

RISK ASSESSMENT OF PROJECT MANAGEMENT IN WATER SECTOR IN BULGARIA

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Abstract

The projects in water sector can be defined as public, investment and infrastructural or combined. In order to be implemented a project like so one of the requirements is to be prepared risk assessment of project management in water sector, which is the main aim of the paper (to assess the risk of project management in water sector). On this basis are made generalized conclusions for the level of risk in the sector and possible recommendations to reduce it. The first part of the paper presents literature review of risk assessment in project management. The second part of the paper assesses the risk of project management in water sector based on opinion of project beneficiaries of the Operational Programme Environment 2007-2013, axis 1. The main results connected with risk assessment present that neither indicator could be defined as system risk. Most of the indicators are defined as irrelevant risks. Made by the experts classification of the possible risk shows that some indicators are defined as critical risks. Recommendations are connected with management of all types of risk, involvement of project manager and project team members in identification and evaluation of the risks, monitoring of risk etc. The conclusions in the paper are based on the results of university research project "Project management of sustainable development in water sector" (UNWE).

Key words: management of water projects, risk assessment, risk profile

INTRODUCTION

The projects in the water sector can be defined as public, investment, but often they are also infrastructural. They are determined as public projects because they are oriented to natural resource of public interest and by their implementation the public objectives are achieved. This type of projects is investment and requires considerable resources and time scale for implementation. They require also highly skilled team of professionals. Water projects are often classified as infrastructural projects. They spend large-scale investment resources and there is a need of significant time scale. They are characterized with a high risk. The effects of their implementation are needed for development of the sector and they are not only economic but also have social and environmental.

The inclusion of environmental and social aspects in purpose, scope and / or conditions of the project requires the assessment of potential risks of the project realization. In this regard, under the risk of an investment

project is understood accidental event that impacts negatively or positively on the indicators of the project – time periods, cost and content (quality) [6]. The project risk is an objective phenomenon in the functioning of any organization. Unlike uncertainty, the risk has measurable parameters - probability of occurrence and impact on several stages [1]. Some authors [8] consider there is a high risk and uncertainty realizing a project, because most of the activities are not repeated and they are not routine. Some authors [7] define risk in the context of a project as potential impacts on project objectives such as cost and time. They also characterize risk by its probability of occurrence and its uncertain influence on project objectives. Project risk management is based on the analysis and assessment that use scientific approaches and advanced technologies. The main task of risk management is to reduce the risks in the process of projects implementation and to neutralize the negative effects of risk factors [2]. Project risk assessment in water sector support decision making that contributes to

public safety and clarifies project expectations [11]. At the same time assumptions for risk assessment are project-specific and are influenced by the size and complexity of the project environment. According [3] risk analysis has two stages: qualitative analysis that focusses identification and subjective assessment of risk and quantitative analysis that pay attention on objective assessment of the risk. A qualitative analysis allows the main risk sources to be identified and the quantitative involves more specific techniques. Risk assessment discloses the sensitivity of the project to its participants to ensure that all threats are fully understood. As a result, targets and contingencies can be set at correct levels, contracts can be negotiated with an accurate understanding of potential challenges and risk mitigation strategies can also be created in advance. Risk assessment also improves teamwork by increasing openness, honesty, and understanding within the project team [5]. In carrying out large and complex investment projects the human factor is significant because the attitude of staff may affect the accuracy of risk assessment and undertaken action by occurrence of risk events. In this regard the organization should have a common approach to risk management based on wide open communication for realizing management decisions, searching the balance between risk assessment and prevention throughout the life cycle of the project. [10]

MATERIALS AND METHODS

The main aim of the paper is to assess the risk of project management in water sector. On this basis are made generalized conclusions for the level of risk in the sector and recommendations to reduce it.

In terms of risk assessment are evaluated 1) the probability of occurrence in relation to the implementation of the project 2) the level of expected impact as a result of the occurred event. Both components are evaluated based on the following indicators of risk: Change of legislation in the water sector; Failure of part of the contract by the beneficiary; Incorrect selection of technologies for project

realization; Incorrect budgeting; Leaving the staff of the project team; Incorrect selection of project team; Default in the deadline for implementation of the project; Delay in key stages of the project; Inefficient communication; Insufficient information provision; Inefficient allocation of project resources; Delay in payments on the project by the managing authority; Environmental risk; Climate risk.

Each individual risk is evaluated on a scale from 1 to 3, as indicated in Table 1.

Table 1. Scale for a risk evaluation

Scale	Probability of Occurrence	Impact
1	Low probability (0 -35 %)	Insignificantly impact
2	Middle (36 - 70%)	Critical impact
3	High probability (up to 71 %)	Catastrophic impact

On the basis of risk assessment is carried out a risk matrix which contains a combination of probability and impact, and allows risks ranking. (Figure 1)

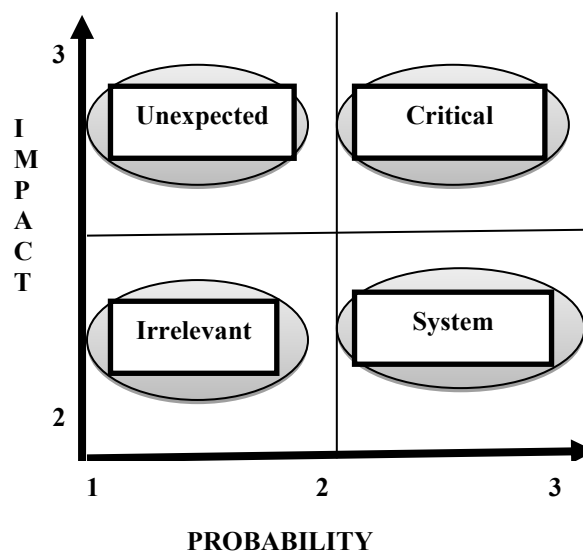


Fig. 1. Matrix of risk
 Source: adapted by [4]

Based on the classification of risk it could be different types as follows:

-Critical risks: possess both factors, valued at around 3. Usually this is a group of risks that require immediate attention and monitoring of activities related to risk management.

-Unexpected risks must be controlled before "systemic risks" because their impact can be significant, although probability for their

occurrence is less than the critical risks. In these cases are usually taken precautions.

-System risks. The probability for occurrence of these risks is high, but their impact is relatively low. In this matter are usually taken precautions. It should be taken in account rather the cumulative effects (for example a series of small problems with major impact on accumulation or systematic violation).

-Irrelevant risks are those where both factors were assessed around 1. Based on the level of risk tolerance, these attract attention or don't. It depends on the resources available and the requirements of stakeholders.

Conclusions in the paper are based on the results of university research project "Project management of sustainable development in water sector" [9].

RESULTS AND DISCUSSIONS

Table 2 and Table 3 present assessment of

Table 2. Assessment of probability

Indicators	<i>Low probability</i>	<i>Middle probability</i>	<i>High probability</i>
Change of legislation in the water sector	20	55	25
Failure of part of the contract by the beneficiary	45	45	10
Incorrect selection of technologies for project realization	50	35	15
Incorrect budgeting	40	55	5
Leaving the staff of the project team	45	45	10
Incorrect selection of project team	45	35	20
Default in the deadline for implementation of the project	25	50	25
Delay in key stages of the project	20	50	30
Inefficient communication	45	45	10
Insufficient information provision	60	35	5
Inefficient allocation of project resources	45	45	10
Delay in payments on the project by the managing authority	15	35	50
Environmental risk	55	30	15
Climate risk	50	35	15

Source: [1]

Most of the experts (from 40 up to 80 %) find that the assessed indicators will have critical impact. Respectively 80 % and 70 % of them have the opinion that "Failure of part of the contract by the beneficiary" and "Delay in key stages of the project" have critical influence. "Delay in payments on the project by the managing authority" is evaluated from 45 % of the experts as indicator with critical impact and also 45 % of them consider that it will be with catastrophic impact for the project

probability and impact of some indicators that support the risk assessment in project management in water sector. Around half of the respondents consider that indicators as "Failure of part of the contract by the beneficiary" (45%), "Incorrect selection of technologies for project realization" (50%), "Incorrect budgeting" (40%), "Leaving the staff of the project team" (45%), "Incorrect selection of project team" (45%), "Insufficient information provision" (60%), "Inefficient allocation of project resources" (45%), "Environmental risk" (55%) and "Climate risk" (50%) have low probability to occur (Table 2). The evaluation shows that 50 % of the experts consider that "Delay in payments on the project by the managing authority" has high probability to occur. Around 50 % of the experts consider that most of the indicators have middle probability to occur. A small part of the respondents (5 – 30%) share the opinion that assessed indicators have high probability to occur.

realizing. One third of the respondents share a view that indicators as "Incorrect selection of technologies for project realization", "Incorrect budgeting", "Default in the deadline for implementation of the project" will have catastrophic impact. A relatively small part of the experts (10 %) state that indicators "Failure of part of the contract by the beneficiary", "Incorrect selection of technologies for project realization", "Default in the deadline for implementation of the

project”, “Delay in key stages of the project”, “Delay in payments on the project by the managing authority” will have insignificant impact for the project management.

Table 3. Assessment of impact

Indicators	Insignificant impact	Critical impact	Catastrophic impact
Change of legislation in the water sector	30	65	5
Failure of part of the contract by the beneficiary	10	80	10
Incorrect selection of technologies for project realization	10	60	30
Incorrect budgeting	5	65	30
Leaving the staff of the project team	50	45	5
Incorrect selection of project team	25	65	10
Default in the deadline for implementation of the project	10	60	30
Delay in key stages of the project	10	70	20
Inefficient communication	40	55	5
Insufficient information provision	55	40	5
Inefficient allocation of project resources	21	58	21
Delay in payments on the project by the managing authority	10	45	45
Environmental risk	30	45	25
Climate risk	30	50	20

Source: [1]

Matrix of risk presents (Figure 2) the types of risk for the analyzed indicators. The classification of respondents according to analyzed indicators shows that they define

“Delay in payments on the project by the managing authority” and “Delay in key stages of the project” as critical risks.

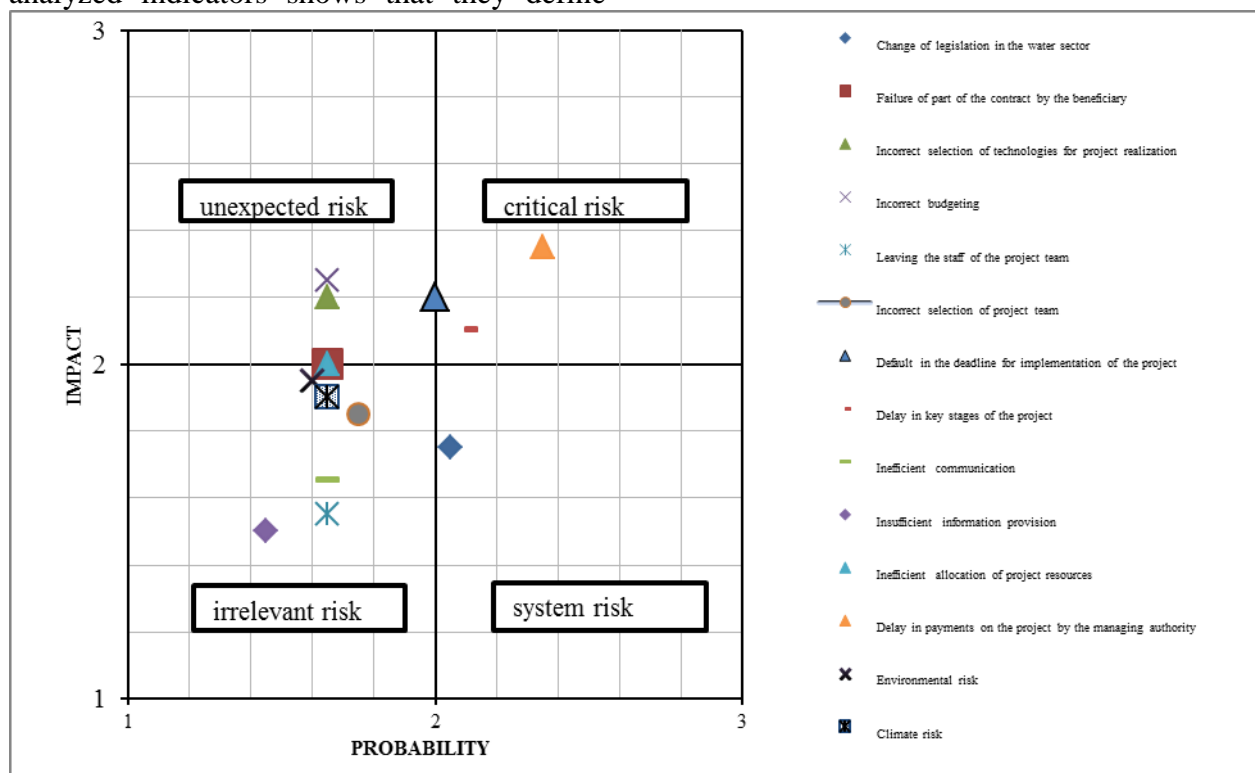


Fig. 2. Matrix of risk

Source: [1]

“Delay in payments on the project by the managing authority” is determined as risks with high impact and probability of

occurrence. “Delay in key stages of the project” is with high probability occurrence but with less impact. In this point of view they

require immediate attention and monitoring of activities related to risk management. "Inefficient allocation of project resources" is evaluated from the experts as indicators with middle impact and low probability occurrence and it falls on the line between unexpected and irrelevant risks. "Default in the deadline for implementation of the project" is evaluated from the experts as indicators with middle influence and also middle probability occurrence and it falls on the line between unexpected and critical risks.

"Change of legislation in the water sector" is defined from the respondents as system risk. The experts consider that "Insufficient information provision", "Leaving the staff of the project team", "Inefficient communication", "Incorrect selection of project team", "Environmental risk", "Climate risk" are irrelevant risks. "Insufficient information provision", "Leaving the staff of the project team", "Inefficient communication" are indicators with low probability and impact. "Incorrect selection of project team", "Environmental risk", "Climate risk" are defined with low probability and middle impact. The indicators that fall in quadrant of unexpected risks are "Incorrect budgeting" and "Incorrect selection of technologies for project realization". They are indicators that have more than middle impact and less than middle probability.

CONCLUSIONS

Based on the risk assessment of project management in water sector could be made general conclusions and recommendations as presented below.

Conclusions:

-Indicators defined as system risk are missing. In this point of view the main state is that there is not such type of risk with high probability for occurrence and relatively low impact.

-Most of the indicators are determined as irrelevant risks that include risks where both factors have low or less than middle assessment. They attract attention or don't, depending on resources available and stakeholders.

-Around a half of the experts consider that most of the indicators have middle probability to occur and a small part of the them (5 – 30%) state that assessed indicators have high probability to arise.

-Most of the experts consider that the assessed indicators will have a critical influence (40-80 % from the experts for different indicators). "Delay in key stages of the project" have a critical impact. One third of the respondents are on the opinion that indicators as "Incorrect selection of technologies for project realization", "Incorrect budgeting", "Default in the deadline for implementation of the project" will have catastrophic effect. A relatively small part of the experts (10 %) state that most of the indicators will have insignificant impact for the project management.

-Made by the experts classification of the possible risk shows that indicators as "Delay in payments on the project by the managing authority" and "Delay in key stages of the project" are defined as critical risks. "Insufficient information provision", "Leaving the staff of the project team", "Inefficient communication", "Incorrect selection of project team", "Environmental risk", "Climate risk" and "Change of legislation in the water sector" are determined as irrelevant risks. The indicators that fall in quadrant of unexpected risks are "Incorrect budgeting" and "Incorrect selection of technologies for project realization". At the same time neither of the indicators is defined as system risk.

Recommendations:

It is necessary all types of risk to be managed through certain procedures in the initial phase of water projects as well as in the other phases, describing the possible events, their consequences and implementation of the most appropriate activities. This would help to minimize the negative effects and maximize the positive results.

-The identification and evaluation of the risks are able to affect the project and documenting their characteristics is significant for the project management. Project manager and project team members, such as experts in different areas and stakeholders have to be

involved in this activity. It is appropriate to create a department or managing body that will be responsible for risk assessment and risk management.

-Monitoring of risk is from significant importance for its reduction. In this regard it is necessary planned actions included in the management plan to be implemented throughout the lifecycle of the project. Continuous monitoring and control leads to the discovery of new risks and change the identified ones.

-“Delay in payments on the project by the managing authority” and “Delay in key stages of the project” defined as critical risks require immediate attention and monitoring of activities related to risk management.

-“Insufficient information provision”, “Leaving the staff of the project team”, “Inefficient communication”, “Incorrect selection of project team”, “Environmental risk”, “Climate risk” and “Change of legislation in the water sector” are irrelevant risks. These types of risks could be managed through identifying the ones that will be from significance for the success of the project according to available resources and requirements of stakeholders. This could be performed by the project manager and the team involved in risk assessment.

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