JASPERS

Cost Forecasting and Programme Management

Task 10 Report - Risk Management

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1 Introduction

1.1 Overview of objectives

This report concerns Task 10 (Risk Management) of the Cost Forecasting and Programme Management (CFPM) Study. The CFPM Study is being undertaken for JASPERS. The main objective of the Study is to review the way in which costs associated with major transport infrastructure projects are forecast and managed[1]. Task 10 should *Develop Guidance on Risk Management during the Project's Lifecycle.*

A Task 10 report has been written for each participating country. This overview report aims to consolidate the observations on risk management practice within the participating countries and relate these to recognisable risk management best practice. A Best Practice Guideline is included in Appendix A of this report. This Guideline comprises an amalgam of proven risk management practices worldwide.

1.2 Purpose

The primary purpose of Task 10 is to understand how the management of risk currently informs the project cost estimate at appraisal, the selection of procurement and delivery structures and thereafter contributes to the cost outturn. This review compares how risks are currently managed compared to best practice. As individual country Task 10 reports have already been written, this overview report provides commentaries on common themes, as well as notable (good and bad) risk management practice.

1.3 Scope

Risk management practice, at all project lifecycle phases, has been reviewed. Data have been collected from both rail and road beneficiaries, as well as selected government ministries. Reviews have concentrated on the four key risk management elements, namely risk identification, risk assessment (including risk analysis), risk response planning and risk monitoring. This report also looks at risk management planning and the management of risk at programme (i.e. project portfolio) level.

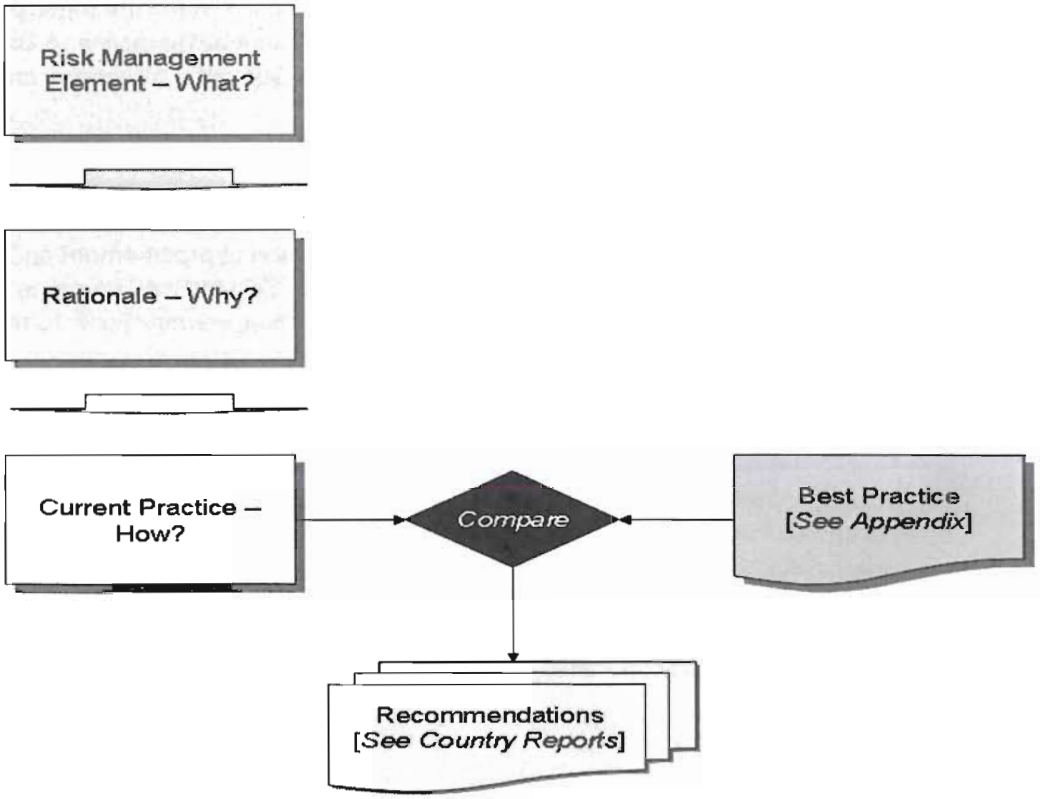
[1] The Study is concerned with major projects defined as those involving a total investment value in excess of Euro 50 million. The scope covers road and rail projects which typically (but not necessarily) are being financed using European Commission funds.

2 Review Methodology

2.1 Introduction

A rationale for applying each risk management element is given below. A commentary is then provided on how participating countries typically apply each element. This current practice is then compared to the *Guideline* in Appendix A. The *Guideline* does not provide detailed guidance on applying each technique, but it does explain their function(s) and the benefits of applying them.

Figure 2.1 – Task 10 Review Process



2.2 Data Collection

To understand current risk management practice, data were collected from the road and rail beneficiaries. Raw data from these interviews are appended to Task 10 reports for each country.

2.3 Classification Scheme for Observations

Commentaries and observations are provided for each risk management element (e.g. planning, identification, assessment etc.). As this report attempts to summarise risk management practice across all participating countries, observations are necessarily general.

All risk management elements, mentioned in Section 1.3, are, arguably, equally important. Recommendations are therefore categorised according to the size of the gap between current and best risk management practice. The category of each risk management element is given in parentheses next to the Level 3 heading, together with a reference to where in Appendix A related guidance can be found. The categories are:

Category 1: Significant gap between current and best risk management practice: no or very little evidence of best practice. Scope for considerable improvement;

Category 2: Moderate gap between current and best risk management practice: some evidence of best practice;

Category 3: Minor gap between current and best risk management practice: best practice is commonplace.

3 Review Results

3.1 Observed Risk Management Guidance

The EC's *Guide to Cost-Benefit Analysis of Investment Projects* provides guidance on the methodology to be followed in determining the financial and economic justification for major projects. Although useful as a guide for inputting into a transport infrastructure improvement business case, it is viewed by some stakeholders as an academic exercise and, consequently, is not always applied.

Few participating countries have their own dedicated procedures. In the absence of clear guidance from beneficiaries, risk management practice within each country can be inconsistent. Of those that do have their own procedures, Latvia's Procedure Nr 14[2] provides insufficient guidance for the risk practitioner. Bulgaria's *Instruction for Assessment and Management of Risk* and Estonia's new quality assurance plan will be reviewed in the final version of this report. In Romania, NCMNR's new specialist risk unit *Management of Irregularities, Risk and Audit* has recently drafted its *Risk Management Guidebook – Clarification Note & Procedural Clarifications* for application by end 2009. It contains a recognisable risk management process and guidance on the principal risk management elements. Guidance on risk assessment, however, could be clarified, so that the reader knows what the key risk measures (e.g. cost, schedule) are.

Design consultancies, employed by the beneficiaries, use their own methods of risk assessment when developing preliminary and technical designs. Although the reviewer has not had sight of their procedures, selected outputs (e.g. risk registers) have been received and generally accord with good practice. It would beneficial, in terms of project governance and internal control, for beneficiaries to get a better understanding of their consultants' risk management procedures. Together with knowledge of the attached *Guideline*, this would allow them to judge whether the procedures are indeed appropriate and, eventually, to develop procedures for their design consultants to apply.

3.2 Risk Management Planning

3.2.1 Rationale for Risk Management Planning

Planning of risk management processes is important to ensure that the level, type and visibility of risk management accords with the importance a beneficiary attaches to an individual project. It is fundamental to the successful performance of the remaining risk management elements.

3.2.2 Commentary on Risk Management Planning Practice (Category 1.01 – see A4.2)

As with many of the other risk management elements, risk management planning may be being considered, but there is little or no documented evidence. Even Romania's NCMNR *Guidebook* is silent on risk management planning, although the need for it is mentioned in the introduction.

3.3 Risk Identification

3.3.1 Rationale for Risk Identification

A comprehensive list of project cost risks (i.e. threats and opportunities) needs to be identified if the associated assessment results are to be admissible.

3.3.2 Commentary on Risk Identification Practice (Category 2.01 – see A4.3)

The quality of risk identification is varied. Risk perception by many beneficiaries is based primarily on experience of comparable historical projects. This can provide a reliable means of risk identification, but only if the list of risks is comprehensive and the data are

[2] See A5 references

representative and recorded. The Czech Republic's road administration, RSDCR, has a 'catalogue' of historical risks and associated mitigation measures, which it updates every two years. This has been requested and will be reviewed as part of the final version of this Report.

Such a technique, however, needs to be complemented by other risk identification methods in order to arrive at a comprehensive list of risks. There are several reliable techniques that could be used to supplement risk-related information from historical projects. Indeed, the Romanian roads administration, NCMNR, has a *Risk Management Guidebook* which includes a comprehensive list risk identification guidewords in *Attachment 5: Risk Index* to prompt the systematic identification of project-specific risks.

3.4 Qualitative Risk Assessment

3.4.1 Rationale for Qualitative Risk Assessment

A preliminary, qualitative assessment of risk exposure highlights the more significant risks. It, therefore, prioritises risks and effort for more detailed quantitative risk analysis and risk response planning.

3.4.2 Commentary on Qualitative Risk Assessment (Category 2.02 – see A4.4)

Some risk classification schemes, for judging risk probability and impact values, have been reviewed (e.g. Latvia and Romania). They are qualitative in nature and can be used to rate identified risks. What is missing is a clear linkage between the classification scheme and those risk measures (especially cost) that are important to the beneficiary. If a classification scheme includes methods for assessing individual risk measures, it forces risk consequences to be described more clearly in terms of impact on the relevant risk measures. This, in turn, will make the process of responding to identified risks easier, more effective and more efficient.

3.5 Quantitative Risk Assessment

3.5.1 Rationale for Quantitative Risk Assessment

Cost risk quantification can help quantify a project's likely outturn cost and consequently inform monetary contingencies. It can also be used to review outstanding contingent reserves[3] post award of contract. This exercise can also contribute to the ongoing refinement of the scoping, costing, scheduling and procurement/delivery elements

3.5.2 Commentary on Quantitative Risk Assessment (Category 1.02 – see A4.5)

Percentage uplifts to base cost estimates are typically used to determine cost contingencies at each lifecycle stage. These uplifts may well be informed by a beneficiary's perception of project risks, but are often fixed or capped. They do not appear to be based on comprehensive risk assessments, which can be scrutinised or audited. There are two potential adverse consequences: the first is that a percentage uplift is applied unnecessarily, thereby making the project prohibitively expensive; the second is that the outturn cost is underestimated and the beneficiary/ state treasury has to fund the shortfall once EC grant funds are exhausted.

For the Czech Republic's RSDCR, the project costs at outturn very rarely exceed the estimate at appraisal. RSDCR follows a process by which historical unit price data are recorded and used to inform cost estimates. This process may be one of the main reasons for this good performance. Importantly, all tendered prices, not just those submitted by the successful bidder, are used populate MoT databases with average prices for each item. Prices, therefore, are market-tested and reflective of prevailing market conditions. This process is similar to Task 9 of this Study, which has involved collecting historical cost data, from all participating countries, from three points in a project's lifecycle, namely appraisal,

[3] By "outstanding contingent reserves" we mean assessments of monetary contingency as the implementation phase develops and either money is drawndown from the contingent fund or impact timeframes pass without risks occurring.

contract award and completion. The output is a series of uplift percentages to be applied from project appraisal to contract award.

Quantitative risk analysis (QRA), using Monte Carlo simulation, is not commonplace; the only examples being observed in Estonia, Lithuania and the Czech Republic. In all cases these appeared to be used to support EU funding applications rather than official methodologies used on all projects. Unfortunately, the Estonia example only modelled two risks, one threat and one opportunity. The reliability of the output results in informing a reliable cost contingency was, therefore, questionable. The Czech example also modelled only two risks. The Lithuanian example modelled nine risks which had been identified as the critical risks.

3.6 Risk Response Planning

3.6.1 Rationale for Risk Response Planning

Risk identification and assessment is a worthless exercise unless responses can be developed and implemented. Indeed, the effectiveness of responses directly determines whether risk exposure remains within tolerable limits.

3.6.2 Commentary on Risk Response Planning (Category 1.03 – see A4.6)

As with other risk management elements, there is little evidence that risk response planning is systematic. The project risk register needs to include detailed risk response planning information at all project lifecycle phases. By so doing, it demonstrates that the beneficiary understands what the key risks are and has planned to ensure its related exposure is kept within tolerable limits

Alternative procurement structures (especially design and build, design-bid-build) are used by beneficiaries in an attempt to optimise risk transfer. Common risks (e.g. inflation and exchange rate fluctuations, contractor default) are allocated under terms and conditions of contract. However, without a comprehensive list of project risks (see Section 3.3.2 above), it is difficult to justify selection of a particular procurement or delivery structure as providing optimal risk transfer.

Contractual clauses tend to be standard NEC Red Book and Yellow Book. The Czech Republic's RSDCR, however, does adjust its contractual clauses to account for experience of comparable historical projects.

The allocation of contingent reserves, as a risk acceptance strategy, is discussed in Section 3.5.2.

3.7 Risk Monitoring and Control

3.7.1 Rationale for Risk Monitoring and Control

It is critical that the risk management process monitors a project's risk profile and the actions taken to manage it, because risk exposure can change over time owing to the:

- Implementation of risk response measures
- Emergence of new risks
- Occurrence of risk events
- Passing of risk impact timeframes.

3.7.2 Commentary on Risk Monitoring and Review (Category 1.04 – see A4.7)

For most beneficiaries, the maintenance of a project risk register is not a requirement. Design consultancies maintain their own risk registers, but are not required to submit them to clients for review. Beneficiaries are, therefore, not only failing to retain auditable records to help manage risks effectively on current projects, they are missing an opportunity to learn lessons to benefit future projects/programmes.

3.8 Programme Risk Management

3.8.1 Rationale for Programme Risk Management

Beneficiaries can reap benefits by managing their projects in a coordinated manner. By clarifying a programme's success criteria and related requirements, programme management teams can ensure:

- Suppliers are suitably prepared on award of contract;
- Consistent application of PRM best practice by suppliers;
- Reliable and timely indication of programme risk exposure (cost and schedule);
- Prioritised expenditure on risk response planning;
- Reduced chance of incurring financial losses (e.g. from delays and scope changes).

3.8.2 Commentary on Programme Risk Management

There has been little evidence of documented risk management at programme level. However, it is possible that there is some form of implicit programme risk management as part of the process of compiling operational programmes. In other words, beneficiaries select projects for inclusion in operational programmes based on some understanding of the aggregated risk exposure.