

Applying Value Management & Market- Oriented Economic Land Value Assessment as a Managerial Decision-Making Tool: Case Study

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Abstract:

Background: Decision-making is a mental process to select among several possible alternatives. It is the study of identifying and choosing alternatives based on the values and preferences of the decision-maker. Value management is one of the decision-making tools. In case of decisions that related to determining the feasibility of construction or rehabilitation projects, real estate appraisal is very helpful.

There are two main approaches for Land valuation; the first one depending on the economic value of the land in comparison with recent sales of similar plots under similar conditions. The second is focusing on the expected production potential of the land taking into account socio-economic considerations; it is suitable for rural areas and in regions where there is either no functional market and/or where there are very few land sales.

Materials and Methods: This paper aims to study the value management as a tool to the decision-making process, using the principles of real estate appraisal in analyzing the economic aspect of the decision-making. In addition to using weighted evaluation technique to link between the monetary and non-monetary criteria.

This paper has applied the quantitative research technique based on real case study making-decision to renovate residential buildings.

Results: This paper has contributed with an applicable framework for making decision using value management and land valuation approaches.

Conclusions: There are different types of decision-making tools. The suitability of any of them to the situation depending on the available information, the severity of the decision, and the capabilities of the decision-maker. Successful decision-making process needs well-known and agreed objectives, clearly defined alternatives with known or predictable consequences, and rational, systematic, and logical managers. There are some important non-monetary evaluation criteria such as social, environmental, and political that should be considered in the decision-making process. These criteria importance degree depends on the nature of the project under study, the applied regulations and the decision-maker priorities.

Key Words: Value management, Decision- making tools, Land evaluation approaches, Real estate Appraisal.

I. BACKGROUND

Decision-making is the process whereby an individual, group, or organization reaches conclusions about what future actions to pursue given a set of objectives and limits on available resources. This process will be often iterative, involving issue framing, intelligence gathering, coming to conclusions, and learning from experience. [1] Prioritizing information and making choices can be a difficult task for both individuals and groups. [2]

Having a process and a set of tools helps to assure that all alternatives in a decision have been adequately considered. It is important to provide a logical argument supported with reason and enough data to support the taken decision [3]

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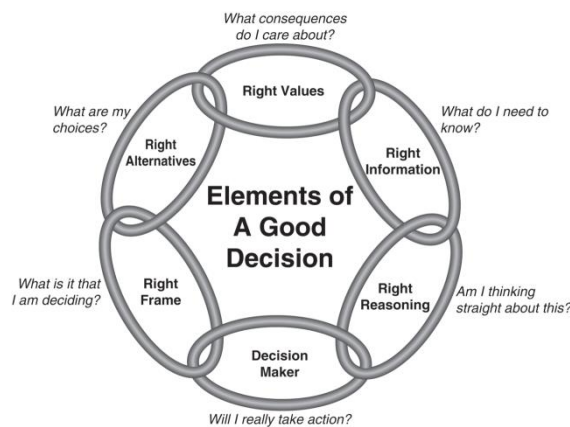


Fig. (1): Elements of a Good Decision - (Source: John Huber (2020))

Decision & Decision-Making: The following few paragraphs explore definitions of some important terminologies in the decision making process.

A Decision: is an opportunity to contemplate severely about what is essential to us, what will be its drawbacks, and what superior possibilities we might be able to come up. We may say that decision-making is one of the fundamental activities of management. [4]

Decision-Making: Decision-making is an intellectual process that assists in identifying and choosing alternatives based on the values and preferences of the decision-maker integrated into the interaction with the environment [4]. Fig. (2) introduces the critical requirements to ensure making rational, unbiased decisions [5] and requires going through several stages as clarified in fig. (3) [4]

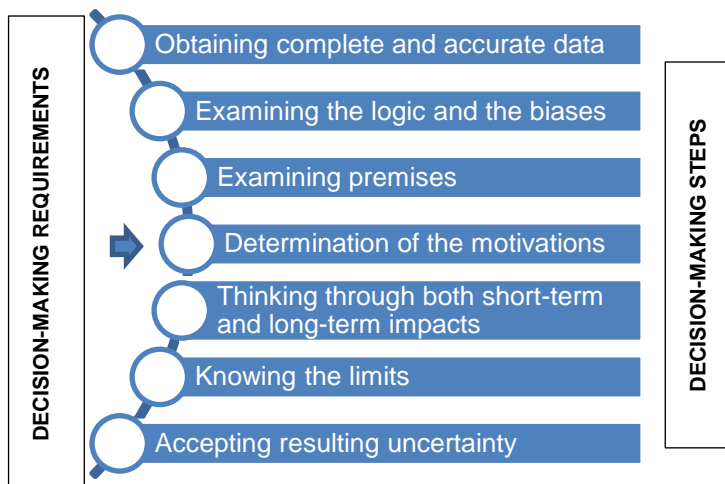


Fig. (2): Decision Making Requirements



Fig. (3): Decision-Making Steps

Decision-Making Approaches: When making a decision, many different methods can be used to get a conclusion. Some of them rely on qualitative measures, which means that the decisions are made by different processes. Some others named quantitative rely on a scoring system or probability. [6]

One of the multiple views about strategic decision-making in big organizations is rational. In which the organizations match external opportunities with internal strengths by scanning their environment. [1]

This approach has forces the decision-maker to consider a decision in a logical manner and an in-depth analysis of alternatives based on information rather than personal prejudices, emotions, or social pressure.

However, its weaknesses are the difficulty in obtaining complete information and applying quantitative analysis on some alternatives that obstructs making comparisons. [7]

“Quantitative decision making is most useful when there is a rational policy for obtaining the outcomes.” (Goodpasture, 2003). Goodpasture goes on to explain Using quantitative analysis when it comes to decision-making makes use of applying a quantity to a decision choice and either comparing the value to others or using pay-off methods to calculate outcomes and probabilities.

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There are several common decision-making techniques and the categorization depends on the following factors: 1) problem nature, 2) available information, 3) seriousness of the decision-consequences, and 4) capabilities of the person who applies the study.

Some of these techniques, which are commensurate with the nature of the study project, are mentioned below: [8], [6]

1. Grid Analysis (Decision Matrix): it is useful when making a decision that involves many factors. A grid is created with “factors” and the options on either axis. The factors are the outcomes you want when making a decision and options would be the alternatives that can be chosen. The basis of this type is to weigh or score each factor for each option. The weights themselves are weighted in order of importance that is then multiplied by the weights given to the factors, which are then totaled to give a score (www.mindtools.com). The advantage of this approach is that it gives the decision maker a clear indication of the level of importance of each criterion concerning the options. The visual representation of a grid analysis also makes it easier to see how one option fares against another. [6]

2. Cost/Benefit Analysis: it uses the cost of a decision and the benefit of that decision. This method puts a monetary value on the decision in question with considering its advantages it will produce. It is used to determine if the benefits outweigh the costs. The main obstacle in using this method is the probability of inaccuracies when calculating the costs. [6]

3. Decision Tree: Decision tree is tree-like diagram used to represent a decision. It included the available options and the consequences for each option, further decisions that may arise, the probability of its occurrence, the cost of, and the potential value as a result of choosing this option. You start with the decision to be made and represent this with a box. Then branches are drawn, one for each possible option. At the end of the branch, will be another decision to be made, and uncertainty, or a result. [3]

The result will determine if the decision is worth carrying forward with. However, with this approach, there is not a lot of hard data, and decisions are not fully explained. [6]

The evaluation factors and the specific weight (priority) differ according to the nature of the subject (problem) under study. Economic feasibility is one of the most important factors in studying issues related to investment projects. Also, the environmental and social dimensions have impacts in determining the most appropriate alternative especially in the case of governmental projects. The case study of the paper is an asset, which makes it necessary to rely on the rules of real estate appraisal to determine the economic feasibility.

Real Estate Appraisal:

Land: is one of the most precious assets. Its value and price are commanded by offer and demand and by the underlying perception of potential benefits that can be derived from it. [9]

Location or Area Preference: Location refers to people's choices and tastes regarding a given area, based on factors like convenience, reputation, and history. Location is one of the most important economic characteristics of land (thus the saying, "location, location, location!"). [10]

Real Estate: is the land, plus any permanent human-made additions, such as houses and other buildings. [10]

Land Evaluation Approaches: Conventionally, there are two main approaches to the evaluation of land. A first group, commonly used in developed countries, is inspired by the economic value of the land in comparison with recent sales of similar plots under similar conditions. A second group is focused on the production potential of the land, with some adjustments for socio-economic considerations; it is currently applied in rural areas and in regions where there is either no functional market and/or where there are very few land sales. [9]

Real Estate Appraisal: is the process of estimating and determining the market value of the property subject to evaluation based on the location, nature, and condition of the property. One of the areas of real estate appraisal work is determining the feasibility of construction or rehabilitation projects. [11]

Value: According to the European Union (EU) in Directive 91/ 647/ EEC “*Market value shall mean the price at which land and buildings could be sold; under a private contract between a willing seller and an arm's-length buyer on the date of valuation. It is assumed that the property is publicly exposed to the market, that market conditions permit orderly disposal and that a normal period having regard to the nature of the property, is available for the negotiation of the sale*”. [9]

For decision-making about the land, the relevant concept is in any case not the price but the opportunity cost. Land cannot be reproduced and is spatially linked to a specific location. Although the land may be extraordinarily valuable in the center of a city.

II. MATERIALS AND METHODS

Real Estate Valuation: A property's value is defined as the present worth of future benefits arising from the ownership of it. As the benefits of real property are generally realized over a long period, an estimate of a property's value must take into consideration economic and social trends, as well as governmental regulations and environmental conditions. The steps of this process can be summarized as follows: [11]

- 1) Description of the subject of the valuation, including its site, the existing buildings.
- 2) Determination of the appropriate method (or methods) for assessing the situation.
- 3) Specifying of the required information and the sources for obtaining it.
- 4) Determination of the maximum and best use of the property. This analysis requires taking into account the location, land area, type and flatness of construction, determinants of use, building permits and conditions. "It must be the highest and best use naturally applicable, legally permissible, and economically feasible."
- 5) Estimation of the land value, by comparing it with their counterparts at nearby sites that have the best use similar to them. From this comparison and judging by the prices of the neighboring sites, the price of the land is determined (site evaluation).
- 6) The value of the building is estimated using the cost method, the comparative sales method, and/or the income capitalization method.
- 7) Reconciliation of results. In the case of using more than one method of calculation, the results are reconciled, as well as by giving relative weights to the outcome of each method according to how close it is to represent the case under study.

As mentioned previously, the importance of the economic aspect of the issue has been pointed out, but we cannot overlook other aspects such as the social, environmental, preserving the safety of life, and other aspects. The use of the principles of value engineering is one of the useful methods in evaluating alternatives, taking into account the various evaluation factors as well as the relative importance of each.

Value Management as a Decision-Making Technique

As a process, value management enables the client and key stakeholders to consider all the issues surrounding a project and examine all the options available to them while considering their social, political, economic, and environmental impacts. Figure (4) summarizes the job core plan. [12]



Fig. (4) The summary of job core plan for Value Management

Evaluation Techniques and Choosing the Appropriate Solution: There are many techniques and methods for evaluating ideas in value engineering studies, including the following:

1- **Comparative evaluation.** The comparison process between the suggested ideas is done by listing down the pros and cons of each idea in an objective way. The evaluation criteria include meeting the beneficiaries' requests, the relative ease of change, the impact of the idea on the progress of the project and its impact on other ideas, the total cost and the savings that will be achieved, and possibilities, the success and time required for implementation. A grade is assigned to each idea based on these criteria and then the ideas are ordered according to their degrees. The best degree is chosen.

2- **Feasibility Ranking.** The study team determines criteria for evaluating ideas. These criteria may include novelty of the idea, its acceptability, and application, time and cost required for implementation, savings that will be achieved by the ease of maintenance and energy consumption, and establish a degree (the highest degree of ideas that achieve the best advantages) for each idea in front of each criterion of the standard. The rate to choose the idea with the highest rate.

3- **Weighted Evaluation.** A technique to choose the best alternative from among several alternatives that achieve the same function according to several criteria that have different arithmetic weights according to their importance and impact. This evaluation is done in two steps, the first is for the standard weighting process in which the best benchmarks are determined and weights are given according to the degree of importance by the value study team. The second is for the matrix analysis and evaluation process in which the criteria points are collected and the relative weight of each standard is determined and the value function is calculated based on it. The alternatives are ranked in order of priority for the application. [12]

III. RESULTS

After exploring the previous studies discussing the definitions, approaches and methods of Decision-Making, Value Management and Real Estate Appraisal. It becomes clear that value management and real estate appraisal can contribute effectively in decision-making process in case of projects related to construction field.

The following chart illustrates the proposed framework.

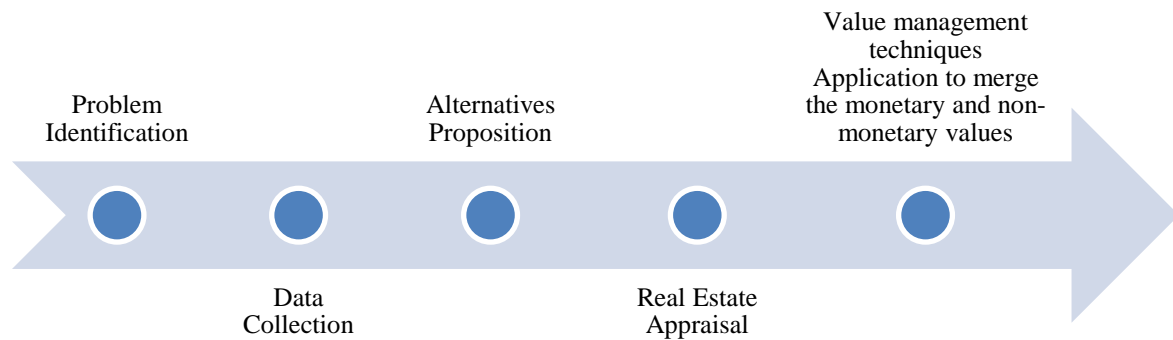


Fig. (5): Framework for Making-Decision using Value Management & Real Estate Appraisal Techniques

Case Study: This case was studied according to the governmental authority point of view.

Project Site Layout: The project consists of 23 low-cost residential buildings containing (920) housing units built from about 40 years, with an area of 68 square meters per unit. It is located in Sixth of October City, Sixth District, Laylat Al-Qadr, the Tenth Neighborhood, near the Higher Institute for Tourism and Hotels as shown in figure(6).

Area Preference: The Central Ring Road, which connects the city with the industrial zone, passes near the area. There are some residential compounds near this area. The area is dominated by the character of low-cost housing and the architectural system lacks privacy.

Problem/ Scope Identification: There are problems with some structural elements that affect the safety of buildings and residents. Worn out of the external sewage network, which led to a leak around the concrete bases of the buildings. Leakage in the internal and external feeding and drainage networks. The high rate of deterioration in the structural condition. Where the technical committee approved the high rate of deterioration between the time of inspection and the start of restoration operations in some buildings.

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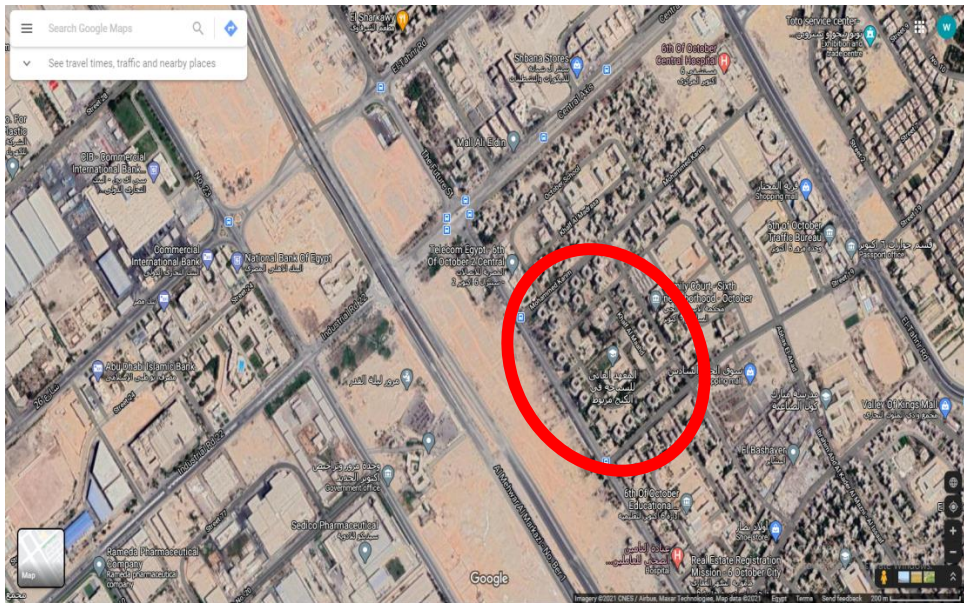


Fig. (6): General project site layout

Available Alternatives: There are two available alternatives as described below.

- 1) **Complete the repair operations, with the residents partially moved to temporary units.** The required works include repair of structural elements, changing the internal and external plumbing networks of most buildings and the required building works, insulation, ceramics work for wall and floor, as well as plaster and paints works. This requires temporary movement of the buildings' residents during the two-month restoration process for each building to preserve the safety of them.
- 2) **Total demolition and re-use of the land.** This alternative includes compensating the residents with social housing units in Sixth of October City, which means replacing the current units with a larger area and an architectural design that achieves a higher level of privacy. This alternative also provides the opportunity to utilize the land with the best use, as the project site became more vital and distinguished as a result of the development of the Kafrawy axis and the construction of the central ring road, which links the industrial zone with the residential areas of the city.

Proposed Non-Monetary Evaluation Criteria: According to the discussion with the responsible authority representative to determine their priorities; the following evaluation criteria was proposed.

1. Achieve safety and privacy for the residents and improving the standard of living
2. The social aspects (such as distance from their workplace, schools, or social relations...)
3. The time required to implement each alternative.
5. Availability of services (schools, markets, hospitals, places, transportation...).
7. The environmental aspect and the impact on health.
8. The default service life of the units resulting from the application of the alternative.
9. The financial burden on the owner due to applying the alternative.

Alternatives Analysis Hypotheses: Costs were calculated based on a set of information and assumptions summarized in tables (1) to (5);

Table (1): Summary of the Repair Alternative Assumptions

Description of Alternative (1) characteristics	Values
Nominal area of the unit	65 m ²
The actual area of the unit	58 m ²
Number of units per floor	8 units
number of floors per building	5 floors
number of buildings	23 buildings
Total units per the project	920 units
required duration for unit repair	3 months
Average monthly rent per unit	1,000 L.E.

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The average cost for a detailed structural study	380,000L.E.
required steel quantity per building	42 tons
price of repair steel per ton	40,000
The amount of concrete required to support the walls	180 m ³
The price per cubic meter is concrete for restoration, including workmanship	5,000 L.E.
The average cost of required non-structural maintenance	300 L.E./ m ²

Table (2): cost components for Repair Alternative

REPAIRING COST ITEMS	VALUE (L.E.)
Average cost for detailed structural study	380,000
The cost of repairing the stairs and the corridor of distributing units in the floors	38,640,000
cost of concrete walls repair	20,700,000
cost of finish work	16,008,000
cost of temporarily rented units during repair	2,760,000
TOTAL COST	78,488,000

Note: these costs may be increased during execution duration by 20% due to prices change.

Table (3): Assumptions & Calculations of Total Demolition and Re-use of the land Alternative Revenue

Calculation of land Price according to investment revenue		Notes
The total area of the project	25,024 m ²	
Allowed buildings area	12,512 m ²	50% of the total area
Allowed floors number	5 floors	
The total residential area for sales	57,120 m ²	
Total commercial area for sales	3,264 m ²	
Construction cost including utilities/m ²	4000 L.E.	According to market prices
Total Construction cost	241,536,000 L.E.	
Total Construction cost + profit	313,996,800L.E.	30% profit + indirect costs
Expected sale price for residential units	6,500 L.E./m ²	
Expected sale price for commercial units	15,000 L.E./m ²	
Total sale revenues	420,240,000 L.E.	
Net investment revenue	106,243,200 L.E.	(Total sale revenues) – (Total Construction cost + profit)
The expected land price due to investment revenue	4,246 L.E./m ²	According to market indicators, land price is 4,000 to 7,000 L.E.
The required payment for completed repair	10,000,000 L.E.	
Compensation to old units owners	69,000,000 L.E.	Assumed to be 25% of the substitutional units Price.

Analysis Of Non-Monetary Evaluation Criteria: Decision matrix analysis model was used to complete the alternatives study process. The value engineering study of alternatives is used to determine the extent to which each of the proposed alternatives is achieved to make a decision for selecting the optimum alternative of non-monetary evaluation factors, and then it links between the extent of achieving non-monetary objectives and the corresponding cost value.

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Table (4): Decision Matrix Analysis for Non-Monetary criteria

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)			
Social Aspects (A)	B/2				How important							
Achieving safety for the population (B)	C/1	B/C			2 Points for Major Preference							
Required time (C)	D/A	B/1	D/C		1 point for Minor Preference							
Units Space (D)	E/2	B/E	E/1	D/E	1 Point each for Same Preference							
Availability of services (E)	A/F	B/F	C/F	D/F	E/1	(F)			62			
Achieving Privacy - Improving the Standard of Living (F)	G/1	B/G	G/2	G/1	E/G	G/2	(G)					
Environmental Aspect - Health Impacts (G)	H/1	B/H	H/1	H/1	E/H	H/1	G/H	(H)				
Lifetime of units resulting from the implementation of the alternative (H)	A/I	B/I	I/1	I/2	I/1	F/I	G/I	H/I	(I)			
The physical burden on the device as a result of the alternative (I)	3	9	4	4	8	5	10	10	9	QUALITY (POINTS)	TOTAL VALUE	
Criterion weight	4.83871	14.5161	6.45161	6.45161	12.9032	8.06452	16.129	16.129	14.5161			
Criterion weight percentage	5	2	1	2	5	1	1	2	1			
Complete the restoration operations	24.19355	29.03226	6.451613	12.90323	64.51613	8.064516	16.12903	32.25806	14.51613	208.0645	-78488000	
Total demolition, re-use of land and compensation for citizens	2	5	4	4	3	5	5	5	5	446.7742	96243200	
	9.677419	72.58065	25.80645	25.80645	38.70968	40.32258	80.64516	80.64516	72.58065			
DEGREE OF CRITERION ACHIEVEMENT												
5 EXCELLENT												
4 VERY GOOD												
3 GOOD												
2 FAIR												
1BAD												

Table (4) illustrates that the second alternative achieves the non-monetary criteria more than the first one did.

Table (5): Summary of Comparison Results

	Alternative (1)	Alternative (2)
COST	78,488,000L.E.	79,000,000 L.E.
REVENUE	Zero	106,243,200L.E.
VALUE INDEX FOR NON-MONETARY CRITERIA	208	446

- The study doesn't consider the time value of money due to lack of required data for analysis as the required fund availability, repair contract type, availability of new units,
- These calculations are done assuming presenting 25% (down payment value of the new units) fund as compensation for old units' owners.
- Revenue of alternative (2) doesn't include the selling price of demolition waste.

IV. CONCLUSIONS & RECOMMENDATIONS

The decision is an opportunity to think and determine what essential requirements are, what will be its drawbacks and what opportunities might to come up with it. Decision-making is one of the fundamental activities of management. By reviewing different types of decision-making tools, it is obvious that each of them has its pros & cons. Decision-makers; should be able to adopt the decision-making tool that is suitable to the situation according to the available information, the severity of the decision, and the capabilities of the decision-maker. Therefore, for successful decision-making process, objectives should be known and agreed to by everyone. The alternatives, and their consequences are known or predictable, and managers are rational, systematic, and logical.

Assumptions developed during decision-making and their accuracy and representation of reality is considered an important factor in the success of the decision-making process. Decision-makers should not only take into account monetary criteria but also non-monetary evaluation criteria such as social, environmental, and political must be considered in the decision-making process. Decision-makers should try to forecast future

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consequences in both the short and long term. This paper developed a framework for decision-making using value management techniques and real estate appraisal and land valuation tools. The proposed framework enables decision-maker to consider both monetary and non-monetary evaluation criteria. The framework has been examined by applying it in a real life case-study project.

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