Decision Support Systems usage possibilities in real estate agencies

Manole VELICANU, Ion LUNGU, Mihaela MUNTEAN
Academy of Economic Studies, Bucharest, Romania

In the last thirty years the idea of Decision Support System(DSS) generated in the same time a lot of expectations and a lot of speculations and frustrations too. Although there was a fast development of the electronic equipment, managers often felt disappointed about their trails to use information technologies for the decision process (the electronic equipment led to the transformation of the way the information needed for the decision process was performed). Later, managers' attitude started to change as a result of the new storing technology and data analysis: data warehouses, OLAP(On Line Analytical Processing), Intranet and visual modeling.

The phases of the selling and renting process can lead to implementing of a decision support systems which is used to help the vendor and the seller in obtaining the best price for their merchandises.

First stage is just for recognizing the problem. After that, in the. phase of searching for information, there is the possibility of creating same databases, which contains useful information for the buyer and for the one who rents. The information refers to the characteristics of the real estate and it also refers to the tendencies in real estate demand and supply.

The evaluation of the alternatives is a stage that could be the purpose of a data or models driven decision support system. Models about the decision theory or simulation models could be used in these systems. Databases, multidimensional databases and OLAP instruments are characteristics of those processes regarding how to choose and how to decide.

The decision process could be based on a decision support system. It is founded on useful information from the querying of databases, data warehouses and multidimensional databases.

The role of the decision support system, at various levels, is to guide and help people to choose the real estates they were aiming to for the transaction. The agency's employees will do this selection. For this process they will have in mind the customer's requests. The data they use about the real estates available for transaction are as coherent and complete as possible.

After they choose the client, they will present him the alternatives using multimedia information that saves time needed to visit the physical location of the real estate.

Decision support systems which fit best in this situation can be data driven systems (more exactly, database driven decision support system or multidimensional data driven decision support system and OLAP instruments) and also web based systems (accomplishing the type of data driven decision support system).

a) Database driven decision support system

During the intermediary transaction, it is necessary to create a database to gather important and a large quantity of data about the real estates: geographic location, services and utilities, functional structure, equipment, legislation, the rent, surface index, and so on.

The main idea for this database is the extraction and the integration of data regarding different real estates from different sources, in another file where from they can be used for the decision process. The data that a real estate agency needs to consult are gathered from more databases (urban planning, locality/district maps, video archive, real estate evaluation reports, technical examination, etc).

To create such a database brings a lot of serious problems to the real estate agency because the content of it depends on the user requests. The creative process also needs time and effort because this means gathering the whole databases from the entire process.

As a result, when you choose this type of decision support system you have to consider the real estate's activity dimension too. If it is a national or multinational agency, this perspective is the best. As an argument we believe that the information volume the employees have to handle is too big. The result will be an increase for the efficiency of the transactions and benefits on a long term.

If it is about a small or middle agency (most commonly in Romania), such an important investment is not possible.

b) Multidimensional database decision support system and OLAP

Another solution to manage this large quantity of information is represented by multidimensional databases. Such a decision support system offers abstract research

answers in time and an easy implementation because of the Oracle Express, a new instrument. OLAP allows professionals to access data about real estates and the real estate market, and than to offer consulting / assistance in the decision process.

The advantage of the multidimensional model is that it is extensible enough to adapt to unexpected data and to the last moment managers' decisions.

Considering that the real estate field continues to develop, the buyer's demands change in the same rhythm with the technical progress. As an example, the air-conditioned became a minimum standard for residential estates in developed countries, this being a characteristic of the extensibility imposed by the multidimensional model.

The using of OLAP instruments make easier the interactive using of data. A real estate agent can perceive the information from the unit point of view (as an example, the aria of real estate transactions) and then to get into the details as state, town, architectural view.

As a disadvantage, this model cannot manage very large databases, fact that makes large real estate agencies not able to use it.

The result of this application is addressed to large and middle agencies. Because of this fact, this type of decision support system is choused (there will be low costs for implementation, easy to be used, and a low quantity of data).

c) Web Based Decision Support System
The solution of implementing such decision support system is based on the need to change information between different physical locations promptly. In the real estate field, the accuracy and the present interest of data could be critical for the transactions' accomplishment. The information change about real estates between firms eliminates the restrictions about the geographic aria.

Web access can provide latest information but, in the same time, can be an obstacle because of the large amount of information from Internet. So, to find the needed information you have to specify the exactly keywords. More intelligent instruments to find information are to come in the future, using methods that reduce research time.

This information assures the agency a lot of flexibility and little time to answer to accidents and natural disasters (as an example, the imminent outburst of a war will direct to a considerable diminution of the real estate, etc).

The web based decision support system assures the information fluidity without considering distances. It is actually represented as an extension to any decision support system previously presented.

Previously to the buying and selling process, participants (sellers, buyers, builders and other interested persons) will use market analysis for obtaining specialized knowledge. Marketing study has a very important place as information sources for analysis. Based on market analysis previsions and estate investments could be done.

During the marketing analysis process we can select which type of decision support system could be used in order to obtain the proposed goals for each stage.

So, in the analysis of the geographical distribution of the market places we could decide that the best data driven decision support system that could be implemented is the geographical one. This type of system offers flexibility regarding geographical problems and allows the geographical data storing.

When we estimate the market demand for some kind of real estate, we could consider that a model oriented decision support system is the one that fit best our requests. The moving average method will be used for the estimation of the future increase of population. The Delphi method will be used to derive the demand on the real estate market from the local demand of goods and services.

For the assistance of the market researcher we recommend a Web based decision support system specialized in founding the relevant information in the field, in a chronological order. Because of this we have an exhaustive information in time and low comparative costs (the comparative costs — to the case in which the researcher "buries himself in archives", a long process that involves very high costs).

The fitted decision support system for the prevision activity is model oriented. Between the decisive factors for prevision, economical conditions and clients demands evolution, they will use Delphi method to estimate them. They can also be estimated using semblance methods based on the general urban-planning (there cannot be used determinist algorithms because not all the factors are known).

The prediction of a real estate demand leads to decision support system based on prediction models: exploitation, methods based on cause-effect (the geometrical or multiplied regress method will be used to determine the cause-effect relation) or the analysis of the time series.

The DSS for the evaluation activity cannot be analysed separately from the other activities. There is an interaction between the information generated by the different real estates: the necessary data and the results of this phase will be used in other activities also, as an example in the intermediary activity.

We will start from all the decision systems analysed types to the intermediary activity like: data driven DSS, multidimensional data driven decision support system and OLAP instruments, web based decision support system.

In order to complete the necessary instruments to get to a decision during the evaluation period, elements landed from other DSS types will be added:

a) *decision analysed models driven DSS*
Here we can consider the Analytical Hierarchy Process technique in order to evaluate the real estate using the market comparison method. To adjust the characteristics of an estate, in accordance with the characteristics of real estates that have already been sold or rented
A decisional structure/tree could be build/elaborated. The top of the hierarchy is represented by the purpose of the real estate's evaluation. The pointed essential characteristics will stand among the superior and the inferior level of the hierarchy as selection criteria. For the *leaf* level running through the decisional structure/tree from the root to the leaf represents the evaluated value.

b) *qualitative models driven DSS*
The technique of using the intuition rule could be included considering that the adjustments of the real estates values are done using *heuristic coefficients*. The simplicity of the evaluation methods presented here and the results influenced by a lot of subjectivity impose by themselves qualitative methods where the human factor has a decisive influence.
These instruments do not implement a totally automatic solution for evaluation, the process itself interacting with the human factor continuously. The results look like an *interval of accurate values* (the minimum limit and the maximum value). The results will be affected by the user's options, in case that only the qualitative characteristics need to be ordered.

c) *financial and bookkeeping/account DSS*
We can work with financial models needed for calculation like: the income *capitalisation* model (used for evaluating the estates that produce income), the

determination of the general capitalisation *instalment/rate* (using the general formula), the determination of the land capitalisation *rate,* the determination of the building capitalisation rate.

Bibliography

[CD97] S. Chaudhuri, U. Dayal, "An Overview of Data Warehousing and OLAP Technology", SIGMOD Record, 1997
[CT98] L. Cabbibo, R. Torlone, "A Logical Approach to Multidimensional Databases", Proceeding of VLDB, 1998
[KI96] R. Kimball, "The Data Warehouse ToolKit: Practical Techniques for Bulding Dimensional Data Warehouses", 1996
[OC99] "The Essentials of Data Warehouse Database Design", Oracle Corporation, 1999
[PO00] D. J. Power, "Building Data-Driven Decision Support Systems", 2000, *http://www. dssresources. com*
[PO98] D. J. Power, "Web-Based Decision Support Systems", The On-Line Executive Journal for Data-Intensive Decision Support, 1998, *http:// ■www, tgc. com/dsstar/*
[VM94] M. Velicanu, "Sisteme expert pentru fundamentarea unor decizii economice", Bucuresti, Ed. A.S.E.,1994
**** Monografie privind evaluarea unei proprietati imobiliare, Asociatia Nationals a Evaluatorilor din Romania **** Colecfia de reviste "Piata imobiliara", anii 1996, 1997