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# A TECHNOLOGY INVESTMENT REQUEST (TIR) GUIDE:

## Cost Benefit Analysis

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This document provide guidance for conducting a Cost Benefit Analysis (CBA) with the TIR **CBA Workbook**, which results in a summary CBA profile for up to three viable IT alternatives. The workbook can be used even when there is only one viable alternative, as it will generate a cost benefit profile for that individual solution. This CBA portrait is important summary documentation in the TIR.

## *INTRODUCTION*

A Cost Benefit Analysis (CBA) is a methodology for collecting important facts in order to compare solution alternatives. It enables decision makers to make a fact based comparison and come to a decision about the best solution from among several viable alternatives. IT projects costing more than $500,000 must conduct a CBA if there is more than one viable alternative (SAM1600). It is recommended that smaller projects also use this methodology to assure that the best possible solution is chosen (see xxx for general TIR process).

The facts used in a cost benefit analysis include the costs, benefits, risks and functional capabilities for each viable IT solution alternative. Since a CBA relies on the collection of comparative information, several other steps in the TIR process should have already taken place prior to using the **CBA Workbook**, including.

- Project requirements must have been documented (see xxx),
- IT solution alternatives must be evaluated to determine which options are viable (see xxx),
- Benefits must have been mapped for financial and non-financial benefits, and
- Costs and financial benefits for the viable alternatives should be documented using the Service and Resource Planner (see xx).

## *INSTRUCTIONS FOR USING THE CBA WORKBOOK*

The following provides guidance for completing the worksheets in the **CBA Workbook**. Completing the worksheets result is a *CBA Comparison* of the alternatives being considered. There is a *CBA Setup* worksheet that allows the initial identification of the project and up to three alternatives for further evaluation. This is followed by three worksheets (Alt-ROI) for the transfer of the cost and benefit summary information captured by the Service & Resource Planner.  Next are worksheets for the evaluation of non –financial

benefits.  This is followed by the Alt-Risk worksheets to capture risk data for the alternatives. Finally, the **CBA Workbook** summarizes the results on the *CBA Comparison* worksheet.

Data entry cells are colored white on each worksheet. The sheets are protected to avoid the inadvertent change or deletion of formulas. If you have a need to unprotect sheets, please contact EITS Planning (775-684-5800)

## CBA SETUP

The first section of the CBA Workbook captures basic TIR/project information as well as the basic information for each of the alternatives being evaluated. Up to three alternatives can be evaluated.

### PROJECT DEFINITION

The CBA Setup worksheet allows basic project information to be entered only once, and automatically cascade to each of the subsequent worksheets. Project definition for the CBA Workbook should be the same as that on the other documents for the TIR. It includes:

TIR Name: This should correspond with the name used on the other TIR documents

Agency Name: This includes Department as well as Division, and section or program when appropriate.

Budget Account: The 4 letter budget account.

Decision Unit: This is the primary decision unit used for a Biennial TIR.

Fiscal Year: This is the beginning fiscal year for the project once funded. IT should correspond with the beginning year used in the Service &Resource Planner.

### ALTERNATIVE DEFINITION

Alternative Name: The name used here should correspond with the name evaluated in the *Alternatives Evaluation* table. Use "N/A" (not applicable) when there are less than three alternatives. When this is the case, corresponding worksheets for benefits and risks will also be left blank.

Functional Fit: The alternatives being evaluated have already been determined to be viable, meeting functional and technical requirements on a pass/fail basis. It is now necessary to determine whether each alternative meets all requirements (100%) or only some portion. While the sheet allows the entry of any percentage in the *Degree of Func-*

*tional Fit* cell, it would be unlikely that an alternative would be considered as a viable alternative with a less than 70% (minimally satisfactory) rating. The percent entered will determine a *Functional Fit Report Card Score* which will also be displayed for the alternative being evaluated. For percentages less than 100%, please provide a brief explanation of the alternatives shortcoming in the *Explanation of Functional Fit* cell provided.

Intangible Benefits: Provide a concise, focused, executive level description of intangible benefits for this alternative. This should necessarily be kept brief (100 words or less) as it will be displayed as a high level summary on the *CBA Comparison* worksheet. This summary should be considered a pointer to the discussion of intangible benefits described in greater detail in **Section 3.3B Primary Benefits** in the TIR business case.

### FINANCIAL ROI AND COST WORKSHEETS (ALT1 to ALT3-ROI Tabbed Worksheets)

The ROI worksheets draw on the five years of cost and financial benefit data collected using the Service and Resource Planner (**S&RP- C-9: ROI** worksheet). The information can be copied and placed in equivalent tables in worksheets (**Alt1 to Alt3-ROI**). Rename the Alt1-ROI tab to the name of the particular viable alternative being displayed and copy the ROI figures to the table in that particular tabbed worksheet, *being sure to paste values and not formulas.* Do this in turn for ROI summaries for each of the other viable alternatives, using a separate tabbed worksheet for each (Alt 2-ROI for the second and Alt-3 ROI for the third). As with Alt1-ROI, provide the name of the alternative to the worksheet. These names should correspond with the alternative names (are abbreviations of those) listed on the **CBA Setup** worksheet.

### NON-FINANCIAL BENEFITS (ALT1 to ALT3-NON$BENEFIT Tabbed Worksheets)

These worksheets allow for the capture of information related to the top10 non-financial benefits for up to three alternatives. Though not financial in nature, these benefits must be quantifiable. Please consult the **TIR Guide: Defining, Mapping and Tracking Benefits** to answer any questions about defining and quantifying non-financial benefits. Remember, it is important to try to make a reasonable case (and not a watered down case) for the alternatives. Exclude low level benefits. The only exception is when it is the only benefit for a particular important benefit type. Refer to **A TIR Guide: Evaluating Non-Financial Benefits** for further guidance.

The top benefits (up to 10) for a particular solution alternative should be captured in the cells provided (the white cells). Each benefit should be classified as to one of the following classes. An associated Benefit identification number should be input for each based on its sequence within that classification (PS-1, PS-2, etc.)

| Classification | Classification Code | Starting Sequence Num. |
|---|---|---|
| Process Improvement | PI | PI-1 |
| Public Safety | PS | PS-1 |
| Security Benefit | SB | SB-1 |
| Strategic  Benefit or Improved Compliance | SC | SC-1 |
| Service Improvement | SI | SI-1 |
| Stakeholder Satisfaction | SS | SS-1 |
| Technical Improvement | TI | TI-1 |

The benefit should be named in the **Benefit** column. A brief description of how the benefit will be measured and the five year target for the benefit should be listed under *How Measured / 5 Year Target*. This should be drawn from your previously mapped benefits using the methodology described in the *TIR Guide: Defining, Mapping and Tracking Benefits*. A complete definition of the benefit classifications used above can be found in *A TIR Guide: Evaluating Non-Financial Benefits*.

A scale (1 to 3) is used to rank each benefit on three criteria: *Probability* of the benefit being achieved, the *Level of Improvement* that will occur once the benefit is achieved, what will be the *Difficult y in Tracking* and reporting it.

*Probability*: This is a determination of the likelihood of achieving a particular benefit.  It requires the assessment of potential barriers to accomplishing it, which may be due to people issues (stakeholder, organizational, managerial, cultural), process difficulties (size of process change, magnitude of difference from current process), technological barriers (outside dependencies, magnitude of change), outside factors (how much of the project is dependent on outside factors not immediately under the control of the project), timeframe factors (how rushed is the project?), or other things that may impeded the achievement of the benefit. Level 3 indicates a high probability of achievement.  It is anticipated that most benefits will be at level 3, or level 2 (medium probability). Low probability (Level 1) benefits may occur as a top 10 benefit in circumstances, such as mandated projects that happen by directive, rather than for the accomplishment of high benefit levels.

*Level of Improvement*: This evaluates how significant the improvement is to the business. Level 3, high level improvements are anticipated to be the predominant ranking for a solution alternative's top 10 benefits. Moderate benefits (Level 2) may commonly occur in the top ten when there is a high probability of accomplishment. As with Proba-

bility, Level 1, low level of improvement may occur in the top ten benefits with mandated projects, but is not anticipated as a frequent occurrence.

*Difficulty in Tracking*: This rating factor is used to counterbalance the other two factors be establishing a level of credibility. A benefit that is likely to occur with a great positive impact has little credibility if it cannot be reasonably measured, accurately quantified, and reliably reported. A level 1, *Easy* rating, may occur most frequently when you are expecting to see improvements in existing performance indicators. Not having a base-line to compare to should automatically move the rating up one level, such as from Level 1, *Easy*, to a Level 2, *Moderate* difficulty. This also holds true if you have to rely on outside entities for some of the data. The amount of effort that goes into developing and conducting new surveys would also score a benefit at Level 2, or possibly, Level 3 difficulty rating.

Once the benefits have been scored on their probability, improvement level and difficulty in tracking, a *Rating* score is automatically calculated by adding the score for *Probability* and *Level of Benefit* and then counterbalancing that by subtracting the score for *Difficulty in Tracking*. This score will range from 1, *Minimal Benefit*, to 5, *Extreme Benefit*. An average benefit rating will be calculated based on the individual benefit ratings. A benefit classification is evaluate and displayed (scores range from: Minimal (<1.5), Low (>1.5), Medium (>2.5), High (>3.5), Extreme (>4)). A frequency table and pie chart characterize the frequency of the evaluated benefits by benefit level. The overall classification is used in the **CBA Comparison** of alternatives.

Special Note: One may wonder why you would capture anything but benefits of the highest level. As it is not necessary to capture 10 benefits, why not just capture the few highest to get a high risk classification? The answer has to do with a projects range of benefits. Determination as to whether a project will be funded is based not only on its financial ROI, but on the significance, breadth and credibility of these non-financial benefits. The *Non$Benefit* worksheets will show the significance (Probability + Impact), as well as credibility (counterbalancing for ability to credibly measure and track the benefit). However, breadth is provided by entering the best possible benefit measure for each benefit class possible. Covering each class with a benefit measure would result in seven entries. A range of benefits are expected and evaluated when projects present their business case to the IT Strategic Planning Committee (ITSPC) for ranking in the Governor's Recommended budget. The classes of benefits used here align with those benefits evaluated by the ITSPC (see Department of Administration Budget Instructions).

### RISK EVALUATION (ALT1 to ALT3-RISK Tabbed Worksheets)

These worksheets allow for the capture of information related to the top10 risks for up to three alternatives. Please consult the **TIR Guide: Defining and Evaluating Risks** to answer any questions about defining and quantifying IT project risks. The remaining guidance here is a counterpart to that guidance.

The top risks (up to 10) for a particular solution alternative should be captured in the cells provided (the white cells).  Each risk should be classified as to one of the following classes. An associated Risk identification number should be input for each based on its sequence within that classification.

| Classification | Classification Code | Starting Sequence Num. |
|---|---|---|
| Security | X | X-1 |
| Business | B | B-1 |
| Technical | T | T-1 |
| Funding | F | F-1 |
| Schedule | S | S-1 |

The risk should be named in the *Risk Factor* column. A brief description of how the risk will be managed should be listed under *How Risk will be Managed*.

A scale (1 to 3) is used to rank each risk on three criteria: *Probability* of the risk impacting the project, the *Impact* that the risk will have (on accomplishing project goals or other adverse business impacts), and the ability to *Control* and manage the risk.

*Probability*: This is a determination of the likelihood of a particular risk becoming an impactful reality. Level 1 indicates a *Low* probability of occurrence. *Medium* probability is Level 2, and *High* probability is a score of 3 for a probability rating.

*Impact*:  This evaluates how significant the improvement is to the business. Level 3, *High* impact and Level 2, *Moderate* impact are anticipated for most of the listed risks.

*Control*: This rating factor is used to counterbalance the other two factors by establishing a level of confidence in the ability to manage the risk. The rating for a significant risk is reduced if the level of confidence in managing it is high.

Once the risks have been scored on their probability, impact and ability to control the risk, a *Rating* score is automatically calculated. This score will range from 1, *Minimal*, to 5, *Dangerous* risk. An average risk rating will be calculated and a benefit classification shown: *Minimal* (<1.5), *Low* (>1.5), *Medium* (>2.5), *High* (>3.5), *Dangerous* (>4).  A frequency table and pie chart characterize the frequency of the top risks by level. The occurrence of even one *Dangerous* risk will result in a warning that suggests that this particular solution alternative be re-evaluated for validity (please refer to **A TIR Guide: Comparing IT Alternatives to Find Viable Solutions**). Of course, there is the possibility that a mandated project could have some dangerous risks.  A highly probable, very impactful risk that can't be controlled could result in a "-1" *Risk Rating*. The *Risk Rating* formulas have been adjusted so that scores less than "1" will be reevaluated at a lowest possible Risk Rating of "1" and included that way in the Average Risk calculation.

### CBA COMPARISON

This worksheet summarizes and compares the entries of the prior worksheets. A cost benefit profile is created for each alternative. Functional fit and intangible benefits are pulled from the CBA Setup worksheet. Costs and Financial ROI are from the Alt1 to Alt3 ROI worksheets. Non-financial benefits and Risk are represented from the entries on those respective worksheets. The only entry required on this form is to identify the *Evaluation Outcome* for each alternative. Identify the selection alternative as "Chosen" and the others can be identified with your own designated terms (*2nd* and *3rd*, *2nd* and *Last*, or simply *Not Chosen*, etc.). This comparative sheet should be attached to the TIR as support for the particular chosen solution alternative. If there was only one viable alternative, this should be attached as a cost benefit profile for that alternative.