Data sources for the purpose of decision making in real estate investment analysis in the territory of Kragujevac City

Milena POPOVIĆ¹*

¹University of Belgrade, Faculty of Civil Engineering, Belgrade, Serbia

Abstract. Analysis of investing in real estate is a complex process for whose implementation two steps are mandatory: data collection and analysis. As the real estate represent a very important resource (both for individuals and for the state), investment analysis must be done carefully in order to achieve the goals of all participants in the investment process. Data necessary for the implementation of investment analysis include data from relevant state institutions which are dealing with planning, management, registration and taxation of real estate. Privacy policy of insight into these data and their usage greatly differs between different institutions. Some of the data are publicly available, while the availability of other is greatly limited. Some institutions have enabled viewing data through web services, while others do not have the technical capabilities to do so. Considering the contemporary aspect of management and use of geo-data in the analysis and decision-making, the availability of data in electronic form via the web service becomes imperative.

Keywords: investment, real estate, investment analysis, real estate records

* Milena Popović> popovic.milena.1509@gmail.com
1 Introduction

A real estate is the most important resource of a country in both economic and social terms. Therefore, the management of the real estate should be systematically and cost-effectively planned. The process of managing real estate begins with the investment. There are several definitions of the term investment. However, in general, under theinvestment we consider activities on the money markets and capital markets with aim to raise funds, invest in real estates and obtain benefits in the future. The procedure of investing consists of several steps, amongst investment analysis is considered to be the most important one. Considering the amount of funds that are invested in real estate, investment analysis must be done carefully in order to achieve maximum profit, to minimize the risks and to achieve the goals of all participants in the investment process.

The initial step in the investment analysis is data collection. Investing in real estate involves including of all factors that affect the investment in the analysis. Those factors are market, legal, tax and financial environment.

Analysis of investments in real estate involves usage of data on real estate and rights on them, as well as the data that reflect the activities of the real estate market. This paper is focused on the historical development and current state record of immovable property and rights to them in the Republic of Serbia, as well as the services that are publicly available and contain information that is useful in investment analysis. In the process of decision-making in the analysis of investment in real estate various data sources that have different roles in the investment analysis were used.

Finally, the role of the data sources for the purposes of making a decision about investing in real estate at the local level will be presented on the example of the City of Kragujevac

2 Investing in real estate

2.1. Definition

The origin of the word investment could be sought in the Latin word "investitio", which means capital investment in a lucrative business. An investment represents any kind of capital investment in order to obtain certain economic benefit, ie. profit. Several definitions of the term investments could be found in the literature. Common to all definitions is that investments are essentially a waiver of consumption today in order to achieve benefits in the future. Numerous definitions of the term investments testifies to the complexity of this concept.

According to Vasić [1,15] "investments are part of an ongoing social product invested in funds for the work, either for replacement of worn (spent) or consumed assets to work, or for creating new ones". The broader approach to defining the concept of investment points out that "investments represent part of the social product not spent in the process of its final distribution and use, but used for the replacement of spent and dilapidated and the construction of new capacity" [1,16].

The process of investing lasts for a very long time, and for this reason time value of money must be taken into consideration in investment analysis. Vukadinović at all. [17] points out that "investing as a process puts on a very important place time elapsing from the beginning, from the initial idea, through decision-making and implementation of investments and finally the exploitation that should bring some benefits". Duration of an investment process includes the risk of planned objectives failure. Therefore, the investment risk is an essential parameter in the investment analysis.

2.2 The importance of investment

The importance of investment can be seen from the political and economic aspects, which overlap and it is difficult to draw a definite boundary between them. In economic aspects, investment represents the assumption of economic development and stability of economic and social trends [17]. Therefore, investment is a prerequisite for the technological advancement of society and an essential element of the economic policies of each country.

The importance of investments is reflected primarily in their role and function in the economic and social development. Investments [17]:

- Ensure the continuity of production,
- Raising the productive potential to a higher level than in the previous period,
- Create material-technical basis for the reconstruction of all economic sectors,
- Contribute economic stability,
- Provide a desirable rate of economic growth and
- Represent the basis of reproduction material conditions of people's lives.

Investments are essentially a waiver of consumption today in order to achieve benefits in the future. Investors invest capital in order to achieve rate of return. While investing capital, investors are
deprived of the possibility of its use in certain period of time and on a certain way, which is why they expect compensation [17].

2.3 Investing in real estate

In the literature various approaches define several types of investments: according to purpose, source of funds, the impact on the growth of national income, the technical structure and so on.

An important group in each of these divisions are investments in real estate. As an example in the investments by purpose, the investments in real estates can be divided in two groups, economic and non-economic investments. Investing in real estate as an economic investment serves maximizing the productive potential of the economy (i.e. investing in the tools and the subjects of the work). On the other hand, investing in real estate as non-economy investment involves investing that is not directly associated with investments in the economy, but it also represents an investment in facilities designed for social standards and so on.

Investing in real estate is a long-term activity which includes risk as a key factor that must be taken into account when making decisions about investment returns.

Any successful investment in real estate requires a careful analysis of many unforeseen circumstances on which the decision depends. There are five basic steps that lead to a final investment decision [8]:

1. Identification of goals and limitations of the various participants in the investment process that investment must satisfy in order to be acceptable.
2. Analysis of the overall investment environment in which the investment decision has to be made (market, legislation, financing, taxes, etc.).
3. Forecasting expected future benefits and costs arising from the ownership of the investment. This analysis covers four types of decisions: operational, financial, reverse (feedback) decisions, as well as tax planning.
4. Application of appropriate criteria in order to compare the profits and costs from the investment. The analysis must be done carefully, in order to overcome the limitations imposed during the investment process and achieve the goals of all participants in the investment process.
5. Accepting or rejecting the investment by assumption of input variables.

The purpose of the investment process is to determine if the specific investment is feasible, i.e. whether there is a possibility of satisfying investment goals [10]. Investment decision is not possible without an analysis of the investment environment in which the investment decision will be made. Investment environment includes a wide selection of parameters that include legal regulation, tax policy, and possible sources of financing, market analysis and so on.

3 Data sources relevant for investment analysis

The process of making a decision about investing in real estate involves the collection of data necessary for investments analysis. It analyzes goals and limitations of the participants in the investment process, the overall investment environment in which the investment decision has to be made and predict the expected future benefits and costs [10]. Analysis of investments in real estate involves the use of data from public registers on real estate and real property, as well as the data that reflect the activities of the real estate market.

3.1 Real estate registers

The need for establishing a register of real estate (mainly land) occurred in the early stages of human civilization development. The reason for this is the fact that the real estate itself is very valuable and that their possession (and enjoyment) has significant social, economic and psychological component. The first registers of real estate mainly presented factual situation and formed the basis for determining the tax (fiscal character) [18]. Although in their beginning they were not legal registers, they are considered forerunners of real estate and real property modern registers, because they have shown that society had tendency to record the real estate [18].

The first documents which recorded land data on the territory of Serbia dated from the medieval Serbian state. These are the "monastic charters" written in Church Slavonic language. The oldest preserved "monastic charters" dates from 1220, and it is located in the Žiča monastery near Kraljevo. The first known (recorded) document in the Serbian language of survey and land records is known as "Prizren deed" made during the reign of Emperor Dušan (1346-1355.) which contained numerical data about the size of the individuals estate [2].

At the beginning of the twentieth century the Republic of Serbia (RS) inherited a very different state of cadastre and land survey in certain parts of the territory. In the past some regions of the Republic of
Serbia were within the different countries and therefore the process of establishing real estate and real property registers was carried out at different times and under different conditions. Until the World War I Autonomous Province of Vojvodina was part of the Austro-Hungarian Empire and during the nineteenth century on its territory graphically survey and established land cadastre and land registry were made. However, for certain parts of the territory of RS (central Serbia) there were deed books as records of property, but process of establishing a factual registry started in 1918, when surveying and the establishment of land cadastre began.

**Deed books**

Deed books are Turkish land books, in which the basic unit is the deed - a document which confirms property right. Deed books were valid in the central part of Serbia even after the fall of the Ottoman Empire [4, 18]. The existence of a deed system was governed by the laws from 1929 and 1931. In deed system rights on someone else's real estate (mortgages, easements) are gained by registration in special books [18]. In the period after World War II deed system was increasingly losing its importance and rarely is applied. The reason for this can be found in weakening of the private property role in this period [4].

**Land Books**

The Land Book is public register in jurisdiction of the courts where the actual rights on real estates, as well as an obligation rights, are registered [18]. Land Books were first founded in Autonomous Province of Vojvodina in 1855, by adopting the so-called grunt order. In rest of Serbia this area has been regulated with three laws from 1930 and various by-laws derivated from them. Land Books were established from north to south of the country and separately for the city of Niš [3]. Land Books where the actual rights on real estates are registered were formed in 1287 cadastral municipality, or 28% of the total number of cadastral municipalities [4].

**Land Cadastre**

The Land Cadastre is a public book that contains data on land parcels and objects with regard to their position, shape, area, and category, more exactly about land cultivation, solvency, class, cadastre revenue and users, that serves as the base for Land Books [4]. Taxation of land was the original function of land cadastre.

**Real Estate Cadastre**

Real Estate Cadastre is a unique register of real estate objects and the rights established on them and was created on the basis of gathering and uniting the data from the Land Books, the Deed Books and the Land Cadastre [4].

The main reason for creation the Real Estate Cadastre was the condition of existing records on real estate that could not satisfy demands of modern administration.

Work on establishing the Real Estate Cadastre started in 1988 and was completed in 2012. The first cadastral municipality in which real estate cadastre were established were cadastral municipality Cerovac and Gornje Jarušice in the municipality of Kragujevac in 1992, while the first municipality with established Real Estate Cadastre was municipality of Stari Grad (2002), Plandište (2002) and Sombor (2003) [3]. Along with the establishment of the Real Estate Cadastre, Republic Geodetic Authority (RGA) implemented numerous international projects aimed to improve efficiency of the geodata management, as well as the services availability and defining policy of data services usage.

**Real estate registers in the city of Kragujevac**

Maintaining Real Estate Cadastre register in Kragujevac is entrusted to the Service for real estate cadastre Kragujevac. Service for real estate cadastre Kragujevac has jurisdiction over the area of about 86,000 ha, with 62 cadastral municipalities, of which 58 rural and 4 urban municipality types. Real estate cadastre Kragujevac was made based on data of new state survey and cadastral maps in digital form, and had to be agreed with data that were entered into the existing Land Cadastre and Land Book [10].

Real estate cadastre as a unique register of real estate objects and the rights established on them, the conditions are fulfilled for more efficient and better quality services for all potential users of cadastral data and guarantee ownership over enrolled rights [3]. This enables faster and more efficient management of changes in cadastral operate and maps and provides more quality information to potential investors.

**3.2 Tax authorities records**

Calculation and collection of taxes in the Republic of Serbia in jurisdiction of the tax authorities. Tax Administration is a body within the Ministry of Finance, whose scope of activity is defined by the Law on Ministries [20]. Taxes calculation has been entrusted to the tax authorities at the local level.
Tax determination on the territory of the City of Kragujevac is the activity of the city tax administration and consists in taking legally prescribed actions, which establishes the existence of individual tax obligations and determine taxpayer, tax base and amount of tax obligations [6].

Jurisdiction, authority and duties of the City tax administration are established by the Law on Local Government ("Official Gazette of RS", No. 129/07), the Statute of the City of Kragujevac ("Official Gazette of the City of Kragujevac" No. 37/12) and the Decision of the City Administration of Kragujevac ("Official Gazette of the City of Kragujevac", no. 42/12 and 29/13).

3.3 Local Government

City of Kragujevac is the economic, administrative, geographic, cultural and academic center of Central Serbia. According to the Law on Local Government ("Official Gazette of RS", no. 129/2007 and 83/2014-other Law) is determined scope of work of local government and organizational structure of government at the local level. The organizational structure of the government of the city of Kragujevac is governed by the Statute of the City of Kragujevac ("Official Gazette of the City of Kragujevac" No. 37/12) and the decisions of the council of local government.

Twelve Secretariats are formed within the City administration, including the Secretariat for construction, urban development and environmental protection which is most important for potential investors.

Within the Secretariat for construction, urban development and environmental protection internal organizational units are formed:
- Department of Spatial Planning,
- Department of Construction,
- Department of Environmental Protection,
- Department of legalization and
- Department of Infrastructure [7].

Secretariat for construction, urban development and environmental protection as a body ensures the location, building and occupancy permit for potential investors is of great importance in all phases of real estate investment.

4 The role of data sources in the process of decision-making in investment analysis

A prerequisite for decision-making in investment analysis is a data collection from various sources. For the purposes of decision-making in investment analysis in the city of Kragujevac, data sources of interest are real estate cadastre, tax administration and secretariat for construction, urban development and environmental protection.

Data sources used in the investment analysis can be classified, according to the criteria of accessibility, to: publicly available and those whose access is restricted by fulfillment of certain conditions. Sources of data are also distinguished by ability to access them publicly through a web application or disability to do that and hence being required to fill a request to the competent institution. Publicly available services that can be accessed through the web applications (in Kragujevac) are KnWeb, the National Spatial Data Infrastructure - NSDI, Central Mortgage Register (CMR) and Prices and Estimates records. City Tax Administration and the Secretariat for Construction, Urban Development and Environmental Protection do not have the ability to display data through web applications.

4.1 KnWeb applications

KnWeb application is the internet service of Republic Geodetic Authority which provides insight into the database of the real estate cadastre.

Real estate registry database is the central database of the Republic of Serbia which was formed by taking all data from the real estate cadastre services.

The database can be searched by the number of parcel within the cadastral municipality or via the addresses of real estate (Figure 1).

![Fig. 1. Searching for a data in the application KnWeb for the municipality of Kragujevac [13]](image-url)

There are two forms of access, public access and access enabled for registered users only [10]. Service was created in 2008 and back then was available to registered users only. At the beginning, the service
was used only by state institutions, local government, state and public companies, and later, Republic Geodetic Authority signed an agreement on using the service with almost all commercial banks, a large number of agencies engaged in the business of real estate, as well as attorney's offices. Public access to "KnWeb" was enabled in 2012. Public access allows all residents to verify ownership and other information about real estate via the Internet without going into real estate cadastre and without paying fees.

Although the data obtained by this service (Figure 2) can not be used as official documents, it can greatly help potential investors through time savings.

4.2 National Spatial Data Infrastructure - NSDI

National Spatial Data Infrastructure - NSDI is an integrated system of geospatial data, which allows users to identify and access spatial information collected from a variety of sources, from local through national to global levels, in a comprehensive manner [14]. A big step in the forming of the NSDI represents a GeoSerbia portal. Republic Geodetic Authority realized the project "Digital orthophoto production in the Republic of Serbia" within the donor program of the European Union in 2011. In May 2011, orthophoto for the whole territory of the Republic of Serbia was set entirely on the geoportal. Orthophoto is important for planning and use of space as well as for studies and projects regarding investment. Thanks to digital orthophoto, the location itself can be seen as well as its surroundings, which affects faster investment decision-making [14].

In order to increase the volume of data available to users on the geoportal, the area of digital cadastral data is extended.

Figure 3 shows an example of cartographic view for the town of Kragujevac through the initial GeoSerbia geoportal.
4.3 Central mortgage register - CMR

After introducing the Law on Mortgage at the end of 2005, the Republic Geodetic Authority has created an application "Central mortgage register (CMR)" [11]. Simultaneously with the mortgages registration in the public register - central register of mortgages is being formed as a unique electronic public database which contains the mortgages registered in the relevant public register of real estate, in order to search and gather information on mortgages, led by the Republic Geodetic Authority. Figures 4 and 5 present examples of searches mortgages registered in the CMR, on objects and plots in the city of Kragujevac.

![Fig. 4. Searching stored mortgages on objects in CMR [11]](image1)

Fig. 4. Searching stored mortgages on objects in CMR [11]

![Fig. 5. Searching stored mortgages on plots in CMR [11]](image2)

Fig. 5. Searching stored mortgages on plots in CMR [11]

The importance of Central mortgage register (CMR) is reduced by the existence of KnWeb application. Characteristic for CMR is that the Republic Geodetic Authority is not responsible for the accuracy and completeness of data entered into this record.

4.4 Price and assessment records

Law on State Survey and Cadastre [19] introduced a definition of evaluation of real estate which represents determination of the market value of the property that is by following procedures and methods of mass appraisal. Responsibility for performing the duties of mass appraisals is given to the Republic Geodetic Authority by law.

For the purposes of mass appraisal, records are kept of market prices of real estate, which is collected from sales contracts and lease agreements of real estate [10]. Republic Geodetic Authority has developed a software solution - Registry of real estate transactions, with a central database and web application for data entry. Figure 6 shows the data...
input through this application.

Fig. 6. Data entry through the application of the Register of real estate transactions

Through the Registry of real estate transactions the following information about real estate are collected:

- Identification data traffic (Organ certification, number and date of certification)
- Data on the cost of traffic (the date of the contract, amount, currency, unit price, single price for the shares of real estate)
- Data on parties in traffic (name / name, identification number / registration number of the entity, place of residence / seat)
- Information on the type of traffic (traffic of land, buildings, parts of buildings, mixed),
- Basic information about the total real property (real estate types, identification, size, share of traffic) and
- Additional data on total real property, referring to their characteristics at the time of the traffic necessary for market analysis [9].

System Registry of real estate transactions has to do with the databases of the Real Estate Cadastre and address register, as well as the connection to the service of the National Bank of Serbia for obtaining the currency exchange rate on the day of transaction.

Figure 7 is presented to show the realized real estate transactions in Kragujevac according to the type of real estate, while Figure 8 presented a more detailed view, the total price of real estate.

Fig. 7. The application records the market price and the mass appraisal (e.g. City of Kragujevac) [12]
Registry of real estate transactions is the first subsystem of the system of mass appraisal and has a role in gathering all the information on the real estate market which is needed to analyze the market in order to carry out mass appraisal. In addition, this system can provide transparency to real estate market in the Republic of Serbia and the data necessary for the interest groups who relate their work to the market and valuations of real estate properties [12].

Publicly available data on mass appraisal will contribute to the stability of the real estate market, through the prevention of extremely high or low prices in transactions of real estates. The biggest benefit of this system of mass appraisal will see the state tax authorities, banks, investors and insurance companies [10].

5 Conclusion

Investment analysis in real estate involves collecting numerous data which will help in a real estate investment decision-making.

Required prerequisites for making the right decisions in the analysis of investment in real estate are up to date data on real estate and rights on them, compatibility of spatial and urban planning, efficient and equitable system of taxation, etc. Qualitative analysis of all available data sources for a particular territory is essential for potential investors. The historical development of data sources with their legal framework demonstrates the importance of quality and reliable records in the past as well as today.

In addition to improving the cadastre of real estate Republic Geodetic Authority is making an effort to, by using positive foreign experience, establish advanced Internet services. The modern aspect of investment decision-making analysis implies the availability of necessary data in electronic form via the web service. Some state services and local self-government in the Republic of Serbia allow access and usage of different data, with or without compensation. Further development and usage of these services includes: a defined policy on data usage, the cost of using, a clear policy on the distribution of responsibilities, implementation of standards in the production, distribution and use of data. Some of these parameters will be resolved through the management and development of the NSDI, whose the most important achievement is GeoSerbia geoportal.

The importance of up to date records and services is reflected through efficient functioning of the real estate market, as well as through indirectly increased inflow of foreign capital, the development of cities and rural areas, etc. The Republic of Serbia and the authorities are working on the development of the NSDI and other projects that are in line with international standards and state policy, with the ultimate goal of easy accessible information for all interested parties.

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