MULTI CRITERIA ASSESSMENT OF RESIDENTIAL UNITS[*]

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Abstract

The last two decades have been a turbulent time for the SE Europe. Socioeconomic conditions strongly affected the real estate conditions in an adverse manner. In addition, the economic trends over the last 5 years resulted in explicit demand of the potential buyers to have an objective assessment tool at their disposal. Several criteria have to be taken into the account if such tool is to be perceived by the stakeholders on the real estate market as useful.

The paper presents foundations for the development of the multi-criteria model. Relevant criteria and sub-criteria are identified and justified: location, technical quality, architecture and living comfort, and their relative importance is judged from Bosnian point of view.

Further, as green building and building certification play an important role in raising awareness and promoting the construction quality, they are used as one of the starting points of the model.

The research results conducted in the city of Mostar (Bosnia and Herzegovina) are presented. Data were collected from five agents employed in the real estate agencies. Each agent has given details for 8 potential buyers, which includes a total of 40 residential units. Data were collected by surveying and interviewing, and by using of existing databases.

Keywords: multi criteria assessment, residential buildings, real estate market, quality, customer

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[*] The complete text is available on CD-ROM / Žujo, Ćećez, Šelih, Kušar

Introduction

Bosnia and Herzegovina, as a republic of the former Yugoslavia, had an identical housing purchase system during the socialist period as well as the other republics of former Yugoslavia, until 1992. A variety of local companies were Investors that have funded the building construction for their employees. Dwellings were awarded primarily based on the social criteria ranking list. The quality of construction was not in the first place. This is understandable, because the occupants received their dwellings on a "gift". There were very few real estate agencies at that time.

Residential real estate market has experienced many changes since 1995. Trading has rapidly increased, conditioned by the populations' demographic changes in the former common state. We are witnessing a massive construction, reconstruction and repairs of all types of dwellings. Due to the construction speed and lack of funds, buildings of poor quality were built. Additional burden on the construction quality is the lack of free construction land in the centers of larger cities. At such locations there is a much greater housing demand than supply in the market. Such a condition can be misused by the contractors, who want with less money invested to get more profit on sales.

For the majority of people, regardless of their age, purchase of residential units is the biggest investment in their lives and one of the most important personal events. In the process of decision making the customer usually behaves intuitively, which is certainly not the best way to solve his housing problems.

A particular problem when purchasing a residential unit is the buyers' lack of information and technical features knowledge from the civil engineering point of view.

This paper analyzes the criteria that will be the main input for determining multicriteria mathematical model for the assessment of residential units, which will be the aim of future research.

2. Previous researches

Real estate assessment methods are challenge for both practice and academia. Any method of residential units' evaluation is a complex work and involves contradictory aspects. Nearly all methods are based on local regulations and standards, in accordance with local economic, social, cultural, environmental and other aspects. However, there are several examples of global methods. Various tools of sustainability assessment are available on the construction market, and they are widely used in the declarations of Environmental Protection (for example, BREEAM in the UK and LEED in the U.S.). There are also Life-cycle assessment (LCA), based on the available tools that have been developed specifically to address the building as whole, e.g., Eco-Quantum (Netherlands), EcoEffect (Sweden), ENVEST (U.K.), BEES (U.S.), ATHENA (Canada) and LCA House (Finland). Tools for evaluation are in constant development in order to resolve their constraints on the local environment. The main goal is to develop and implement a systematic methodology that supports the design process of a building (Bragança et al., 2010).

Solving problems using multicriteria methods can be applied in many fields, starting from a global, such as economics, construction, mathematics to individual processes, such as road design, property management, environment control, contractors' ranking etc. Numerous examples show that the multicriteria analysis in construction is necessary. Selection of the best solution should not be based on single criteria (Kracka et al., 2010).

In Germany, the German Sustainable Building Council ("Deutsche Gesellschaft für Nachhaltiges Bauen", DGNB) was formed in 2007, and by 2010 has more than 820 members. The DGNB has claimed for their German Certification for Sustainable Construction to

developed "first system of the second generation" asking for performance oriented indicators and considering the entire life cycle of a building. Based on approx. 50 criteria the overall buildings sustainability is evaluated and color (gold / silver / bronze) as well as grade is awarded to the building. Each criteria reflects one aspect that is important to sustainability (Wittstock et al., 2010).

SBTool method gives a new methodology based on the lifelong cycle (preparation phase, construction phase, use phase and end of life phase) and by calculating potential impact reductions for object that will be built in relation to a reference building. This method is based on the principle that the rating system has to adjust to local conditions at the very beginning. The method is completely objective, which avoids the subjectivity in the assessment. This method can be successfully used for the buildings certification, with carefully 'weighed' impacts (Macias and Larsson, 2010).

Damaging impacts of buildings on the environment are diverse. The key for environmental impact reduction and strengthening of green building lies in the adoption of an integrated approach to design and life cycle of the building.

GRIHA (National Rating System for green buildings in India) deals with various issues of green building through the design, construction and use of buildings, to ensure minimal environmental impact. This rating system has the ability of ranking the air-conditioned and non-air-conditioned buildings, based on the actual energy efficiency (Vij, 2010).

The assessment should take in consideration all the characteristics of residential units that potential buyers claim (Pšunder, 2009).

In order to assess the environmental impact of the Swedish building and property (real estate) management sector, a new top-down life cycle assessment (LCA) method was used which was based on input–output analysis using national statistical data. Key implications will be on the selection of building materials, the construction process and the extension of building longevity (Toller et al., 2013).

Commercial methods of real estate evaluation represent a mechanism which can enable the environmental and social aspects to be more included into the economic question. The perception of the real estate is changed if the structure characteristics are taken as main evaluation factors. (Lützkendorf and Lorenza, 2005).

Some countries have introduced the so called mass appraisal for taxation purpose. The evaluation appraisal relates to real estate groups, not to a particular real estate. Mass appraisal system management is both a challenge and an opportunity. To resolve the task, the mass appraisal assessors use modern technology in form of a computer assisted mass appraisal – CAMA. These systems enable the possibility of increasing the efficiency and technical competence of state bodies and creation of a more accurate and fairer evaluation (McCluskey and Anand, 1999; McCluskey et al., 1997).

3.   Research in Bosnia and Herzegovina

3.1. Literature data

In Bosnia and Herzegovina, the residential units' construction was 8.0% higher in the 2012 in relation to the 2011. In the first part of 2013 an increase of 83.40% compared to the same period 2012 was registered (Agency for Statistics of Bosnia and Herzegovina, 2013). As the population gravitates to cities, the number of residents in urban areas increases, and greater demand for quality residential units can be expected.

Real estate prices are determined mainly arbitrarily, without adequate evaluation of the residential unit quality. As a consequence unrealistically high prices are frequently encountered.

In Bosnia and Herzegovina agency for building certification on the basis of the construction quality assessment does not exist. This means that potential buyers of dwellings can not get valid information about the construction quality of the dwelling which they want to buy. The only guarantee for customers is the Use permit which is the result of technical acceptance performed by the service ministry after the completion of the construction. During the buildings' technical acceptance, the Investor is required to submit to the Commission, certification for all installed building materials (Construction Act, 2002). Experience shows that this practice should be improved, because certificates are not always legitimate and members of the Commission do not always know to interpret the certificate in the right way. This suggests the need to establish an institution that will solely deal with buildings certification. It should be emphasized that the building certification has an important role in raising awareness and promoting higher quality of building construction.

According to „Energy Performance of Building Directive" in Bosnia and Herzegovina there are no relevant energy policies and legislation for energy efficiency and energy saving, also, there are no application of environmental pollution Directive, neither the buildings certification model (www.training.eebd.org).

Nowadays, real estate appraisal in Bosnia and Herzegovina is performed by court experts of the civil engineering profession who have been appointed by the Ministry of Justice on public invitation. The experts are all of the civil engineering profession and are expected to show a high level of professionalism. However, in reality, they have no formal education from the real estate appraisal field or any standards or methodology to follow when performing their job.

In 2012 the Bosnian and Herzegovinian Property Association (BHPA) was founded in Sarajevo whose aim is to be the only organization in Bosnia and Herzegovina for certifying experts of the real estate field (www.bhpa.org.). BHPA is dedicated to creating and maintaining a strong base for future experts of the real estate field through knowledge and professionalism perfection of its members. BHPA certifies four professions: real estate market evaluation, real estate management, real estate development and real estate agent. BHPA will ensure integrity, credibility and ethical standards of the profession to be compatible to the global standards determined by the RICS (Royal Institution of Chartered Surveyors) in London (www.rics.org).

At the University of Sarajevo, for the first time in the region, the School of Economics and Business proudly presents Master of Property – Advanced Finance in cooperation with the University of Melbourne. The program aims at achieving specialist knowledge and professional standing in the field of property – applied finance. The Master of Property – Applied Finances focuses on activities encompassing the full property cycle. This professional course is intended for graduates keen to acquire an indebt understanding of the structure and operations of the property sector. It is rather popular because it encompasses a diverse range of skills. It enables students to develop/enhance expertise in professional fields such as property funding, valuation, management and development. The ethos of the course is to offer teaching which introduces underpinning theories and then through case study analysis underpin its practical orientation. The course has a strong commercial focus and a practical orientation and provides the student with the essential knowledge and necessary skills (http://www.efsa.unsa.ba/ef/ba/property-applied-finances).

The University of Sarajevo, School of Economics and Business's partner for this master study is the School of Economics of University of Split.

4.   Field data

The results obtained in this study will be the input parameters for the determination of multicriteria model for a comprehensive assessment of residential units. This model should serve to potential buyers of residential units for an optimal choice decision. The optimal choice of residential units is one that has the most favorable ratio of price and features. In

addition, real estate agents, managers, engineers, architects, as well as various construction companies would have benefit from this model. What is important for such a model is simple usage and that with construction plans and related auxiliary means one can realistically assess the residential unit.

In the period March/April 2013 field research was performed. Data were collected from a total of five agents employed in the Real Estate Trading Agency in the city of Mostar, which is the center of Herzegovina. Each agent has given information for 8 potential buyers, which includes a total of 40 residential units. Data were collected by surveying and interviewing, and by using existing databases. The interview was required in cases where the questionnaires were incomplete or the answers were not precise enough. Survey/interview was conducted in a way that each agent was asked two questions:

1. "What criteria potential buyer prefers when buying a dwelling?"
2. "To what level are potential clients interested in green building?"

The answers collected can be placed in four groups: location, technical quality, architecture and living comfort. The research has resulted in the following values:

- Location - 35%
- Technical quality - 25%
- Architecture - 20%
- Living comfort - 20%

Each of these parameters is summarized through the sub-criteria.

Location:

- Micro location (city center, other urban areas, suburban areas) – 70%;
- The position of the building within the micro location (traffic jam, traffic noise) – 5%;
- Insolation (per individual rooms) – 5%;
- Utilities – 5%;
- Public areas – 5%;
- Neighborhood (proximity of adjacent buildings, storeys of adjacent buildings) – 10%.

Technical quality:

- Construction type (monolithic, semi-prefabricated, prefabricated) – 50%;
- Building materials (natural, artificial) – 10%;
- Building equipment (lift, antenna system, multimedia networks, computer networks, video surveillance, alarm system, blinds) – 15%;
- Building elements (roof, facades, windows and doors, flooring) – 15%;
- Heating, cooling, ventilation – 10%.

Architecture

- Rooms in the apartment (number of rooms, layout, size of the rooms, insolation) – 30%;
- Geographic location (population density, green areas) – 5%;
- Number of storeys (number of floors in the building, the location of the apartment in the building, number of floors in the apartment) – 35%;
- Parking space (uncovered, covered, closed) – 30%.

Living comfort:

- Sound insulation (sound in the air, the sound in object) – 35%;
- Thermal insulation [*] – 55%;
- Natural light (per individual rooms) – 10%.

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[*] Bearing in mind that the city of Mostar has very high summer temperatures (average 31°C)

For the second survey question, data shows that potential buyers of residential units do not mention green building and it appears that their total disinterest stems from the lack of information on the principles, the importance and benefits of green building.

5.   Conclusion

Residential unit purchase for the majority of people, regardless of their age, is the biggest investment in their lives and one of the most important personal events. In the process of decision making the customer behaves intuitive, which certainly is not the best way to solve his housing problem.

Research on a sample of 40 residential units in the city of Mostar in Bosnia and Herzegovina has shown that customers are not informed about the principles, importance and benefits of green building in Bosnia and Herzegovina and in the world. Also, research has shown that potential buyers prefer the most location - 35% (microlocation, ie downtown area) and then technical quality - 25% (the most important is the type of construction, ie whether the object is a monolithic), architecture - 20% (number of storeys and location of the dwelling in a building) and living comfort - 20% (primarily thermal insulation).

In Bosnia and Herzegovina there is no relevant energy policies and legislation for energy efficiency and energy savings, there are no application of environmental pollution Directive. There is no agency for building certification on the basis of the construction quality assessment. It should be emphasized that building certification plays an important role in raising awareness and promoting the construction quality.

The results obtained in this study will be the input parameters for the determination of multicriteria model for a comprehensive assessment of residential units. This model should serve to potential buyers of residential units for an optimal choice decision. The optimal choice of residential unit is one that has the most favorable ratio of price and features.

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