Method and system for Multi-Attribute Market Value Assessment in analysis of construction and retrofit projects

Loreta Kanapeckiene, Arturas Kaklauskas*, Edmundas Kazimieras Zavadskas, Saulius Raslanas

Gediminas Technical University, Sauletekio av. 11, LT-10223 Vilnius, Lithuania

1. Introduction


Dedieu et al. (2003) addresses the development of a two-stage methodology for multi-objective batch plant design and retrofit according to multiple criteria. At the upper level (master problem), the Multi-Objective Genetic Algorithm (MOGA), which proposes several plant structures, is implemented for managing design or retrofit problems. At the inner level (slave problem), the Discrete Event Simulator (DES) evaluates the technical feasibility of the proposed configurations. First, basic DES principles are recalled. Then the following section develops MOGA based on the combined, single-objective, genetic algorithm (SOGA) and Pareto Sort (PS) procedure. Finally a didactic example related to manufacturing four products using three types of equipment of discrete sizes illustrates this approach. Next, two criteria, investment cost and number of different plant unit sizes, are considered for designing a workshop. Then, starting from the best solution in terms of investment cost found in the design phase, a plant is retrofitted for double manufacturing. Finally the workshop is redesigned under the assumption of double production at the design phase. In terms of investment cost, this new solution yields a significant saving compared with what the retrofitted plant yields. In fact redesigning a new plant may challenge the retrofitting choice. Secondly an additional criterion is introduced concerning the number of production...
campaigns for reaching the steady-state or oscillatory regime, and the same approach (designing, retrofitting and redesigning) is performed which leads to the same conclusion as the bi-criteria case does.

Alanne (2004) proposed a multi-criteria “knapsack” model to help designers select the most feasible renovation actions during the conceptual phase of a renovation project. A case analysis concerning a real, Finnish apartment building was also presented. The primary aim of this case study was to test the applicability and functionality of the “knapsack” model in the context of these types of problems and to demonstrate the new model. For these reasons, as well as to avoid confusion, the simplified approach was applied. The results allowed to conclude that the method worked as had been expected. The analysis of this building case study led to the recommendation to adjust the radiator network by installing thermostatic valves. The most controversial factors regarding the evaluation of the model were the subjectivity feature of the multi-criteria assessment as well as the additive process of the model.

Based on the multi-index comprehensive evaluation method combined with the Life Cycle Assessment (LCA) Theory, Analytical Hierarchy Process (AHP) Method, post-evaluation thought and the combined with the Life Cycle Assessment (LCA) Theory, Analytical Hierarchy Process is the most popular technique followed by the PROMETHEE and ELECTRE outranking techniques. Validation of results with multiple methods, development of interactive decision support systems and application of fuzzy methods to tackle uncertainties in the data were examined in the published literature.

Zavadskas et al. (2008) considered some of the problems associated with assessing the retrofit effectiveness of apartment buildings in urban areas. The retrofit of houses should be followed by the amelioration of their surroundings. The priority order of districts to be renovated depends on the condition of the buildings in a district and on strategic urban development programs. To determine the profitability of investments in housing retrofit, a number of retrofit scenarios need to be developed. The authors of this paper offer a new approach to determine the retrofit effectiveness of houses based both on expected energy savings and the increase in the market value of the renovated buildings. Retrofit scenarios for apartment buildings in Vilnius were developed in line with the proposed approach; i.e., retrofit investment packages for various districts were prepared and arranged in priority order for their application according to the geographical analysis method suggested by the authors.

Other authors applied the Method of Multiple Criteria Complex Proportional Evaluation (COPRAS) for various retrofit tasks (Kaklauskas, Zavadskas, & Raslanas, 2005; Kaklauskas et al., 2006; Zavadskas, Kaklauskas, Turskis, & Kalibatas, 2009 and others).

Upon analyzing the aforementioned scientific works, it can be asserted that those studies did not comprehensively analyze construction and retrofit project assessments since they did not take into consideration the entire life cycle of a project nor did they include all the groups interested in a project and their needs satisfaction.

Research shows that various scientists have specialized in depth the different and very important areas of multicriteria methodology and systems (Amiri, 2010; Dymova, Sevastianov, & Bartosiewicz, 2010; Fasanghari & Montazer, 2010; Kahraman & Kaya, 2010; Montazer, Saremi, & Ramezani, 2009; Xidonas et al., 2009). However, the current multicriteria methods and systems cannot determine a utility degree and market value of alternatives (projects). In order to find what price will make a project being valued competitive on the market a Method and System for Multi-Attribute Market Value Assessment determining the utility degree and market value of projects based on the complex analysis of all their benefits and drawbacks were developed by authors of the paper. According to this method the projects utility degree and the market value of a project being estimated are directly proportional to the system of the criteria adequately describing them and the values and weights of these criteria.

The structure of this paper is as follows: Section 2, which follows this introduction, presents Multi-Attribute Market Value Assessment
دریافت فوری متن کامل مقاله

امکان دانلود نسخه تمام متن مقالات انگلیسی
امکان دانلود نسخه ترجمه شده مقالات
پذیرش سفارش ترجمه تخصصی
امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
امکان دانلود رایگان ۲ صفحه اول هر مقاله
امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
دانلود فوری مقاله پس از پرداخت آنلاین
پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات