Addressing the problem of limited resources in Risk Management

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Abstract

Although many years have passed since Project Risk Management was regarded as a secondary arrow in the best-in-class consulting firms’ “tools-quiver”, it has not yet earned the attention that it deserves, at least in the Greek Construction Industry. Thus, Project Managers avoid spending valuable resources in order to perform an extended Risk Management Process.

The problem raised by this fact is that the typical Risk Management Cycle (Identification, Analysis, Mitigation and Follow Up) is not thoroughly executed. After examining several projects undertaken by one of the big five Greek construction companies, the authors of this paper have come to the conclusion that in the name of completion the “so called” risk team divides the available resources (time, budget) more or less equally between the four phases of the cycle.

The aim of this paper is to challenge the soundness of such an approach that may lead to ambiguous results and impoverish the effort that Risk Managers put into persuading Projects Stakeholders about the benefits that Risk Management may bear.

Instead of equally distributing the available resources, this paper suggests that the risk team should focus on specific phases such as Identification and Mitigation. The concept is also supported by the outcome of several projects, where the risk team followed the aforementioned proposition, one of which will be illustrated in the full paper.

Key words: Risk Management, Risk Identification, Risk Mitigation.
1 Introduction

Risk Management has primarily been adjusted to technical solutions, regarding the technical risks that can lead to the failure of a system [1]. Moreover, it was adjusted to the theory of investments and then the financial risk was a fact [2]. Furthermore, Risk Management has been adjusted to human errors and occupational safety [3], [4]. The trend of our times that we strongly suggest, is the adoption of Risk Management as a strategic tool [5], [6]. However, the adoption of such a technique like risk management, should be adjusted to the adopting organisation’s capabilities. Moreover, the organisation should level the benefit coming from the implementation of a new methodology and decide whether the full methodology or just a part of it should finally be considered for “putting in action”.

The Project Management Institute (PMI) [7], which is one of the most active and recognised non-profit organisations world-wide, has divided project risk management into six core steps like in Figure 1.

![Diagram of Typical Risk Management Process](image)

The interesting debate starts with the next five steps. Is identification more important than analysis? Should analysis be separated in quantitative and qualitative? And finally, which is the most important step in this cyclical process?
There are quite many who believe that the identification step is the most important one. They claim that you cannot cope with a problem that you actually do not know. This is also supported if we take into account Lyons and Skitmore’s [8] survey, which resulted in a weighted average score (WAS) of the use of risk management steps. In the survey, four risk management steps are considered, namely identification, assessment, respond and documentation, receiving a WAS of 4.0, 3.9, 3.5 and 3.2 respectively. If we admit that the step that is mostly used is regarded as the most important one, then we may assume that identification has a slight advantage.

On the other hand, there are those who are pretty sure that the most important step is risk analysis. Their basic argument is that if you do not analyse risks you cannot decide on which one to act first or how many of the available resources should be devoted to each one of them [9]. Certain algorithms have been developed, one of which has been presented by the authors of this paper in 2002 year Risk Analysis (III) Conference [10]. But even that category of scientists tends to argue if qualitative methods are sufficient or quantitative methods are an “one-way” approach.

There are also those who claim that finding out the right response is the most important step, as that is what the risk management is used for!

Same as planning, controlling is not affected by this debate as it is a straightforward process for handling the decisions taken.

The rest of this paper is organised in three sections. The first one describes the general methodology that has been followed. The next one presents the outcomes of a case study and the last one digests the conclusions drawn by the study.

2 Methodology

Although the easy answer to the question is that all five steps should be treated equally and with the most possible attention, it has been proved by practise in this research that this might not be the appropriate confrontation. Of course, the authors of this paper do not state at all that any risk management step should be neglected. On the contrary, if possible, all the steps should be carried out in the most efficient way. But, which is the most efficient way, always depends on the organisation’s maturity concerning this specific aspect. Uher and Toakley in their research related to the Australian construction industry [11], revealed that the most important reason for not implementing risk management was lack of knowledge. However, there are certain risk management steps that demand more or less effort in order to be implemented. For instance, you might be able to identify some risks but unable to make an estimation of their impact on the project. Moreover, you may be able to estimate the impact but have no data at all to estimate the cost of a mitigation action. The methodology presented here suggests that instead of dropping the idea of performing risk management when someone does not have full data, he/ she should consider implementing at least those steps that may have a positive outcome. That is, identification, response planning and monitoring. The concept of this study was to compare the outcome
of performing a limited risk assessment instead of performing a full risk assessment. This concept has been developed in order to cope with a problem that arose when authors tried to implement a complete risk assessment study on certain type of projects of a leading construction company in Greece.

It was, very soon, revealed that since the company had no structured referential concerning risk assessment, it would be prohibitively time-consuming to gather the appropriate data. Although it was quite difficult, the full assessment process had been followed for a number of projects, one of which will be presented in the Case Study section. However, the company would not be willing to consume so much time to implement the risk assessment step at every project. The solution of this problem was to develop a flexible and short-length procedure until a company’s referential could be built. This procedure is depicted on Figure 2.

Figure 2: Alternative Risk Management procedure.

Risk identification consists of determining those risks that are likely to affect the project and documenting their characteristics. It is the first step of the risk management procedure and it should be carefully treated. However, there are quite many ways to acquire one of the most popular risk-identifying tools that are risk checklists. Risk checklists can be found in risk-related organisations, books, and journals or even be developed “in house” relying on previous experience. Checklists are classified based on risk domain [5] or even better they might be classified per industry area [12]. In other words, the project management team might get a quick and easy solution for risk identification with minimum effort and time consumption. Furthermore, the checklist is enhanced through “lessons learned” that come up after each project execution. As a result, the identification step is getting more effective project by project.

Instead of the risk assessment step the risk prioritisation step has been adopted. It has been observed that even if a project manager is not able to determine the exact exposure (measure of risk severity) he/she is usually pretty sure about the ranking among the identified risks. In a nutshell, the project
manager may not be capable of determining a value (stochastic or not) for risks’ exposure but he/she can decide which one is more important than another one and thus produce a rank. The most important observation is that the estimation made by the project manager, based primarily on rules of thumb, is in great extend correct. One problem (not a minor one, we have to admit) is that the only knowledge occurring from this process is which risks should be dealt with first and not what exactly will happen if they are not treated at all or are treated partially. However, instead of ignoring the risk completely or feeding a model with wrong and unchecked data resulting in a similar no-meaning outcome, it might be better not to spend the valuable time of project’s resources and just use the empirical ranking. In addition, if the organisation or the project manager can provide more information than just a simple ranking, the procedure proposed here also supports a primitive qualitative assessment. For implementing this qualitative approach, the very well known P-I matrix is used, but so as to keep the simplicity, a three level scale is used for both the probability (P) and the impact (I). The scale can be seen in Figure 3.

<table>
<thead>
<tr>
<th>Probability</th>
<th>Impact</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td></td>
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<tr>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
<td></td>
</tr>
</tbody>
</table>

Figure 3: Qualitative scale for risk assessment.

Even though the right approach would be to define certain ranges to define Low to High Probabilities or Impacts the scale can still be used separately. One has to bear in mind that the endeavour is not to come up with an overall exposure or to make comparisons among different projects. The only need is to be able to judge whether it is more probable for one risk or another to happen and respectively if one risk has a more or less serious impact than another. By doing this we end up with groups of risks that have (depending on the scale presented in Figure 3) a Low, Medium or High exposure.

The rank produced from the previous step is used as a guide for the response planning. Responses are identified from the highest in rank risks to the lowest ones. Practise through this study has shown that usually there are quite many risks that may be mitigated with actions of minor cost, such as close follow up or good planning.

The last step of the procedure is risk control. Risk control can be very easily executed by the development and maintenance of a risk sheet. The risk sheet should contain really necessary information that can be gathered with the minimum possible effort. A typical example of such a risk sheet is given in the next section of this paper.
3 Case study

In this Case study section two cases of the same company are going to be discussed in brief. These cases have been chosen from a set of projects that have been studied with the typical and the proposed risk management procedure. The first one concerns a project where the typical risk management process has been followed and the second one concerns a very similar project on which the proposed procedure was used. For reasons of brevity due to the limited available space, only the results of the first project are going to be presented. For more information on this project one can refer to the article published by the same authors in 2001 [13].

3.1 The company

Both projects have been developed by a construction company and in particular by the department activating in housing and office development. The company is part of a major group operating, for over fifty years, in the sector of construction industry. During this period the group executed a multitude of worth-trying projects in several countries and achieved to claim one of the highest positions in the exclusive list of the Engineering News Record Top 250 International Contractors. The group achieved to be one of the most productive and effective International Building and Civil Engineering Contractors, operating efficiently in several countries, mainly in the Middle East, Asia, Africa and Europe.

The present study concerns the Greek market where the group begun operating in 1979. The activities of the group have substantially expanded due to strategic acquisitions and alliances with important contractors. The company seeks to expand its business to neighbouring countries and exploit the maximum of the opportunity appeared since the award of the Olympic Games to Athens.

3.2 Project execution with the typical risk management process

The first case presented in this paper is about the renovation of a building, located in a small town near Athens, named Patra. The aim of this renovation was the building to be used as a host of the Cyprus Bank branch. The most serious concern about this project was that the building was a landmark, so it was of high importance not to ruin its “facade”. For sure it was not the most difficult project that had ever been undertaken by the company, however it was very interesting and tempting since it was quite complex. It is out of scope of this paper to describe the well-known typical risk management process that has been followed, so only the results of the assessment step are going to be presented.

Having identified the risks that might affect the project, the project team had to assess the exposure of each one. People working for the project were guided to quantify the impact of the appearance of a risk and to assign a probability for this appearance to happen. This process was indeed time-consuming since it demanded the acquiring of relevant data and a series of meetings with the company’s experts. A typical risk that was examined was the “Inability to find skilled subcontractors in the region of Patra for woodworking”. Although it was
not the first time that the company ran a project in that region, the fact that Patra is a city of not more than 200,000 citizens, resulted in the risk of not finding subcontractors to perform certain tasks of the project. The project team after reviewing the total qualified subcontractors in the region as well as the current workload estimated that the probability of such an incident was approximately 30%. The project team suggested that if the risk occurs, they had to recruit subcontractors from Athens (approximately 200km away). By a similar process, it was contacted that the project cost would be surcharged by 5515 currency units (cu) and the duration would be prolonged by approximately 10 days. The risk exposure is calculated by multiplication of these numbers with the probability of occurrence i.e. 1654 cu and 3 days. Similar calculations were made for each identified risk. A Monte Carlo simulation was used in order to estimate the real cost of the project taking into account the risks (provided that mitigation actions would have been taken). The simulation resulted in Figure 4.

![Diagram](image)

Figure 4: Results of Monte Carlo simulation for typical risk assessment process.

The initial anticipated cost of the project was 83.697cu, the estimated cost of the project including risks was 106.500cu with a probability of 80% and the actual cost that was really tracked after project completion was 111.218cu.

3.3 Project execution with the proposed risk management procedure

The second case presented hereafter is about another renovation of a building located in a small town, near Athens, named Thiva. The aim of the project was the renovation of the branch of the National Bank of Greece. This project was very similar to the previous one and that is why it was selected for comparison.
The execution of the project (concerning the risk management part) followed the steps described in the methodology.

The identification of possible risks relied primarily on the use of checklists and the methodological meetings led by the authors of this paper. By the latter we mean that the project team was urged through questions and discussion to come up with analytical thoughts about particular events that could influence the project’s outcome.

For each identified risk, a risk sheet was prepared like the one in Figure 5. The risk sheet as can be seen was the tool for risk control (one can see the evolution of Exposure related to Actions’ Implementation), as well.

<table>
<thead>
<tr>
<th>Company Name</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project</strong></td>
</tr>
<tr>
<td><strong>ID</strong></td>
</tr>
<tr>
<td><strong>Risk Name</strong></td>
</tr>
<tr>
<td><strong>Description</strong></td>
</tr>
<tr>
<td><strong>Causes</strong></td>
</tr>
<tr>
<td><strong>Impact</strong></td>
</tr>
<tr>
<td><strong>Probability</strong></td>
</tr>
<tr>
<td>Medium</td>
</tr>
<tr>
<td>Medium</td>
</tr>
<tr>
<td>Low</td>
</tr>
<tr>
<td><strong>Actions</strong></td>
</tr>
<tr>
<td>1/ Arrange the task to be executed during holidays or weekends</td>
</tr>
<tr>
<td>2/ Arrange three shifts for the task</td>
</tr>
<tr>
<td>3/ Remarks</td>
</tr>
</tbody>
</table>

**Figure 5:** Proposed risk sheet.

The overall ranking at the start of the project ended up with the list of risks presented in Figure 6.
As stated in the methodology, the main effort of the project team was put in identification and the formation of proper response actions planning. The basic qualitative process used in that project for the ranking of risks consumed less than 5% of the time that has been consumed in the assessment step of the previously described project. Moreover, there is a tendency for management techniques to be confronted as no added value by those who do not belong to the senior management team. Nevertheless, the procedure met less resistance from the inferior staff as it demanded less time.

The final result of the “Thiva” project concerning cost was as follows: The initial anticipated cost of the project was 61.348cu and the actual cost was 79.987cu. The increase in cost of this project is 30.4% when the same index for the “Patra” project is 32.9%.

<table>
<thead>
<tr>
<th>ID</th>
<th>Risk Name</th>
<th>Exposure</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Stop branches operations</td>
<td>High</td>
<td>02/09/03</td>
</tr>
<tr>
<td>1</td>
<td>Inability to find skilled subcontractors</td>
<td>High</td>
<td>02/09/03</td>
</tr>
<tr>
<td>3</td>
<td>Changes in already constructed parts</td>
<td>High</td>
<td>02/09/03</td>
</tr>
<tr>
<td>7</td>
<td>Violation of the security system of the Bank</td>
<td>High</td>
<td>02/09/03</td>
</tr>
<tr>
<td>2</td>
<td>Public disturbance</td>
<td>Medium</td>
<td>02/09/03</td>
</tr>
<tr>
<td>9</td>
<td>Accidents due to branch’s operating</td>
<td>Medium</td>
<td>02/09/03</td>
</tr>
<tr>
<td>11</td>
<td>Reduced productivity due to branch’s operating</td>
<td>Medium</td>
<td>02/09/03</td>
</tr>
<tr>
<td>4</td>
<td>Good communication with the customer</td>
<td>Medium</td>
<td>02/09/03</td>
</tr>
<tr>
<td>8</td>
<td>Changes asked by the customer</td>
<td>Medium</td>
<td>02/09/03</td>
</tr>
<tr>
<td>6</td>
<td>Revealing of ruins</td>
<td>Low</td>
<td>02/09/03</td>
</tr>
<tr>
<td>10</td>
<td>Loss of property</td>
<td>Low</td>
<td>02/09/03</td>
</tr>
</tbody>
</table>

Figure 6: Ranking of risks at the start up of the project.

4 Conclusions

The same results as those presented in the Case Study section have been faced in a set of projects managed with the typical process or the proposed procedure and analysed by the authors. The conclusion that has been drawn is that whether we perform an extensive assessment of risks or just a simple prioritisation, the final result of the project is almost the same. Moreover, the less time the procedure consumes, the less resistance is opposed by the project team.

Aim of this paper is not at all to undermine the importance of analytical assessment techniques. On the contrary, the authors are persuaded that in really complex and highly demanding (in terms of decisions that have to be taken) projects, quantitative techniques have to be used. However, in less extensive projects and especially when one has to succeed in proving the benefits coming from risk management, a more flexible, though quite efficient, procedure as the one proposed should be used. In a nutshell, a quick and easy to use procedure may be the Trojan Horse that should be used by someone of our risk-community in order to be given the chance to show the benefits that stem from risk management. On the other hand, there are many cases where highly appreciated and best in class risk management methodologies
have been given up as the organisation that they were implemented on did not
have the appropriate maturity level.

The lesson learned is like the Greek proverb “Starting something is the half
way to fulfil it”!

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