INTEGRATING RISK

AND EARNED VALUE MANAGEMENT

A White Paper

BMT

risk decisions
management solutions

Contents

Introduction

In most organisations, Risk and Earned Value (EV) Management are undertaken as separate processes. More often than not, even where the need for a level of integration has been recognised, processes are not in place to assure the correct use of data derived from each of the disciplines. The traditional roles of Risk and EV Management are considered below:

Risk Management is primarily concerned with future events:

- Identifying the potential threats to the programme or project objectives
- Assessing their significance, in terms of probability and impact
- Planning the mitigation strategies to deal with them
- And finally monitoring the effectiveness of the process.

All of this seeks to increase the chances of meeting the baseline time, cost and performance targets.

EV Management on the other hand, is mainly concerned with progress and performance to date, and what is happening at 'time now'. The trend data provided through the collection and analysis of the EV data, if accurate and stable, can provide the basis upon which to make sound predictions in the form of 'Estimates at Completion'. In some organisations these predictions also 'take account' of the risks identified in the relevant areas of the programme.

Integrating information provided by the Risk and EV Management processes properly leads to a far broader and more robust approach to running the programme. This paper considers the benefits of, and some of the key issues related to, integrating these complementary processes.

Integrating Risk and Earned Value Management Processes

Risk and EV Management share common frameworks. EV Management requires a Work (or Project) Breakdown Structure, containing costs, timescales, budgets, and product definitions. When combined with an organisation breakdown structure, one has a logical framework for identifying risks to programme objectives, deciding ownership, and formulating and managing mitigation plans.

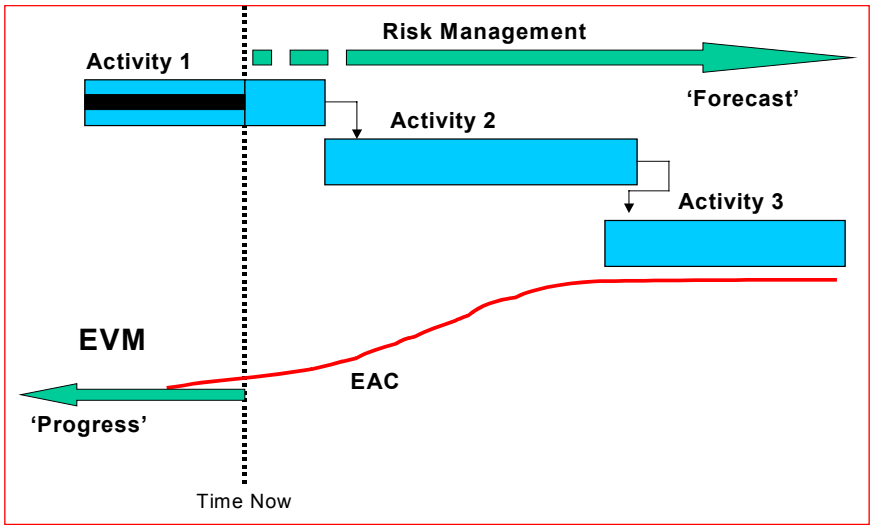


Figure 1. Risk and EV Management – The Synergy

Prior to contract let, a proper risk-based analysis of the proposed performance management baseline will result in a more realistic setting of Management Reserve and a far better understanding of the key areas of uncertainty in a project. Post-contract let, the processes interact in:

1) Monitoring progress
2) Forecasting activities.

<u>Process interaction – progress</u>

In terms of progress to date and what is happening at 'time now', the greatest influence of the Risk Management process upon the EV system should be through the implementation of risk mitigation actions. A robust risk process will provide pre- and post-management assessments of each risk, to justify expenditure on the risk management strategy. The strategy itself will include mitigation or fallback actions/activities.

Many of these actions will require resource and budget not included in the original baseline. In a mature EV and Risk Management culture, there will be a desire to embed these actions into the baseline programme.

Where the baseline activities cannot accommodate such actions, additional resource and budget will be required i.e. they will require a 'draw down' on Management Reserve. Links are therefore required with the change management and planning elements of the EV system.

Process interaction – forecasting

Control account/project managers must make predictions in the form of 'Estimates at Completion' (EACs). These timescale and cost predictions, should take account of the potential impact of risks on each work package in the programme. Regular outputs will be required from the Risk Management system to support monthly variance reporting. The outputs of qualitative and quantitative risk analysis can enhance this information.

A straightforward qualitative analysis of the risks and associated mitigation strategies etc. owned by a control account manager will inform the estimating process. However, quantitative analysis would strengthen this approach. In a mature Risk Management culture, a three-point estimating process will underpin quantitative timescale and cost risk analysis. As a result, sensitivity analysis and 'what if' scenarios, can be considered at both overall programme and sub-system levels to:

Determine whether or not risk management strategies have been formulated, and if so whether they have been integrated within the baseline programme

Assess whether these mitigation or fallback strategies are having the anticipated impact – a real measure of the effectiveness of risk management.

The probabilistic outputs from this quantitative analysis contribute to the debate about risk management strategies, and can be compared with the EV-based predictions. Percentage confidence levels (for timescale and budget predictions) can be directly compared with EACs. Significant variances can be investigated.

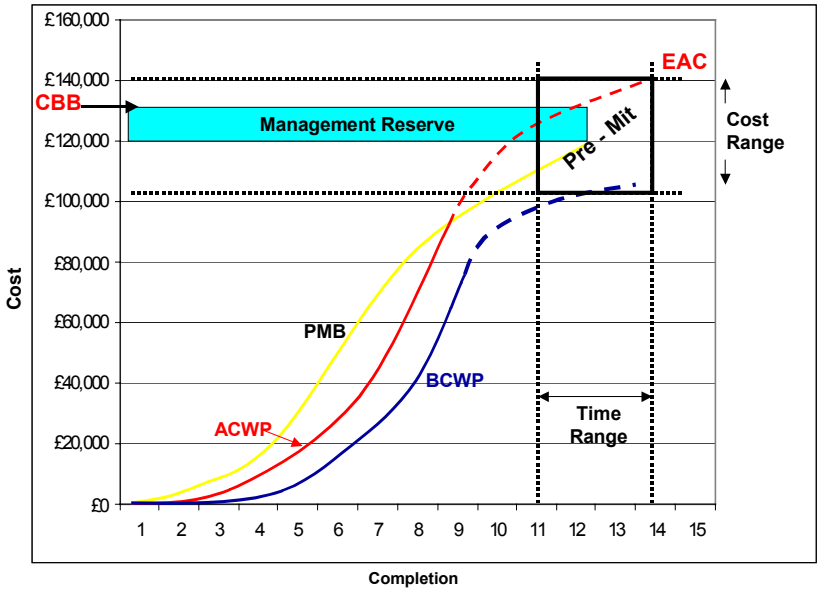
Using Risk Mitigation to Improve Value

An EV Management system requires us to establish a Performance Measurement Baseline comprising an integrated schedule and associated set of time-phased budgets. The Performance Measurement Baseline and the agreed Management Reserve then combine to provide a Contract Budget Baseline.

The tracking of the Actual Costs of Work Performed and Earned Value allows there to be a predictive/trending process. Associated with this, the calculation of 'Estimates at Completion', and cost and schedule variances can be determined.

A well-structured Risk Management process will allow the compilation of a robust risk and opportunity register upon which qualitative and quantitative risk analysis can be undertaken. The quantitative outputs of cost and timescale analysis can be overlaid onto the EV system outputs, as shown in the figure below.

Figure 2: Quantitative Risk Analysis vs. EV Management Forecast



Key

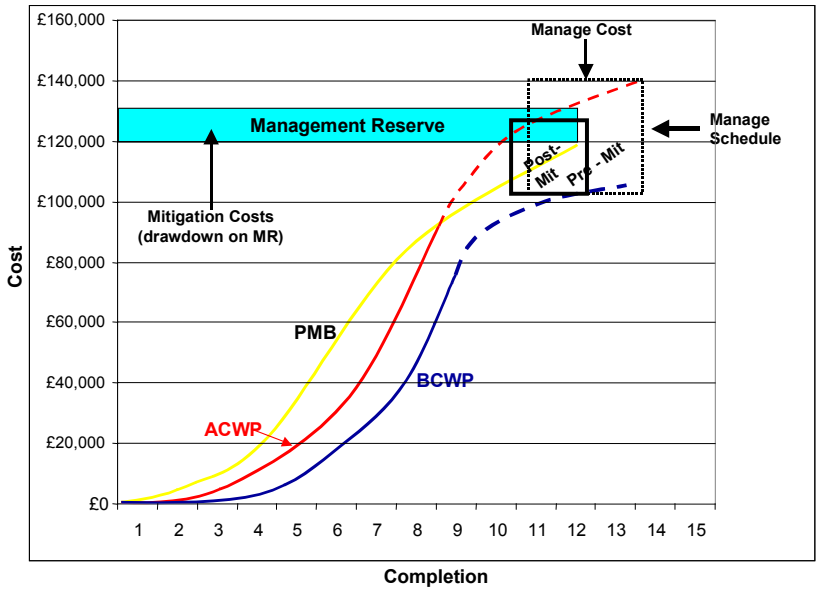
ACWP – Actual Costs of Work Performed
CBB – Contract Budget Baseline
PMB – Performance Measurement Baseline
BCWP – Budgeted Cost of Work Performed
EAC – Estimates at Completion

Quantitative analysis, undertaken in an appropriate simulation tool, allows the production of probabilistic outturns of cost and timescale in the form of percentage confidence levels. First, we can consider the pre-mitigation scenario. The pre-mitigation box, shown above, is bounded by the 10% confidence to the left and bottom, and by the 90% confidence to the top and right.

However, of more significance is the post-mitigation scenario (see below), which shows the effect of risk on cost and schedule assuming successful implementation of mitigation actions.

Comparing the EV-based predictions against that of the quantitative risk analysis can help determine the amount of risk management activity necessary to protect the Performance Measurement Baseline and whether or not this is affordable.

Figure 3: Post-Mitigation – Quantitative Risk Analysis *vs.* EV Management Forecast



Key

ACWP – Actual Costs of Work Performed
CBB – Contract Budget Baseline
PMB – Performance Measurement Baseline
BCWP – Budgeted Cost of Work Performed
EAC – Estimates at Completion
MR – Management Reserve

By drawing down on Management Reserve, we can begin to manage cost and timescale impacts, and through cost-benefit analysis try to determine an acceptable 'post-mitigation' position against the Contract Budget Baseline.

However, to achieve this there needs to be confidence in the figures underpinning the predictions. The challenge in achieving this confidence is to:

Ensure that the output data from the Risk and EV management processes are robust and consistent.

Integrate this output data in a straightforward and practical way.

Project/programme specifics must be addressed in any process developed to support this integration, but a key issue that all organisations must manage is outlined below. The generation of risk exposure forecasts and estimates at completion both require the inclusion of risk mitigation action costs.

The danger is that the risk mitigation costs are double-counted, or worse not counted at all. This is illustrated in below.

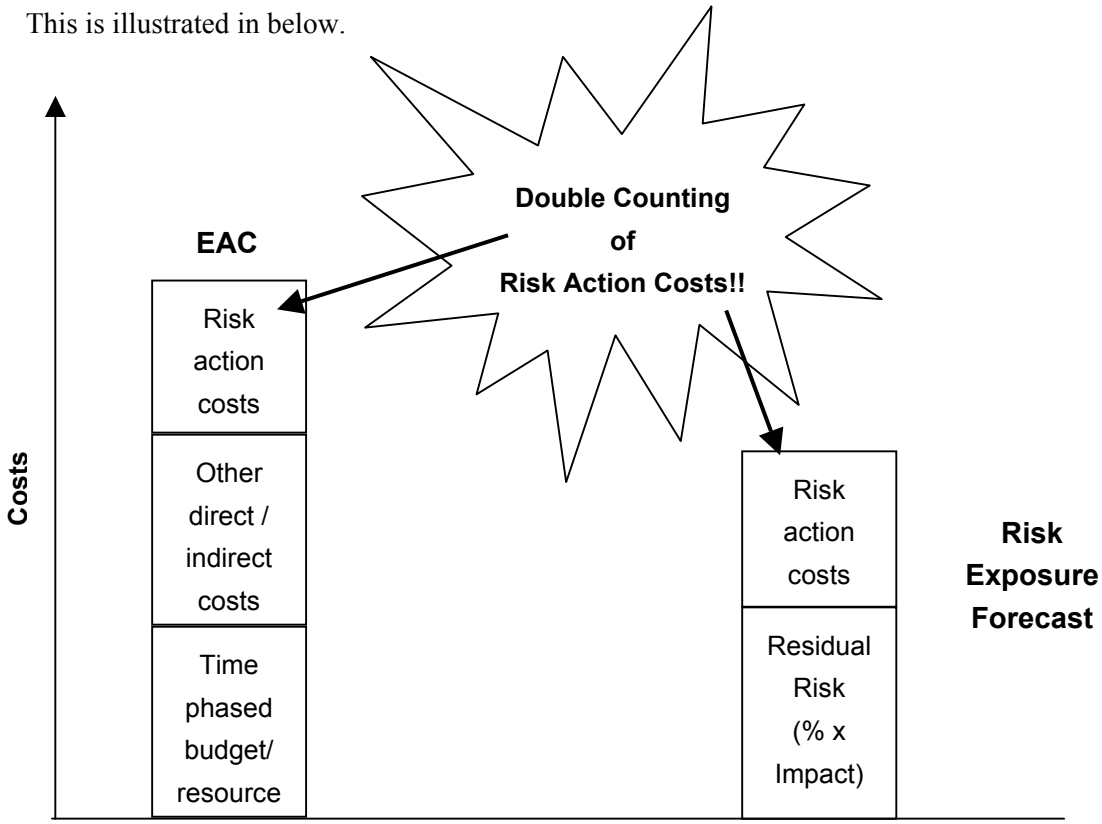
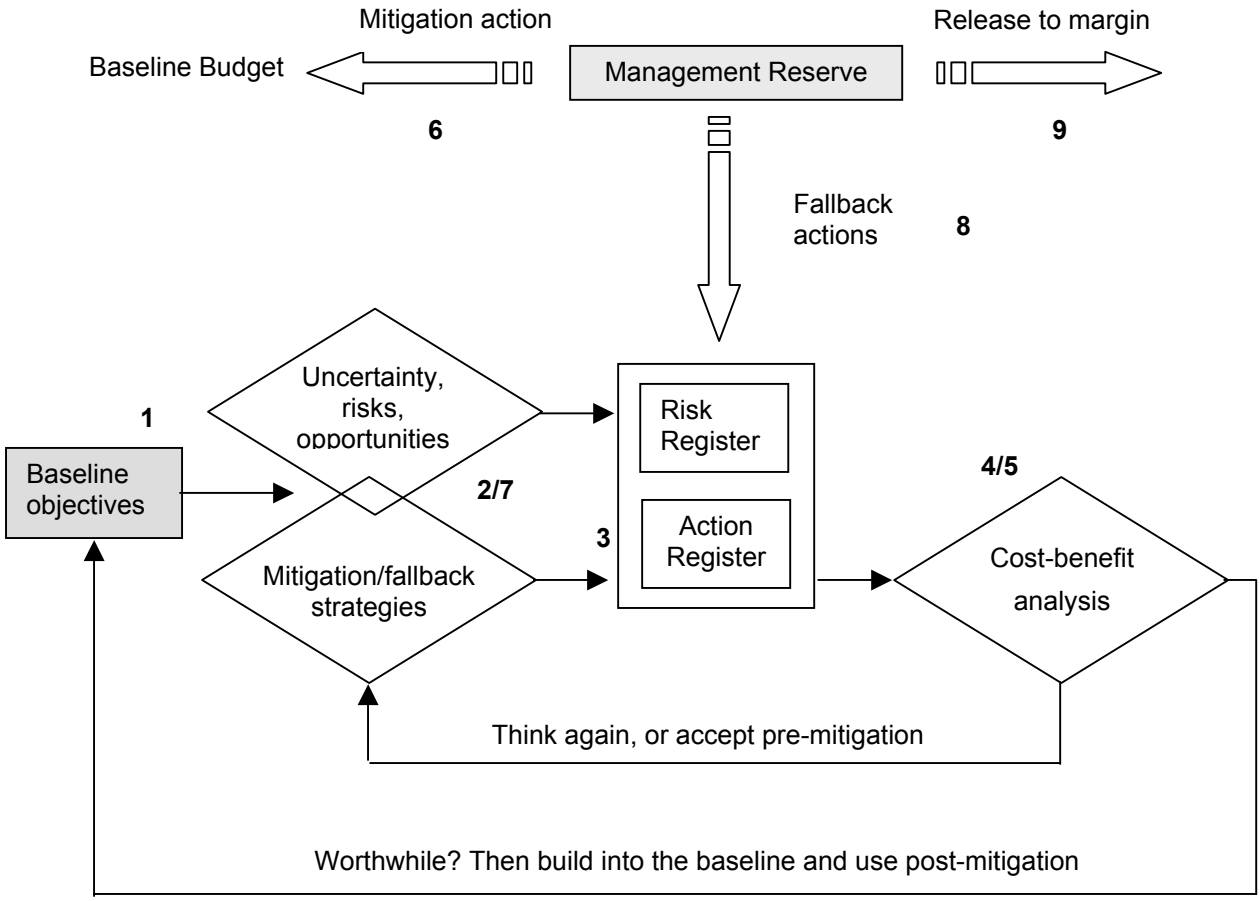


Figure 4: Potential Double Counting of Risk Mitigation Costs.

An Integration Approach

An integrated approach, aimed at addressing the 'double counting' issue is outlined below.



1) Agree the Performance Management Baseline around project objectives of time, cost and performance (the deliverables). This, together with the Management Reserve forms the Contract Budget Baseline (see Figure 1).

2) Identify risks and opportunities using the structure provided by the Performance Management Baseline, which as been generated through a robust EV process.

3) Develop mitigation and fallback strategies and record these in an action register.

4) Assess each individual risk/opportunity to ensure that the actions chosen are cost-beneficial. Although of course, cost is not the only consideration.

5) Undertake a more holistic cost-benefit analysis to prioritise which mitigating actions to undertake: since projects are cash and resource constrained, they generally cannot afford to undertake all the actions.

6) Transfer actions, once approved, into the baseline plan, drawing down from Management Reserve into the baseline budget. This is effected through the Baseline Change Request or similar. The process ensures a) The movement of planned activity and budget to the

baseline; and b) that risk actions are 'flagged' (in the register/database) in such a way that they are no longer included in any risk exposure calculation.

7) Assess new risks and opportunities as they are identified, as alternative scenarios or mitigation strategies are formulated, or the availability of budgets/resources changes.

8) As the residual, un-mitigated risks happen draw budget for fallback actions down from Management Reserve.

9) Finally, high performing programmes release Management Reserve to margin.

Benefits of Integrating Risk and EV Management

Integrating the Risk and EV Management processes delivers significant benefits pre- and post-contract award:

- Identifying and assessing the key programme risks and allowing for the cost and time to carry out mitigating actions ensures that a more realistic baseline is established pre-contract
- Taking a view of the programme's post-mitigation (residual) risk exposure informs the decisions and negotiations surrounding the provision of Management Reserve.
- Identifying and assessing the risks to a programme, and proactively managing the risks, opportunities and mitigating actions increases the chances of meeting the baseline time, cost and performance targets

Predictions (in the form of Estimates at Completion) based on EV data will be more accurate and realistic if they properly take account of the identified risks in the programme

Finally, a broader and more robust picture of the programme promotes improved confidence amongst stakeholders and customers.

Conclusion

The benefits of bringing together the Risk and EV Management disciplines are clear, pre- and post-contract award. What is required however, is a pragmatic approach to the integration of the supporting systems.

Management Reserve presents a particular challenge, since both disciplines have a call on it. Management Reserve is a key component of EV Management systems: along with the agreed Performance Measurement Baseline, it forms the Contract Budget Baseline. It is therefore essential that programmes can manage Management Reserve effectively and appropriately.

Management Reserve is also central to risk management. The most important aspect of effective risk management is the identification, implementation and management of actions that mitigate risks and exploit opportunities. These actions require funding, via draw down of Management Reserve.

This paper suggests an approach for ensuring that the risk mitigation costs (a key component of Management Reserve) are not double-counted.. However, this has implications for both the customer and supplier. A good, trusting relationship is essential for communicating risks and agreeing ownership. Finally, there may be a need to take a more pragmatic approach to contracting in the future.

This paper was presented in two parts over the first and second *UK International Performance Management Symposiums* held in October 2002 and October 2003 respectively.

About Risk Decisions Ltd

Risk Decisions has a well-established reputation for delivering best practice risk management solutions to major corporate and government organisations worldwide. These solutions are based on the Predict! software, training and technical helpdesk support, and risk and opportunity management services.

Our Predict! software gives you a user-friendly, scalable, flexible and secure environment for identifying risk exposure at every level in your organisation, and for proactively managing critical risks, opportunities and management strategies. By communicating better information about risks and opportunities, Predict! enables you to make better decisions about your business and programmes, and to be confident of achieving objectives on time and to budget.

We also provide robust and practical risk and opportunity management services based on best practice, and delivered by our experienced professionals. Each client has unique requirements and we place this foremost in our minds when seeking the best solution for an organisation. We work closely with our customers, transferring skills via training and on-going support to ensure that these solutions become embedded into their organisations for long-lasting effect.

In a business environment where effective risk management is essential, you can rely on Risk Decisions' experienced risk professionals to provide long-term expert support.

About BMT Sigma Ltd

Based in the City of Bath, BMT Sigma's experience and expertise in through life Integrated Performance Management provides the business support to enable you to meet your customer's needs. They achieve this by becoming a true partner and an integral part of your team, acting as an informed independent adviser on strategy and implementation. The company is part of British Maritime Technology, an independent international technical consultancy based in Teddington, London.

BMT Sigma staff are experienced in supporting the development and maintenance of a strategic overview from concept to disposal, providing the tools, techniques and processes to achieve governance, control and assurance objectives. Integrating business improvement, programme management and systems engineering processes greatly increases the likelihood of meeting strategic objectives at project or organisational level.

At a tactical level their staff work within and move between functionary boundaries, identifying critical interdependencies and forcing "lateral information flow". They supply the real time feedback on project progress to the strategic level.

In addition to their technical skills, experience and domain knowledge, BMT Sigma staff are able to communicate clearly and concisely at all levels within an organisation. It is this, combined with their independence and objectivity that enables them to gain rapid acceptance and respect.

For further information contact:

Risk Decisions Ltd
Buchan House, Parkway Court
Oxford Business Park South
Oxford, OX4 2JY, UK
T: +44 (0)1865 718666
F: +44 (0)1865 718600
E: enquiries@riskdecisions.com
www.riskdecisions.com

BMT Sigma Ltd
5 Riverside Court
Lower Bristol Road
Bath, BA2 3DZ, UK
T: +44 (0)1225 820980
F: +44 (0)1225 820981
E: info@bmtsigma.co.uk
www.bmtsigma.co.uk

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