



Choice architecture for architecture choices: Evaluating social housing initiatives putting together a parsimonious AHP methodology and the Choquet integral



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ABSTRACT

Choice architecture concerns different forms and procedures to present and handle a decision problem. It is a paradigm around which many theoretical results have been collected within behavioural psychology and experimental economics and many successful applications have been implemented in the domains of health, finance and social choices. In this work, we propose an application of the basic idea of architecture choice that is designing decision support procedures for complex problems, with a focus on housing realm. We consider a real-world problem in which 21 Social Housing initiatives sited in the Piedmont region (Italy) had to be evaluated taking into account several criteria and, to this aim, we propose a decision analysis methodology for supporting assessment in such complex problems. Our main preoccupations in designing the decision aiding procedure were related to build a model that, on one hand, permits to take into consideration the many delicate points of the problem, while, on the other hand, requires to the Decision Maker (DM) an affordable cognitive burden in terms of preference elicitation and interpretation of the obtained results. Since synergy and redundancy of criteria constitute important aspects of the decision problem, we aggregated evaluations on considered criteria by means of the Choquet integral. To maintain the preference information asked to the DM simple and not too requiring, we put together a recently proposed parsimonious approach of the Analytical Hierarchy Process (AHP) and the Non-Additive Robust Ordinal Regression (NAROR). The Parsimonious AHP permitted to assign a value on a common scale to the performances of all criteria, while the NAROR permitted to elicit the importance and the interaction of criteria taking into account all the possible values for the preference parameters compatible with the preference information supplied by the DM. Our methodology allowed a fruitful interaction with the DM that had the possibility to update the preference information during the decision process until he/she felt convinced and satisfied of the obtained result. The suitability and the interest of the proposed methodology were confirmed by the subjective final appreciation of the DM as well as by the objective absence of specific inconsistencies in the AHP procedure and in the non-additive robust ordinal regression, which witnessed the beneficial contribution of our approach.

1. Introduction

In an increasingly complex world, decisions become more and more intricate, problematic and troublesome. Several points of view have necessarily to be taken into consideration, so a good decision support needs a rich and fruitful interaction with the Decision Maker (DM). Hence, particular attention has to be paid on reducing the cognitive

burden and the possible biases (Miller, 1956; Hammond et al., 1999; Milkman et al., 2009) when collecting preference information from the DM. These remarks are assuming special importance for architecture problems, which are characterised by heterogeneous social, economic, environmental and cultural domains having consequences on both the territory and the society. Here comes the necessity for new decision support methods able to structure, process and aggregate the

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information collected and provided by the DM, in a simple and understandable way, avoiding misunderstanding during the decision process and beyond. To define this new general decision processes perspective, we can “borrow” a very well-known expression from the economists: choice architecture (Thaler and Sunstein, 2008). Moreover, since this concept is here applied to the architecture problems domain, a “word pun” is easy: choice architecture for architecture choices.

In this paper, we apply the idea of choice architecture for architecture choices to one of the most urgent needs directly related to the social dimension of the economic global crisis, which is the new housing demand from the so-called in “work-poverty population” (Dartford Borough Council, 2011; Marx and Nolan, 2012). This particular social target is composed by subjects in a situation of housing vulnerability or who need transitory housing solutions and constitutes a “grey zone” for the social housing policies. This new type of demand has emerged all over Europe and has increased dramatically in the last 20 years (CECODHAS – Housing Europe, housingeurope.com). In this sense, the beneficiaries of the Social Housing (SH) encompass people not having the minimum income needed to pay a rent on the regular real-estate market and people needing social support (Marx and Nolan, 2012).

This new growing housing demand is characterized by high economic and social fragility (Wills and Linneker, 2014). The rebalancing of the relationship between the number of households and the number of inhabitants is not dealt with but rather an attempt is made to lessen the gap between access to the housing market and the real disposable budget income of the households. It is also expected that the size that this phenomenon has reached in recent years will show no sign of decline in the medium-long term in many European Countries, and it will probably cause a severe crisis in the welfare system and in the real estate market (ec.europa.eu).

Despite real estate investments being closely linked to the urban, regulatory and economic contexts in which they are applied, it is possible to recognise synergies and shared features in defining elements of this housing crisis across the European Union (EU) member states, namely:

- the desire and need to provide affordable housing through the construction and lease of homes (Crook and Kemp, 2014; Whitehead et al., 2012; Oxley, 2012; Haffner and Heylen, 2011);
- the definition of target groups either in socio-economic terms or in relation to other kinds of vulnerability;
- the pursuit of housing quality by achieving energy efficiency standards and reducing social exclusion (Czischke and Pittini, 2007).

After the Second World War, SH evolved gradually from centralized control to decentralized management style, engaging private sector involvement (Wong and Goldblum, 2016). Moreover, while after the Second World War the focal point of the SH was to provide houses to people in an emergency situation, over the last 20 years the human factor has become fundamental: the SH focus has shifted from the building to the people living in the building (CECODHAS Housing Europe, housingeurope.com). This evolution of the SH concept needs for new policies able to overcome the traditional SH logic, activating new decision process and procedures able to find effective means of investment for the institutions that operate in this field (not only the public sector but also the third sector) (Lami and Abastante, 2017).

The first author of this paper experienced several SH decision processes working in the private sector with the *Programma Housing* (PH), which is an operating entity of the Italian Bank Foundation “Compagnia di San Paolo” (CSP – Turin, Italy). The PH is composed by experts in different fields (i.e. architects, engineers, evaluators, psychologists and sociologists) with the aim of giving grant contributions to third bodies submitting innovative SH projects (9.000.000 euro have been given in the period 2007–2018). In this sense, the PH has to assess a number of

SH projects every year in order to properly finance the most interesting ones acting as a Decision Maker (DM) for the aforementioned processes.

Thanks to this connection between the authors and the PH, we had the opportunity to face a real SH decision process. To this aim, we propose and test a new Multicriteria Decision Analysis (MCDA) procedure able to support complex decision processes to increase the transparency and quality of the processes of allocating public and private resources taking into account the concept of Choice Architecture (Thaler and Sunstein, 2008). Observing that people adopt different strategies in a decision process depending on the size and complexity of the available options, Thaler and Sunstein (2008) affirm that a good choice architecture, i.e. the design of the environment in which people make choices, will provide the structure, and the structure will affect outcomes.

This seems particularly important in SH realm: scholars have viewed that SH needs to be informed by increasingly sophisticated conceptions that treat the setting as a complex, multidimensional field (Camoletto et al., 2017; Allen et al., 2008; Wills and Linneker, 2014). This is the realm, where the concepts get fuzzier, therefore requiring the use of a richer theory and more complex Methods, that, however, permit to interact with the DM with the simplest and most understandable possible procedures. Multifaceted social, economic and financial balance, environmental issues and quality of life make it an intriguing topic that characterizes the field. It is important to underline that the aim of the SH programs at a EU level is increasingly not simply to meet housing needs (such as rental housing at rents agreed), but to promote social inclusion and to improve the living conditions of people from a sustainable social, environmental, institutional, economic and financial point of view.

An adequate choice architecture could help to rethink the whole system of SH in order to create languages, tools and parameters able to develop, compare and evaluate SH projects focusing on the public and private interests. In addition, one of the main difficulties in this context is the need to engage with different types of collective actions, the plurality of subjects with different aims and resources and the lack of homogeneous information. Addressing these difficulties can be extremely challenging (Lami, 2019). In the light of this, the paper addresses the issue of evaluating and ranking SH projects proposing a new methodological approach that allows to tackle decision problems characterised by: i) high number of alternatives to rank; ii) qualitative and quantitative criteria which could violate the preference independence; iii) the possibility for the DM to express her preferences only on the alternatives she knows best.

According to the literature, as the MCDA procedures are countless, it is necessary to deeply reflect on the most suitable method for the decision context in exam (Roy and Słowiński, 2013; Abastante, 2016). In fact, failure to identify the real nature of the decision problem could lead to the application of the wrong methodology placing the resulting analysis at risk and greatly diminishing the relevance of the outputs (Munda, 2008; Salgado et al., 2009).

Thus, we imagined an approach permitting to organize the information by alternating stages of dialogue with the DM and calculation. The dialogue stages aim to collect information directly from the DM, which can reveal his preferences about the alternatives and the criteria at stake. The DM preferences are in turn taken into account in the calculation stages.

After a deep reflection, the proposed methodological approach is based on the conjoint application of the Parsimonious AHP (Abastante et al., 2018), an extension of the Analytic Hierarchy Process (AHP) (Saaty and Ozdemir, 2003; Saaty, 1980), together with the Choquet integral (Choquet, 1953) and the Non-Additive Robust Ordinal Regression (NAROR; Angilella et al., 2010a).

Combining the parsimonious AHP and the NAROR, we apply a novel methodology in order to take into account the following main concerns, basilar for all MCDA procedures:

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