitations. Firstly, it is dependent upon the selected attributes (levels). These have to be chosen correctly in order to obtain to relevant results. Prior research may be needed to select the correct attributes. In the case of urban restructuring this could concern factors such as graffiti on walls, vandalism, litter on the street but also factors like the presence of greenery, schools and other facilities in the dwelling environment.

Secondly, utilities are in general calculated using the linear additive preference function. This indicates that it allows small advantages on some attributes to compensate for a large disadvantage on another. However, in practice residents do have less interchangeable preferences; if a dwelling doesn't have a certain characteristic, it will not be selected whatever the quality of the other characteristics. Thirdly, respondents are not asked to trade off between attribute levels. Therefore, the measurement task may not reflect the mechanisms underlying actual decision-making and choice processes. These limitations show that calculating multi-attribute utilities might be indicative of priorities. However, as is also the case for preference studies in general, one should not depend upon this type of research alone to understand priorities.

An interesting finding of the current study is that it shows that the attractiveness of dwelling characteristics depends strongly on whom you ask. In general, multi-family homes are less appreciated than single-family homes. However, respondents living in an apartment turn out to be more satisfied with their current dwelling type than residents living in a terraced or corner house. In this particular study, it presumably indicates that our respondents made a deliberate choice for their particular housing situation as our respondents had at least an average income.

In summary, multi-attribute utility theory may have additional value to the research field of urban restructuring. It provides the possibility to examine the importance and satisfaction with separate dwelling (environment) characteristics, to calculate single-attribute utilities, to calculate overall utilities for combinations of attribute levels, to distinguish consumer groups with different preferences, to perform analyses such as an IPA analysis and to choose among alternatives when different alternatives are available.

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