

## **The Practice of Project Risk Management in Government Projects: a Case Study in São Paulo City.**

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### **Abstract**

Risk management has become one of the most important areas in project management due to uncertain conditions or events associated to a variety of risks, which may have a consequent impact on projects' results. Dealing with these issues in public projects requires qualified management because of the great number of factors, which could hinder these types of projects.

A survey to a sample of companies from this segment has shown that although most companies have the interest to invest time and resources on implementing methods and procedures, most of them do not have a structured risk management.

In this sense, this paper seeks to present evidences from those companies, their needs for maintaining quality risk management in a structured and systematic form. The paper presents the main results of the survey conducted in São Paulo city, addressing methods and techniques for risk management associated to project's implementation, seeking to raise the management quality and competitiveness of companies.

The need for a progressive implementation on project management knowledge was recognized, and also the need to be implemented along with other areas of project management, and project management must be submitted to continuous improvement, in order to leverage its results.

### **Keywords**

Government projects, project risk management, infrastructure projects.

## **INTRODUCTION**

According to Pritchard (2001), most of the decisions, including the simplest ones, involve risks. The main role in project management activities is to drive the operations in order to reach or to overcome the expectations of those who decided on the investment, the stakeholders. Risk management is fundamental to accomplish those objectives, not only trying to keep away from bad results caused by some special events or uncertain conditions, but also acting as a guide in order to maximize the positive results.

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In this sense, this paper presents the main results of a survey, conducted among some companies oriented to urban infrastructure construction. The objectives were (1) to identify the main risks involved in the project management of public works contractors and (2) to analyze critically how they manage those risks. In addition, this paper sets up recommendations for the risk management process, so as to increase the firms' competitiveness and improve the project management quality as well.

## THE URBAN INFRASTRUCTURE CONCEPT

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Different authors propose different concepts to urban infrastructure. In this paper the concept used is that presented by Zmitrowicz; Neto (1997) that consider the urban infrastructure as a technical system of equipments and services required to the development of the urban functions, considering either the social, economical or institutional aspects. Under the social aspect, the urban infrastructure seeks to promote appropriate conditions for housing, work, health, education, leisure and safety. In what refers to the economical aspect, the urban infrastructure should support the development of the productive activities, e.g., the production and commercialization of goods and services. And under the institutional aspect, the urban infrastructure should support the necessary ways to the development of the political-administrative activities, including city management.

Under a systemic approach, the urban infrastructure system is composed of different subsystems, each one with a specific objective related to a particular service, since any kind of infrastructure requests a service, since it demands some kind of operation and relationship with the user, in a large or smaller degree. On the other hand, although the objective of the urban infrastructure subsystems is the services rendered, there is always the need of investments in goods or equipments, like buildings, machines, nets of piping or galleries, tunnels, access roads, among other (ZMITROWICZ; GRANDSON, 1997).

## PROJECT RISK MANAGEMENT

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According to PMBOK (2000), "the projects risks are events or uncertain conditions that, in case they happen, they provoke a positive or negative effect in the project objectives". The risk has a cause and, when it happens, a consequence. Therefore, risk is a relationship among the probability of occurrence of an event **[P]** and its impact on the results **[I]**.

Project risk management, according to PMBOK (2000), is "the systematic process of identification, analysis and responding to project risks. It includes maximizing the probability and the consequences of positive events and minimizing the probability and consequences to adverse events to the project objectives."

Project risk management is directly related to the other areas of knowledge in the project management field, contributing to the improvement of all operational processes.

It is important that project risk management takes place in all phases of the project life cycle, like the starting, planning, development, control, and completion phases.

According to Wideman (1992), "...failure to give proper recognition to risk management on a project can lead to unnecessary and often substantial losses, or even complete project failure."

The project risk varies significantly during the whole project life cycle and between different phases in the life cycle. Therefore, project risk management has to be established as a continuous and integrated function during the whole project life cycle. It is important especially in the planning phases, when risks are identified, analyzed qualitatively and quantitatively and appropriate answers are built for the main project risks. It must be taken into account in project scheduling activities, especially in what relates to time and costs plans.

PMBOK (2000) presents six processes for risk management: [i] planning of risk management, [ii] risks identification, [iii] risks qualitative analysis, [iv] risks quantitative analysis, [v] answering to risks planning and [vi], monitoring and controlling risks.

## THE PROJECT RISK MANAGEMENT AS A COMPETITIVE DIFFERENTIAL

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In a competitive environment, the companies have to be competitive and also have to look for the improvement of their management processes by developing methodologies capable of driving effective project management, capable of achieving better results. To accomplish it, one of the first steps is to identify the maturity level of its project management activities, as well as the performance of each related process, in order to improve or just abolish them.

Organizations must be capable of applying effective project management processes, including those related to risk management. Focusing on the improvement of their performance, the processes must change from corrective to preventive actions, as the main characteristic of the project risk management is that of being ahead of possible problems and their related solutions.

A model to evaluate managerial maturity is that proposed by Fincher and Levin, presented in the Table 1, applicable when the evolution in risk management can be parameterized. Its use allows not only the recognition of the maturity level, but also the actions for the improvement of the project management processes.

According to the project management maturity, a survey was applied in twenty-eight contractors of public works of urban infrastructure in São Paulo city<sup>1</sup>. The survey consisted on an interview, aimed at the recognition of the maturity profile in project management. The intention was also to address recommendations for the building of a reference structure on project risk management. Based on the Fincher and Levin statements, presented on Table 1, it is possible to identify that most of those selected companies did not reach the level 2, yet. About 64% of the sampled companies declared that they do not use project management methods, neither those structured ones nor those supported by policies or standardized procedures, pointing out the level 1 of maturity, the lowest one.

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<sup>1</sup> Considered that the universe was composed of 262 companies registered at the General office of Urban Infrastructure of the Municipal district of São Paulo, the accomplished survey presented 90% in Confidence Level and 15% error, from September, 2004 to April, 2005.

According to the project risk management aspects, no methods of risk project management were found in 61% of the companies and only in 7% of them their projects could count on project risk management, structured and supported by policies, procedures, and standardized forms.

Despite those numbers, 57% of the respondents affirmed that, in their opinion, the companies were willing to spend time and money to implement or improve project risk management processes, what demonstrates a potential to the implementation of methods and procedures in project risk management.

Table 1. Model of managerial maturity according to Fincher - Levin

Level	Definition
1 – Initial	A process doesn't exist. The work is accomplished according to the needs. The success of the project depends on individuals. There is not a formal of project management methodology
2 – Repeated	The project employees are trained on project management basic elements and related areas. A methodology exists, and is applied. The reproduction of the process is emphasized, in way to ensure that the result of the work will be repeated.
3 – Defined	All project management tasks are defined and the processes are documented. Practices of project management are collected and used in order to increase the efficiency and effectiveness of the project.
4 – Managed	The project management process is measured and controlled. The difficulties on the project are previewed by the management and the solutions are found before causing great impact on the project.
5 – Optimized	Focus on the perfection and on the final adjustments of the methodology, looking for the maintenance of the rhythm even when technological changes occur. The processes are in the right place and being used appropriately. All the employees are well-trained and carrying out their functions competently.

Source: (Cleland; Ireland 2002)

While Table 2 shows the frequency of occurrence of the project risk factors, in accordance with the survey data, Table 3 presents their impacts on the projects.

The survey showed that three risk factors were considered of high impacts on projects' objectives: lacks of or delays in reception, with 86% of answers, financial uncertainty on the contracting party, with 68% and changes in the scope of the contract, with 72%.

In what relates to the impact, four risk factors are considered as high impact ones: failures in project risk management, with 50% of the responses, lack of financial resources, with 75%, lacks of or delays in reception, with 92% and financial uncertainty of the contracting party, with 86%.

Among all factors, those ones that present a straight relation to the capacity of the companies on supporting financial impacts due to payments for the rendered services must be pointed out: 92%

consider payments lacks or delays, and 75% consider the lack of finance as a high impact factor on the project quality. On relating these factors to their occurrence frequency, they are considered high risk ones, as 50% considered the lack of finance as moderate risk factor and 86% considered payments lacks or delays as high risk ones, they all are considered as high risk ones, demanding adequate treatments and responses.

Table 2. Classification of risk factors and their occurrence frequency, related to projects that didn't reach the planned results.

Item	Risk factors	Low	Medium	High
1	Changes in economical politics	96% ■		
2	Government's actions and regulatory policies	89% ■		
3	Deviations in the cash flow (not caused by the lack of or delay on payments)		57% ■	
4	Failures in cost management		57% ■	
5	Failures in risk management		72% ■	
6	Failures in scope management	68% ■		
7	Failures in schedule		46% ■	
8	Lack of financial resources		50% ■	
9	Lacks of or delays on payments			86% ■
10	Environmental impacts	86% ■		
11	Social impacts	79% ■		
12	Financial uncertainty of the contracting party (PMSP)			68% ■
13	Changes in contract scope			72% ■
14	Sum of small effects	72% ■		
15	Exchange variations	100% ■		
16	Other (specify): 93% of the companies didn't consider other risk factors			

OBSERVATION: The presented data refer to those obtained in the survey presenting the largest frequency on the responses.

SOURCE: Survey accomplished by the author ROCHA (3).

LEGEND: High frequency ■  
 Medium frequency ■  
 Low frequency ■

While analyzing altogether the frequency and the impact on risk, as shown in Tables 2 and 3, it's possible to build a qualitative hierarchy of those factors, in order to point out the main risk factors. It is also possible to verify that some factors perceived by the respondents as an average frequency one, are associated with high impact factors; besides, factors perceived as medium impact ones, are

associated to high frequency factors. Because of it, they can be seen as representative factors, and should be taken into account on risk analysis.

It is also possible to identify the risk factors recognized as medium frequency and medium impact ones. Although the classification “medium frequency and medium impact” risk, in general, consider the risks as moderate ones, they should be analyzed carefully, once the incidence of several risk factors may enlarge their impacts on the project.

Failures in scope, time, cost, and risk management were pointed out as medium or high occurrence frequency in projects by many respondents, ratifying the trends on failures increasing when no methods or structured procedures are available.

Table 3. Classification of risk factors, according to their impact, related to projects that didn't reach the planned results.

Item	Risk factors	Low	Medium	High
1	Changes in economical politics	54% ■		
2	Government's actions and regulatory policies	57% ■		
3	Deviations in the cash flow (not caused by the lack of or delay on payments)		43% ■	
4	Failures in cost management		43% ■	
5	Failures in risk management			50% ■
6	Failures in scope management		71% ■	
7	Failures in schedule	57% ■		
8	Lack of financial resources			75% ■
9	Lacks of or delays on payments			92% ■
10	Environmental impacts	86% ■		
11	Social impacts	96% ■		
12	Financial uncertainty of the contracting party (PMSP)			86% ■
13	Changes in contract scope		42% ■	
14	Sum of small effects		57% ■	
15	Exchange variations	93% ■		
16	Other (specify): 93% of the companies didn't consider other risk factors			

OBSERVATION: The presented data refer to those obtained in the survey presenting the largest frequency on the responses.

SOURCE: Survey accomplished by the author ROCHA (3).

LEGEND: High frequency ■  
 Medium frequency ■  
 Low frequency ■

As far as failures in management happen, the risks tend to enlarge, due to both the possibility of their occurrence and to their impact on projects, once the companies are not prepared to manage them. The statement of the occurrence of fails on management ratifies that those companies are still in a low maturity level, pointing out that the implementation of practices on project risk management should happen in a gradual and progressive way and also with other processes like scope, time and cost management, among others.

Therefore, it is important to highlight which techniques and tools should be prior implemented, looking for easiest adjustments on firms and seeking for immediate results.

As most of the searched companies does not apply risk management on all their ongoing projects, the maintenance of systematized and supported practices on project risk management will help to get a competitive differential, that will end up adding value to their projects and reducing negative impacts due to uncertain events, while maximizing the probability of positive events as well.

Not only the existence of a project risk management process is important, but also the way of its accomplishment, that has to be done in a progressive way, fitting it to other related areas. In this sense, three main phases can be identified as described below, as said by the searched firms. These three phases match the levels of Fincher and Levin maturity model: Phase 01 and Phase 02 try to provide a group of practices related to the maturity Level 02 and Phase 03 provides conditions for the company to overcome this level.

- ✓ **Phase 01:** Understanding, training and applying the fundamental elements of project management and project risk management, seeking for the definition of a basic methodology and its application, assuring process reproduction and the work repetitiveness.

Once the typical profile of the searched companies presents low levels in their management maturity, it is necessary that the main management concepts become well known not only by the projects' team but also by the overall organization, before implementing management procedures.

It is hard to imagine a company with no methods to manage scope, time or cost being capable of dealing with project risk management, as a lonely activity, with no links to other project management areas, in an articulate way.

Therefore, the first phase aims at the understanding, the training and the applying the fundamental elements of project management involving, preferentially, all the project management areas such as integration, scope, time, cost, quality, human resources, communications, risks and procurement. Although some areas can be prioritized; neither of them may be forgotten.

- ✓ **Phase 02:** Selecting, developing and applying basic project management and project risk management tools to all management processes and all the ongoing projects.

Once consolidated Phase 01, it is possible to start Phase 02, continuing the implementation of the recommended project risk management practices.

Phase 02 has as main objective the definition of all project management processes, including those related to project risk management, extending its application to all projects phases and their respective life cycle.

- ✓ **Phase 03:** Enlarging project management processes and applying tools and techniques, including project risk management by defining a structured methodology supported by policies and standardized procedures in all projects. It will be necessary to look for gathering information about project management practices in order to increase the efficiency and effectiveness in the project management process itself. It will end up adding competitiveness to the company by anticipating difficulties and risky situations along the project life cycle that will help the implementation of preventive solutions.

In that phase, the main objective is to conclude the implementation of the project management processes with emphasis on previously identified risk factors, analyzing the performance in applying techniques and tools, consolidating a project management methodology, including project risk management.

All the processes of managing risks should be applied aiming as main results both the anticipation of the difficulties and the identification of answers, in order to avoid great impacts on projects objectives.

Finally, a continuous process of improvement should be implemented so as to provide methodology adjustments and suitability, looking for updating on technological changes and company management, seeking for highest levels on managerial competence.

## FINAL REMARKS

This paper presented the relevance of project risk management as a process capable to add quality to project implementation, especially in the case of urban infrastructure construction, bringing a competitive differential to contractors of public works, considering that the majority of the searched public works contractors don't apply project risk management methods although the most relevant risk factors have been detected.

The field data were obtained from a survey conducted among public works contractors in São Paulo city, which resulted in a need for structuring and implementing a project risk management methodology, capable of reducing the incidence and the negative consequences caused by adverse events in their projects.

According to the data, the need for a progressive implementation on project management knowledge was recognized, and also the need to be implemented along with other areas of project management, such as scope, time and cost management, once according to the search failures in these processes are recognized as important risks factors.

It's important to point out that in any project management process the continuous improvement should be sought as a way to leverage its results.

In that way, additional researches are recommended, mainly in what refers to the results that will be obtained by the implementation of the improvements such as those suggested here, which will allow new improvements again.

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