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Risk management – component of cost analysis

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Abstract:

Risk management is the primary job of a project manager. Every project management technique is in fact a risk management technique. Some of techniques reduce the risk of being late and some of them reduce the chances of overrunning the budget. The present paper gives a short idea of how the risk management influence the cost of a product and how the cost can be reduced. The paper also includes a short explanation about the differences between uncertainty and risk as they are perceived from the project management perspective.

Key words: Risk management, uncertainty, probability, impact, risk value, contingency, price analysis, cost analysis.

1. Introduction

Life is full of uncertainty. But why project managers usually call that risk? It is just a confusion created around these two terms basic to any decision making framework or they know that without uncertainty, there is no risk?

As per PMI “Risk is an uncertain event or condition that, if occurs, has an effect on at least one project objective”. Risk impact may be positive or negative and more importantly it can be measured, or more appropriately it can be guessed.

Personally I believe that all project management theories and methods have been developed for the Industry where the good management of the projects is vital for the survival of a Company. Even if the governmental institutions adopt some project management methodologies (internal developed or implementing existing ones) their existence does not depend on such methodologies. This is the reason why from time to time we should re-understand the real life challenges.

The goal of the next few pages is to make people aware of the risk management influence on building up the price for a product and not to describe the Cost Risk Analysis process. The scope of any kind of risk analysis is to produce a defensible assessment of the level of cost to budget such that this cost has an acceptable probability of not being exceeded and is important to understand why sometimes a price looks “unfriendly”.

2. Uncertainty versus risk

In every project there is uncertainty about the schedule, the cost and the quality of the end product. How can this uncertainty be managed?

Risk management is the means by which uncertainty is systematically managed to increase the likelihood of meeting project objectives. The key word is *systematic*, because the more disciplined the approach, the more we are able to control and reduce risks.

Risk management – component of cost analysis

In the “unexpected” world there are project managers ready to deal with the unknowns. The language of project management risk management comes with the following explanations:

- *Known unknowns* – represent identified potential problems, such as the possibility of a strike when labor contract expires, or enough snow to stall a construction project during winter. We don’t know exactly what will happen, but we do know it has a potential to damage our project and we can prepare for it.
- *Unknown unknowns* – are the problems that arrive unexpectedly. These are the ones you honestly couldn’t have seen coming. But project managers do expect them, because they know something unexpected always happens.

Consequently, in order to express the difference between the two terms, we can consider the following statements having the same high probability of being true:

- Risk can be defined as imperfect knowledge where the probabilities of the possible outcomes are known, and uncertainty exists when these probabilities are not known
- Risk involves the possibility of future events the probabilities of which can be calculated. If there is incomplete information and the expected value of occurrences cannot be determined, those elements are uncertainties.
- The more uncertainty, the higher the risk of making a poor decision.
- Uncertainty is the indefiniteness about the outcome of a situation - it includes favorable and unfavorable events. We analyze uncertainty for the purpose of measuring risk!

A more common usage of these terms would state uncertainty as imperfect knowledge and risk as uncertain consequences. If a person says “I am uncertain about the weather tomorrow” this would be a value-free statement implying imperfect knowledge about the future. If this same person says “I am planning a picnic for tomorrow and there is a risk of rain”, now he or she is indicating preference for an alternative consequence. Taking a risk can now be defined as exposing one’s self to a significant chance of injury or loss.

Risk management is the process of managing the identified risks in order to reduce the probability of them occurring and planning how to deal with them should they occur.

The PMBOK provides excellent guidance on techniques to use for the management of risk and the PRINCE2 manual provides an effective approach to embedding risk management within the PRINCE2 Framework.

3. Identifying risks and assigning risk value

As explained in the introductory chapter the scope of this document is to raise the awareness of the governmental institutions regarding the mechanisms behind the price building process. Therefore the example given below is very simple just giving a flavor of the brainstorming related to Cost Risk Analysis process. The professionals know that Monte Carlo simulation remains the best technical practice but further work is needed by the community on ways to simplify the presentation of its outputs (and meaning) to senior decision-makers.

Prior to entering risks in to the risk log the key risks to the project need to be identified. This is not an activity for the project manager alone. Depending on the size of

Risk management – component of cost analysis

the project anywhere from 2 to a dozen people may be required to do an adequate Risk Analysis of the project. This typically would include: technical leads, Information Assurance experts, contracting officers, etc.

The identification of risks at an early stage is essential if the project is to have any chance of remaining within budget and on time. Ignoring risks is not acceptable in any project.

Similar projects, historical data, personal knowledge, knowledge of experts in the field are all sources for identifying risks to the project and each should be approached. For larger projects a meeting dedicated solely to the identification of risks is a very good investment.

Once a set of risks to the project have been identified a high level cut can be made; very unlikely occurrences, as well as those which would make the project superfluous can be set aside. The remaining risks should be listed and assigned a probability and impact rating. The probability is the evaluated likelihood of a particular outcome actually happening and the impact is the evaluated effect or result that particular outcome. The impact should ideally be considered under the elements of time, cost, quality, scope, benefit or people.

It makes sense on time sensitive projects to provide an impact rating for time and for cost; using man days for time and Euros for cost.

The value of a risk is the product of the probability and the impact, for example:

Risk A: (Probability) 0.8 x (Impact) €30 000 = (Risk Value) €24 000

Risk B: (Probability) 0.1 x (Impact) €130 000 = (Risk Value) €13 000

Risk C: (Probability) 0.5 x (Impact) 40 Man Days = (Risk Value) 20 Man Days;

4. Risk mitigation

Calculating a value for a risk makes it possible to evaluate whether mitigating action is cost effective or not. Mitigation is an activity that is carried out and is paid for by the project to reduce the probability of a risk occurring. For Example:

Risk A: (Probability) 0.8 x (Impact) €30 000 = (Risk Value) €24 000

Spending € 000 to purchase new software reduces the probability of the risk occurring from 0.8 to 0.05.

Risk A: (Probability after Mitigation) 0.05 x (Impact) €30 000 = (Risk Value) €1 500

Whilst the Impact is unchanged should the risk still occur, the risk value is significantly reduced by the mitigating action. Hence, in this example, it makes sense to spend € 000 to mitigate the risk.

5. Contingency

The purpose of a contingency budget is to deal with risks that materialize while the management reserve is to deal with uncertainty. The size of the contingency budget should be large enough to deal with the identified risks. However, it may not be possible, or necessary, to have a contingency budget that would cover the cost of the impact of every risk identified.

To calculate a defensible contingency budget the Risk Values calculated for all the identified risks can be used. For Example:

Risk management – component of cost analysis

Project Risk	Risk Probability After Mitigation	Risk Impact	Risk Value
Risk A	0.5	30000	15000
Risk B	0.7	60000	42000
Risk C	0.2	150000	30000
Risk D	0.9	40000	36000
Risk E	0.4	120000	48000
Risk F	0.4	35000	14000
Risk G	0.3	36000	10800
Risk H	0.7	50000	35000
Totals	N/A	521 000	210800

Table 1 – Risk Values

The contingency budget for this project should be set at €210 800. However, an additional check is required; the contingency budget should always be large enough to deal with the largest Risk Impact plus a % of the remainder sufficient to make the budget realistically capable of dealing with the project risks; in this case the budget is equal to 150 000 + 60 800 . The probability of the highest valued and second highest valued risks both occurring is 8% so the calculated contingency is probably sufficient. However, it is the project manager's responsibility to make the decision on the level of contingency that is acceptable, the calculations are made solely to provide some guidance.

Risks to projects are generally applicable during particular periods during the project. When a risk can no longer materialize it is closed in the risk log. Risks that are in the planning window are monitored more closely. With more detailed planning risks are revisited and new risks considered.

Risk management is an ongoing activity in the project and should be reported on in every highlight report.

6.Price/Cost Analysis

For an economist, “cost” and “price” are not interchangeable terms. The “price” of something may well be a component of its “cost.” However, cost includes anything that we give up in order to acquire something else, while price specifically refers to just the cash we shell out to get it.

Usually price is greater than cost. That's what gives a business a profit. But it's not always the case. Sometimes price is less than cost, and we're seeing that right now in our down economy, for example. Some real estate is selling at a much lower price that what the cost of that real estate is, and that's a signal to the business to change things, to get out of that business or perhaps try to become more efficient and produce things at a lower cost."

Some form of price or cost analysis should be performed in connection with every procurement action, regardless of whether the organization is a vendor or a buyer. The form and degree of analysis, however, are dependent on the particular subcontract or purchase, and the pricing situation. Determination of price reasonableness through price or cost analysis is required even though the procurement is source directed by the contracting officer of the sponsoring agency.

In some purchases, price analysis alone will be sufficient; in others, price analysis will be used to corroborate the conclusions arrived at through cost analysis. The form and degree of analysis are dependent on facts surrounding a particular subcontracting or

Risk management – component of cost analysis

purchasing situation. The scope of price analysis performed and the particular techniques used will depend on whether or not cost analysis is done, as well as on such factors as type of product or service, dollar value, purchase method, and extent of competition.

Price Analysis is the process of deciding if the asking price for a product or service is fair and reasonable, without examining the specific cost and profit calculations the vendor used in arriving at the price. It is basically a process of comparing the price with known indicators of reasonableness.

When adequate price competition does not exist, some other form of analysis is required. Some reasons that could affect adequate price competition are: specifications are not definitive, tolerances are restrictive, or production capacity limits those eligible to bid.

Examples of other forms of price analysis information include:

- analysis of previous prices paid
- comparison of vendor's price with the in-house estimate
- comparison of quotations or published price lists from multiple vendors

Cost Analysis is the element-by-element examination of the estimated or actual cost of contract performance to determine the probable cost to the vendor. The goal is to form an opinion on whether the proposed costs are in line with what reasonably economical and efficient performance should cost.

Cost analysis should be performed in those situations where price analysis does not yield a fair and reasonable price or is required by the requirements of a sole source procedure.

Cost analysis techniques are used to break down a contractor's cost or pricing data so as to verify and evaluate each component. Some of the cost elements examined for necessity and reasonableness are materials costs, labor costs, equipment and overhead. These costs can be compared with actual costs previously incurred for similar work, the cost or pricing data received from other vendors, and independent cost estimate breakdowns.

It is easy to notice that any of the cost elements is not called risk or something related to risk. Then where is the contingency budget? Definitely the risk values are now part of their respective cost elements according to the Work Breakdown Structure. In some respect the risk management generates the transformation of the cost into price but is not the only trigger.

Working in the acquisitions I often tried to obtain cost breakdowns from suppliers especially during sole source procedures and I know that it's difficult to persuade a supplier to provide them. Suppliers feel that sharing a cost breakdown will give you a negotiating advantage and they will use any reason to refuse this requirement. They are aggressively competing for business and have little certainty about whether or not they will earn it.

The scope of the negotiator is to engage the supplier in joint cost reduction discussions when he/she knows what the costs are. Being aware of the pricing mechanism and the influence of the risks into pricing it is perfect possible to discover that the supplier is paying sometimes too much for goods or services that get factored into pricing. The associated costs for some risks can be also reduced when the parties work together on the same Risk Log and this kind of transparency could become the key factor for a successful negotiation. As we can learn from Risk Management theory one of the method to handle the risks is transference. I know that the ideal outcome of a negotiation is to get rid of responsibilities but speaking about win-win approach is impossible to reach an end state like this. Consequently is normal to accept the transfer of some risks from the supplier when the mitigation actions can be easily managed. The result of this attitude is commonly

Risk management – component of cost analysis

underestimated but definitely the price is going down, the confidence is increased and both parties end up being more profitable at the end of the day.

Finally there are some figures we need to remember:

- Project management may consume between 5% to 20% of the project budget;
- Risk management may be budgeted between 0.5% to 5% of the project budget.

7. Conclusion

As I already mentioned the Industry represents in some extent the “real life” of our society and we are need to support by all smart means the development of the Companies.

In a society full of suspicions we tend to consider them as being either our adversaries or good Samaritans. Obviously none of these considerations is true. In my opinion the most important thing is to put all our efforts to keep pace in the understanding of the processes and the mechanisms adopted by the Industry.

The continuous education and training should be one of the most important performance indicators for the people working in governmental institutions especially in a direct connection with the Industry.

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