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Risk management of financing methods of urban projects

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ABSTRACT
Nowadays, there are various methods for financing municipalities, the most common of which are non-loan financing methods. In these methods, by accepting the risk of using financial resources in the activity or a project, the financier expects the return of the principal and profit of the invested resources from the economic performance of the invested activity or project. In these conditions, insufficient knowledge of the project implementation environment can create a high risk for the investor. Hence, risk identification and management is a prerequisite for the success of these methods. This article presents different financing methods and then the municipality financing methods are examined. In the next section, by stating the risks and dangers of these methods, the position of risk management in these projects is explained. Finally, by reviewing different information sources and using the opinions of experts and executors of infrastructure projects, a classified structure of risks and hazards of municipality financing methods is presented.
Keywords: Risk management, financing municipalities, urban projects

Introduction
Continuing economic growth in cities, like other developing countries, requires high investment in various areas of infrastructure. In this regard, several barriers, such as lack of government resources and lack of modern technology prevent the growth of facilities in accordance with the needs of urban society. In this regard, along with downsize of government in the last decade, a step has been taken to make services more competitive and to pave the way for private sector investment. This movement characterized by the presence of the non-governmental sector in an urban project and the provision of services, has been started a long time ago in developed countries and today in these countries, it is considered as one of the indicators of development. In this regard, there are different methods for financing, which are divided into two main classes, including organizational financing methods and

external financing methods. Financing methods with the help of external sources include two types of loans and non-loans. In recent years, non-loan methods have attracted much attention of private sector investors and urban executives. The aim of this study is to investigate and identify the factors that cause uncertainty and risk in investment processes in urban project financing projects from initial studies to operation and contextualizing to provide solutions to meet the identified risks to create economic efficiency for urban projects and increase productivity. This article consists of three main sections: In the first section, various financing methods are introduced. In the second section, the risk management process in the context of urban financing methods is examined. In the third section, the risks of financing methods for urban projects are introduced and presented in a structurally classified manner.

Financing Methods

Financing is the provision of the necessary capital to obtain the various factors and resources needed to produce goods or provide services. In other words, financing is the provision of capital necessary for investment in economic projects and implementing a project. Project financing is one of the basic principles of project management and has an important place in the level of strategic project management. The importance of project financing is emphasized since the start of any project will not be possible without selecting the appropriate method of financing, and selecting the wrong method of financing is one of the main causes of delay or stop in the project. Different criteria have been introduced in different references to classify financing methods, but the framework used in most references to classify financing methods is as follows:

A- Financing methods based on municipality resources

B- Financing methods with the help of external resources

If the project capital is provided within the municipality, it will be internal financing, and if the project capital is provided outside the municipality or the source of repayment is capital, product and income from the sale of goods or services of the project, it will be external financing.

Financing methods based on municipality resources

In this method, financing is done by directing savings to invest in projects. In fact, the sources of internal financing are resources that are available to the municipality and can be accessed more easily. In fact, in the method of financing through the internal resources of municipality, the conversion of excess domestic capital is considered. The following financial factors and levers can be used to internal financing of municipality:

- Financing through municipality reserve
- Financing through the sale of securities
- Financing through funds of insurance and pension funds
- Financing through excess liquidity or working capital

Financing with the help of external resources

Using organizational resources for project executors will not always be easy. In general, it can be stated that large and infrastructure projects are not feasible with sufficient internal resources and in these cases, municipalities should try to attract resources and finance urban projects by using other methods. In this regard, the use of external resources has been helpful in many cases. Financing with the help of external resources is done in different ways, which are divided into two main classes:

A. Loan methods

B- Non-loan methods

Loan methods of financing

Loan-based financing includes funds that the investor borrows and must repay along with interest over a period of time. Investors seeking financing through borrowing will quickly encounter a wide range of credit options. This section describes the most important methods of loan financing:

Obtaining loans from banks

Executors of an infrastructure project can receive a part of the required funds for the project in the form of loans from financial institutions, especially banks. These funds can be provided from domestic and international markets. Urban project loans have two characteristics that distinguish them from other types of loans. First, such loans are long-term, and second, they can only be repaid through the funds obtained from project. Therefore, the lender must be large and also have sufficient experience in financing projects with very complex commitments.

Banks are generally controlled and limited by their regulatory organization in terms of amount of loans they can provide to a customer. In addition, there are restrictions for banks in terms of time periods of deposits. Therefore, they are very carefully involved in urban projects and examine the period of their cooperation with a new project to avoid the initial risk that may arise due to the borrower's bankruptcy. Also, banks are exposed to various project risks throughout the cooperation period. It means that they will take risks related to all stages of the project life cycle, such as design and engineering, construction, startup and operation.

The use of official development helps from international institutions and development banks

Since most banks in developing countries are small compared to international standards and do not have sufficient knowledge of the operational process of financing such projects, international banks play a dominant role in financing urban projects. Thus, urban projects can be financed through the resources of international multilateral institutions, regional development banks and bilateral resources. Financial support of the construction of large infrastructure projects is one of the goals of the World Bank. In order to encourage private investment and facilitate private sector activity in infrastructure, the World Bank has allocated part of its financial resources to support these programs. Through its available tools, the World Bank can help municipalities in developing financial mechanisms to reduce some of the risks of private investment in urban projects.

The World Bank Group consists of five financial institutions, which are:

1-International Bank for Reconstruction and Development (IBRD)
2- International Development Association (IDA)
3- International Financial corporation (IFC)
4- Multi-Purpose Investment Guarantee Agency (MIGA)
5- International Centre for Settlement of Investment Disputes (ICSID)

Another external resource of funding for urban projects is regional development banks. At the international level, there are several regional development banks that establishing communication with them to finance energy infrastructure projects is essential. Some of these banks are:

6- Asian Development Bank (ASDB)
7- African Development Bank (AFDB)
8- European Investment Bank
9- American Internal Development Bank
10- OPEC Fund for International Development
11- Islamic Development Bank (IDB)
12-Arabic Fund for Economic and Social Development

Financing through the sale of bonds

An alternative to loans is the ability of sponsors of an urban project to access debt securities, especially bonds. Bonds are long-term guaranteed debt obligations issued by municipalities at a fixed rate. Hence, borrowers are long-term creditors. Long-term debts are often called as fixed income securities, since the municipality accepts the payment of a fixed interest to the holder of these bonds. In urban projects, long-term bonds are an important resource of funding municipality.

Some other methods of loan financing, which are less used than the above-mentioned methods, are mentioned below:

- Use of credit lines and documentary credits
- Obtaining a loan backed by assets (mortgage loan)
- Receiving foreign guarantee loans, financing, etc.

Non-loan financing methods

Non-loan financing methods include investment methods in which the financial supplier expects the return of the principal and profit of the invested resources from the economic performance of the activity or the project invested, by accepting the risk of using financial resources in the activity or project. Some common non-loan financing methods are:

Foreign direct investment

In International Monetary Fund definitions, direct foreign investment is a type of private investment that acquires at least ten percent of the voting shares of a foreign company in order to maintain control over capital. In this method, the foreign investor invests directly and with a certain share in the project.

Participation

A partnership contract is one of the special states of foreign direct investment that is discussed as a separate method due to its widespread use. In this method, by creating a joint company with various percentages of participation of domestic and foreign companies, the urban project will be financed. In this method, the investor is allowed to use the preferred stock in the project, while this commitment is not recorded in the company's balance sheet and credentials.

Compensatory transactions

In this method, the foreign financier, without having direct participation in the share capital of the project company will compensate its return on capital by receiving a manufactured product or its equivalent currency by providing cash and non-cash financial resources. Examples of compensatory transactions are:
Trade counter
Reciprocal purchase contracts
Build-operate-transfer (B.O.T) contracts
Trade counter

Trade counter is used in contrast to the term Back-Buy. In this method, the foreign investor company assumes all investment costs such as design, equipment supply, installation, initiation, and technology transfer, and after initiating the project, it entrusts the project to the municipality. The return on investment and profit of the investor will be obtained by receiving the products of the same project. For this reason, the municipality does not offer an obligation to the investor to repay the principal and interest of the capital and this is a project that must be responsible for the return of capital and profit with its own products.

Reciprocal purchase contracts:

In reciprocal purchase contracts, the seller and the original purchaser agree that the seller (the supplier of the financial resources) purchases his own products or alternative products, himself or a third party. Therefore, the only difference between this method and the trade counter method is that financial resources are not related to sellable products.
Build, Operate, and Transfer Contracts: (B.O.T)

In the BOT process, a group of foreign and possibly domestic companies in the form of a partnership sign a building and operation contract with a limited period of time with governmental or non-governmental companies operating the host country and after the operation period, they transfer the project to the host country. For example, the construction of a B.O.T city train is one of the best methods to provide public transportation for the host municipality, since the construction of a city train is one of the time-consuming and capital-intensive cases. In a B.O.T urban train project, a private consortium active in the development

of urban transport undertakes financing and construction of urban train. At the end of the period of operation of a private consortium of urban trains, usually between 10 and 25 years, ownership of the city train is transferred to the city administration or the host government. The duration of this period is set so that, according to estimates, all capital expenditures, along with a percentage of profits, are compensated by consumer's funds. Although not more than twenty years have passed since the implementation of this contract, due to good welcome of private sector investors and executors of urban projects of this method, so far different models based on this type of contract have been designed and used. Figure 1 shows the structure of the B.O.T contract.

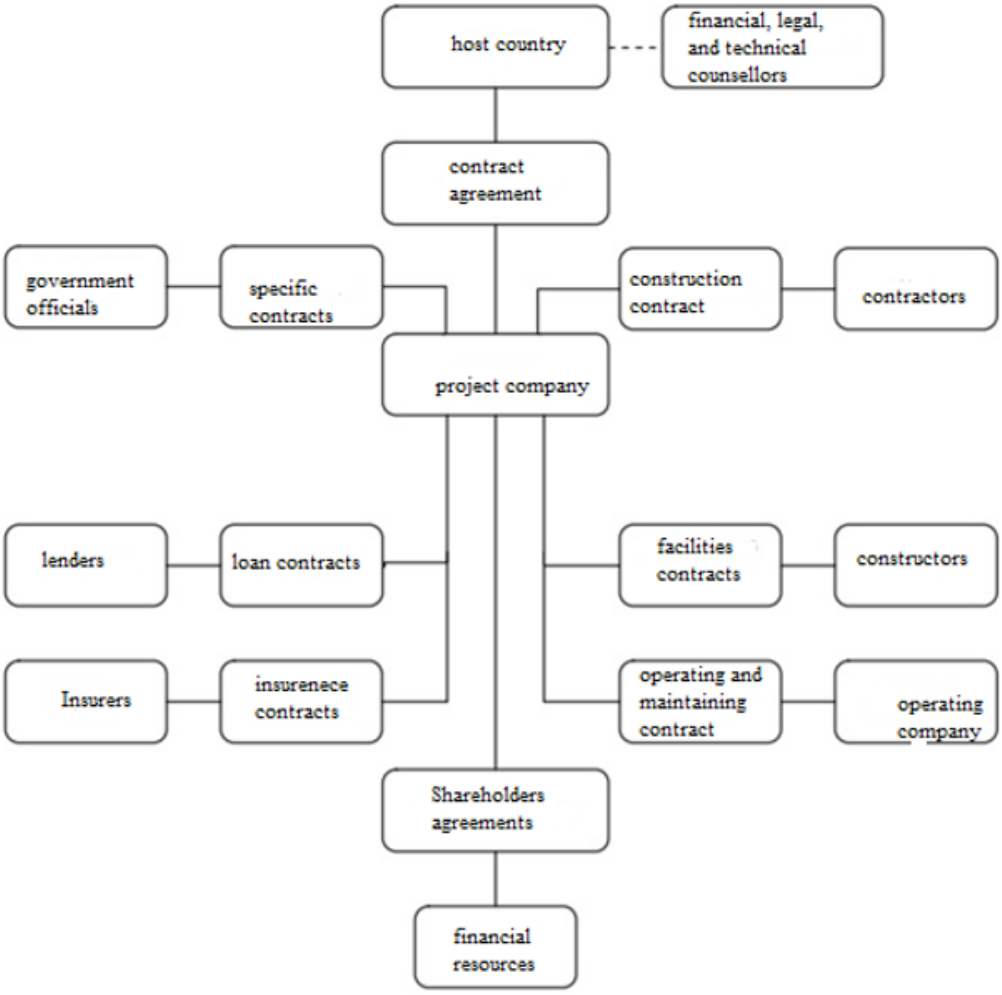

Figure 1: B.O.T. contract structure

Risk management of financing methods for urban projects

Risk management is one of the issues raised in the strategic level of project management and has an equal importance by determining the appropriate method of financing and also selecting the appropriate method of project implementation. Every economic and financial activity, along with the expectation of return, also expects the occurrence of fundamental risks. In fact, it is not possible to make a profit without expecting risk. For this reason, before accepting a project, all related elements, including the employer, executor, investor and operator, should identify and assess all possible risks. The sensitivity of this issue will be clearer in projects implemented with the participation of the municipality and the private sector, due to the complexities of project financing. In the financing methods introduced in the previous section, risk management has had an undeniable importance, since with the proper implementation of the risk management program of these contracts, unpredictable costly events are reduced and financial resources

are allocated more efficiently. It is clear that the structure of each method of financing requires special opportunities and threats, but it is possible to balance the common opportunities and threats of these methods to large extent by providing a suitable model for risk management of these methods. Successful implementation of a project financing process is difficult and requires many uncertain cases. Owing to sensitivity of the financial sector in these projects, long negotiations and several examinations are performed to avoid possible risks as much as possible. Identifying threats and opportunities in such projects is crucial. All of these cases make project stakeholders to seek to create an appropriate structure to control project risks and increase the project's chances of achieving its goals. Thus, managing and controlling risks is a prerequisite for the success and even completion of a collaborative project.

Risk management process

Definition of risk: Risk in a project is the occurrence of unknown events or situations that have negative or positive consequences on the project objectives.

Project risk management is "all processes related to identifying, analyzing and responding to any uncertainty that includes maximizing the results of desirable events and minimizing undesirable results." Also, risk management in the PMBOK standard is defined as the process of systematic identification, analysis and response to project risk throughout the life cycle of the project." Figure (2) shows the risk management process based on the PMBOK standard. Risk is an inevitable factor in projects and is always around us. Thus, risk management in the stage of recognizing and designing the project, that is, before the occurrence of risk can create potentially high returns. If project risk management is neglected and not managed properly, work control will be lost.

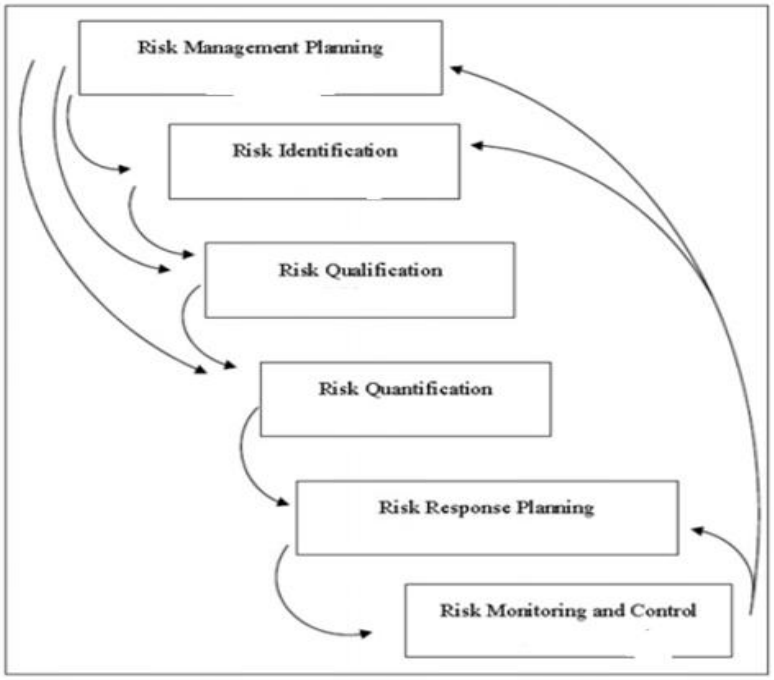

Figure 2: risk management process based on PMBOK standard

Identifying risks

After defining the objectives in the risk management planning section, the next step is to identify areas of risk and uncertainty that prevent the achievement of objectives. Identifying and classifying risks is the most difficult and important part of the risk management process, since if the risk is not identified, that risk is eliminated from subsequent analysis and cannot be properly planned to respond to it. The risk

identification process is a continuous activity that its continuity depends on the level of risks and project conditions. Risk identification is a systematic process to ensure that no important points have been ignored. In this regard, there are different methods for identifying risks. Some of the most important methods of risk identification are:

- Review of documents
- Structured questionnaires
- Daily reports
- Brainstorming
- Risk breakdown structure (RBS)
- Delphi technique
- Interview
- Checklists
- Analysis of hypotheses
- Judging based on information and experience
- Effect and Cause chart (E&C)
- Analysis scenarios = (what - if)
- Weaknesses, Strengths, Opportunities and Threats Analysis (SWOT)

In the PMBOK standard, the risk breakdown structure (RBS) method has a particular importance. The risk breakdown structure categorizes the expected risks in each project. For different projects and organizations, different risk breakdown structures are introduced so that the project parties to gain knowledge on their potential risks and benefits in different situations.

In the literature, various methods have been proposed for risk classification. In the reference, risk in private and government projects is classified into two groups: organizational risks and public risks, so that public risk includes risk credit, construction, income (revenue), operations, legal and financial structure. Also, in the reference, risk in B.O.T projects is divided into 5 classes of financial, market, cost overflow, political, and execution of work.

Qualitative risk assessment

The qualitative risk assessment process involves several stages. In the first step, by using one of the risk identification tools, major threats and opportunities that can affect the output of the project or process are identified. After identifying the major risks, in the second step, a detailed assessment of the frequency of occurrence and the results of each of them is performed and then different risks are ranked based on the obtained values. In other words, potentially hazardous events are prioritized based on the potential effect of each of the risks on the project objectives. It makes it possible to compare risks with each other, and in the later steps of the risk management process, it is possible to decide on appropriate methods of risk response planning. In reference, three criteria of occurrence, severity of impact, and tracing have been used for risk assessment. Also, in many references, to assess (measure) risk, only two criteria of "probability of occurrence" and "impact rate" have been used. In other references, criteria such as "estimation uncertainty" and "organizational ability to respond to risk" have been proposed.

Quantitative risk assessment

Quantitative risk assessment identifies the likelihood of outcomes and consequences affecting project objectives. Techniques that are commonly used in this step include Sensitivity analysis, decision tree analysis, analysis of potential breakdown situations, and Monte Carlo simulation. Selection of any of these methods depends on the nature of the risk or the scope of the assessment. Although a quantitative assessment can be performed simultaneously with qualitative assessment, it is usually done after a qualitative assessment.

Risk response planning

Risk response planning is the process by which options are presented and actions taken to increase opportunities and threats that address project objectives are identified. In this section, the approaches used to respond to risks are introduced. These approaches include threats and opportunities that can affect the success of the project, and the reactions of each are discussed.

Risk control and monitoring

Risk control and monitoring is the process of identifying, analyzing and planning new risks, monitoring identified risks and existing minor risks. Also, it involves re-analysis of existing risks, monitoring the conditions for the creation of precautionary programs, monitoring the remaining risks and reviewing them in terms of evaluating effectiveness.

Proposed structure to explain the risks in the financing methods of municipalities

After reviewing the literature, studies obtained from reports and extracting risk factors in these projects and holding several sessions with executives of private projects and obtaining experts' opinions, the proposed structure of risk breakdown financing methods was prepared (Table 1). The use of this structure to identify and assess the risks of the project makes the risk management process in the environment of these projects to be done systematically.

Table 1 - The proposed risk breakdown structure for financing methods municipality

Foreign risks	Commercial (financial) risks	Market risks	Project performance risks	Operating risks	Building stage risks	Tender stage risks
Confiscation and nationalization of assets	Currency conversion capability	Sales price estimation	Supply of raw materials	Non-observing the standards	Lack of project completion	Initial studies
Change of rules	Currency transfer capability	Demand estimation	Technology capability	Lack of extending the permission	Delay in project completion	Lack of winning
Violation of rules	Currency exchange rate	Selecting the appropriate technology	Technology transfer	Force majeure events of operating stage	Increasing building cost	Offering inappropriate price
Decision-making institutions	Existence of foreign currency	Fluctuation in demand	Management performance	Executive ability	Lack of observing the standards	
Administrative corruption	Interest rate		Competitor projects	Project maintenance	Lack of access to site	
Delay in permissions	Inflation		Restriction in importing needed facilities	Facilities failure and breakdown	Inadequate transportation facilities	
Credibility and power of competing companies	loan repayment		Obligation of contract parties		Technical ability of contractors	
Violating the agreements	Reduction of tariffs		Project reliability		Force majeure events of building stage	
Environmental disputes	Shortage of liquidity				Providing facilities	

Conclusion

In the past, managers used their experience to estimate a percentage of time and cost for risk (threats and opportunities). However, there are nowadays better ways to look more closely at unknowns and uncertainties. In some cases, the outcome of decisions is so important that the occurrence of error may impose irreparable damage, and as a result, outdated and unscientific methods do not meet the management needs. The area of financing is one of the appropriate areas for the application of risk management techniques due to its complex structure and multiplicity. Identifying and classifying risks is the most difficult and important part of the risk management process, since if the risk is not identified,

that risk is eliminated from subsequent analysis and cannot be properly planned to respond to it. Thus, the successful implementation of a financing process will never be possible without fully identifying the risks. This article addresses three main sections. In the first section, various financing methods are presented and then the risk management process in the environment of financing methods is discussed and in the final section, the risks of this type of financing methods are introduced and presented in the form of a classified structure. This article is presented to help private sector actors confront with the risk structure of financing methods in municipalities consciously. The proposed structure acts as the input to the assessment and risk response step. Therefore, identifying the risks of urban projects has a high importance. As future research, response planning to the risks identified in this article is recommended.

References

[1] Ebrahimnejad, Mousavi, Sirafianpour "Presenting a Model for Risk Assessment of B.O.T Projects Based on Fuzzy Multi-Index Decision Making", 5th International Conference on Industrial Engineering, 2007, Tehran Project finance in developing countries, www.IFC.Org/

[2] World Bank, "world Bank Guarantee sparks private power Investment in pakistan", The Hub power project, project Finance Group, June 1995.

[3] Joy Dunkerley, "Financing the Energy Sector in Developing Countries: An overview, "Energy policy 23, December, 1995.

[4] Darrin, Grimsey, Lewis Mervyn K.,"Public Private Partnerships" , Edward Elgar Publishing, 2004.

[5] Harold Kerzner; Project Management- A systems Approach to Planning, Scheduling, and Controlling, 7th Edition, John Wiley & Sons, 2001.

[6] Zandin, Kyell B; Maynard's Industrial Engineering Handbook, 5th Edition ,McGRAW-HILL, 2001.

[7] PMBOK, A guide to the project management Body of knowledge, 3rd Edition, Project Management Institute, standards committee, 2004.

[8] Ropponen; "Risk Management in Information System Development", Computer Science Report, university of Jyvaskyla, 1993.

[9] Rory Burkeh; Project management Planning & control techinques , John wiley & Sons, 1999.

[10] A. Ng, Martin Loosemore; "Risk allocation in the private provision of public infrastructure", International Journal of Project Management, NO.25, P.P. 66–76, 2007.

[11] Chao-Chung Kanga, Cheng-Min Fengb, Haider A. Khanc; "Risk assessment for build-operatetransfer projects: a dynamic multi-objective programming approach", Computers & Operations Research, NO.32, P.P. 1633–1654, 2005.

[12] Dell' Isola Alphonse; "Value engineering practical applications" , R.S.Means Company Inc., 1997.

[13] Glenn Koller; "Risk assessment and Decision Making in Business and Industry", CRC Press,1999.

[14] L.R. Waterland, S. Venkatesh, S. Unnasch TIAX LLC;"Safety and Performance Assessment of Ethanol/Diesel Blends (E-Diesel)", National Renewable Energy Laboratory, September 2003.

[15] Klein, J.H., Cork, R.B.; "An Approach to Technical Risk Assessment", International Journal of Project Management, Vol. 16, No. 6, pp. 345-351, 1998.