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Guide to Cost Estimating

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Note to reader

The *Guide to Cost Estimating* was rescinded on May 10, 2023. It has been replaced by the *Guide to Costing*.

1. Introduction

This guide was published on June 10, 2019, and it replaces the:

- *Guidelines on Costing* (February 2, 2016)
- *Guideline on Cost Estimation for Capital Asset Acquisitions* (October 15, 2015)

The guide's primary purpose is to provide practical guidance on how to develop credible cost estimates that:

- provide comprehensive contextual information to help decision-makers understand how the cost estimate was developed
- improve the understanding of uncertainties, risks and sensitivities associated with the estimate that could impact cost
- provide evidence that is validated
- support the assertions and conclusions of the Chief Financial Officer (CFO), as required by the *Policy on Financial Management and the supporting Guideline on Chief Financial Officer Attestation for Cabinet Submissions*

This guide will help users develop cost estimates for Treasury Board Submissions. Additional guidance, tools, templates and training that expand on the concepts presented in this guide are available through professional associations, academic institutions and other Government of Canada publications.

2. Common applications

The following are common applications of cost estimating in government.

Legislative or policy change: When considering a change in legislation or policy, decision-makers can use cost estimates to:

- help them understand the scope and financial impact of the change
- ensure adequate resources are available to implement and sustain the change

For example, the cost of changing the eligibility criteria for a social program or benefit.

Decisions about offering a new service or program: When deciding whether to offer a new service or program, decision-makers can use cost estimates to help identify:

- new costs
- existing costs that would change

For example, offering a new service might:

- increase the cost of internal services, such as communications and legal services
- affect the cost of services provided by other government departments

Level-of-service decisions: When deciding what level of service to provide, decision-makers can use cost estimates to help them:

- understand the financial implications of a new level of service
- determine whether the additional benefit justifies the cost

For example, the estimated cost of reducing wait times at border crossings.

Cost-recovery decisions: When deciding how much to charge for a product or service, decision-makers can use cost estimates to help identify:

- all of the relevant costs in order to determine the full cost of delivery
- whether or not the objective is to recover the full cost or only a portion of the cost

For example:

- setting interdepartmental fees
- determining the cost of processing a patent application plus the cost of administering the patent

Capital investment decisions: When making a decision to construct, improve or acquire an asset such as a building, decision-makers need cost estimates to help them understand the long-term financial implications of their decision. Acquiring an asset imposes financial obligations over the entire life cycle of the asset, from acquisition to disposal. In addition, there can be significant differences in the financial obligations required by:

- a building that is constructed and maintained by the government

- a building that is acquired through a public-private partnership (P3)

Make-or-buy decisions: When decision-makers are considering whether to develop and deliver a program, product, or service or to arrange to have another department or the private sector do the work, they can use cost estimates to determine the one-time and the ongoing costs of each option. For example, a cost estimate can help determine the difference between the one-time and ongoing costs of:

- developing a new case management system
- customizing and maintaining an existing commercial off-the-shelf (COTS) product

Decisions about reorganizations: When decision-makers are considering a reorganization that impacts two or more departments, or the creation of a new department, they can use cost estimates to ensure that:

- all parties have a complete understanding of the cost implications
- the resulting reference levels are appropriate

For example, decisions about reorganizations would ensure that the reference levels of both departments accurately reflect the cost of transferring responsibility for a program, which should not only include the direct cost of the program but also include the indirect cost of the internal services that support the program.

3. Challenges and limitations

Cost estimation for large government programs and projects is a challenge. The number and magnitude of cost overruns highlight the difficulties in developing and communicating accurate cost estimates. Factors that lead to cost growth include:

- inadequate or poorly defined requirements
- underestimated technical complexity or overestimated technological readiness
- inadequate project management and acquisition practices
- a cost estimate of poor quality, whether as a result of inadequate data, methodology or poorly trained cost estimators

This guide and the work of the Costing Centre of Expertise aims to address poor quality cost estimates by increasing the capacity to estimate costs in the Government of Canada. A concerted effort by leadership in departments is required in order to mitigate the other causes of cost overruns.

A cost estimate is a prediction about the future cost of an investment based on the data and information available at a given point in time. An estimate offers a snapshot-in-time based on available data, such as:

- how long it will take to build a capital asset
- whether specialized contractors are available and how much they will cost to hire
- how many clients will access a service

A cost estimate that provides a cost projection far into the future is less certain and at greater risk of being inaccurate compared to one that provides a cost projection for the near future.

The best antidotes for the limitations and vulnerabilities of a cost estimate are:

- an honest assessment of risk
- a commitment to refreshing cost estimates as new information becomes available

A thorough assessment of risk will help decision-makers allocate an appropriate contingency estimate, and this estimate will increase flexibility when risks are realized. It is important that the departmental culture avoid:

- being overly optimistic when assessing risks
- assuming the best possible outcomes will be realized

Decision-makers may be misled to believe that sufficient resources have been approved for successful project execution if a cost estimate does not adequately:

- assess risk due to optimism
- incorporate appropriate responses

4. Techniques to estimate costs

Best practice: The selection of cost-estimating techniques to use is made in consultation with the Chief Financial Officer's organization. The project or program manager should also consult with the departments Chief Information Officer if the cost estimate includes an information technology or information management component.

This section describes five techniques that can be used to estimate costs.

Activity-based costing: This technique uses historical cost information that is compiled to align the cost of the proposed program or project with the department's program architecture (that is, the categorization of cost information by activity). The relevant costs are then categorized as direct or indirect. Direct costs are fully assigned to the program or project, and an appropriate portion of indirect costs are allocated to the program or project. The cost allocations should be reasonable, consistent and documented.

Extrapolation from actuals: This technique uses actual cost experience or trends to estimate future costs for the same project. For example, historical program expenditure data could be used to estimate the cost of expanding the program. The technique can also be used after the definition phase of a project because at that point, the project team has cost information from the definition phase that can be used to estimate future costs.

Analogous: This technique uses the cost of something similar to develop a cost estimate. For example, if the plan is to renovate a teleconference facility, the first step would be to find a department that has recently renovated a similar facility. Based on the amount that the other department spent for their renovation, adjust the cost to reflect any significant differences between

the two renovations. Whenever possible, an objective approach should be used to adjust for differences. Consulting an expert to adjust for differences is considered a weaker approach because of the subjective nature of the expert's opinion. However, even if an analogous cost estimate is not the primary technique used to make a decision, it can be useful as a reasonableness check on estimates developed using other techniques.

Parametric: This technique applies statistical analysis to historical data from similar initiatives to generate a cost estimate. For example, regression analysis can be used to identify the relationship between the historical cost of an initiative and one of the key characteristics (cost drivers) of the initiative, such as:

- the number of full-time equivalents (FTEs)
- the computer processing power required

In the case of FTEs, the analysis would determine how the estimated cost would change with each additional FTE. This technique is primarily used in the early stages of development when an initiative is not yet well-defined and there is limited data.

Bottom-up : This technique involves breaking down a proposed program or project into components. A cost is then estimated for each component based on the best available information, and the component costs are accumulated to provide the total estimated cost of the initiative. The technique relies on a good understanding of the requirements and may not be appropriate in the early stages of an initiative. If the initiative is a capital project, this technique may also be referred to as an “engineering build-up.” This technique is generally used to estimate the cost of a project while the activity-based costing technique described above, which is similar, is generally used to estimate the cost of a program.

5. Steps to produce a cost estimate

When planning each step in the cost-estimate production process, these two factors should be considered:

- The **level of effort** to develop a cost estimate should be proportionate to factors such as:
    - the importance of the initiative
    - the materiality of the initiative
    - the perceived risk of the initiative relative to the tolerance for risk
    - the level of experience with similar initiatives especially when new technologies are involved
- The **complexity** of the planned initiative because the level of complexity will help determine what resources are needed to produce the cost estimate, such as the required knowledge, expertise and analytical tools

Step 1: identify stakeholders, the purpose and the boundaries

Identify stakeholders and determine their responsibilities. Stakeholders may include:

- the manager who is responsible for the new program
- managers of other programs that might be impacted by the new program
- representatives from internal service groups

The CFO should always be identified as a key stakeholder when a cost estimate is being prepared for a Memorandum to Cabinet or a Treasury Board Submission. Key stakeholders should be directly involved in the next three steps.

a. Agree on the **purpose** of the cost estimate (for example, a cost estimate to support a request for project approval).

b. Define the **scope** of what activities will be included in the estimate, for example:

    - the full life-cycle cost for a departmental asset
    - a limited estimate of the ongoing cost to operate and maintain the asset

    A common method for documenting and communicating the scope is a cost breakdown structure (CBS), which breaks down a project into lower levels of detail. The CBS is usually developed in conjunction with the project's work breakdown structure (WBS) so that the schedule of costs align with the schedule of activities required to complete the project. The CBS focuses on costing while the WBS focuses on deliverables for program or project management.

c. Define the **time frame** that the cost estimate will cover (for example, the time required to implement a new program, ramp it up and have it reach a steady state).

Step 2: collect and normalize data and establish ground rules and assumptions

a. Collect data that is needed to produce the cost estimate (for example, historical expenditure data from a comparable program or a similar IT system). The CBS, described in Step 1, helps to inform the data-gathering process.

b. Normalize the data for consistency and comparability. Data are gathered from a variety of sources and often come in many different forms. Therefore, they should be adjusted before they can be used for comparative analysis or to project future costs. For example, if a comparable program exists in another country, normalizing would mean converting the historical expenditure data into current Canadian dollars.

c. Establish ground rules. Ground rules for estimating the cost of an initiative are constraints that have been identified by a decision-maker. Potential constraints can be identified by any stakeholder but, in order to be a ground rule, they should be documented and approved by the responsible program or project manager. An example of a ground rule is the statement of

requirements for a project (for example, compatibility with an existing IT or infrastructure platform).

d. Assumptions are used to fill gaps between the ground rules and the available data. For example, the length of time the asset is expected to be in service, and the level of use while the asset is in service. Typically, assumptions are used at the beginning of the cost-estimating process when there is less data and less certainty. As the estimate matures, assumptions are generally replaced by ground rules and data. Assumptions will often be based on opinions from subject matter experts. However, it is important that these opinions be:

    - reasonable
    - consistent with one another
    - supported by data whenever possible

Step 3: create and adjust the point estimate

a. Create a point estimate:

    - by using the purpose, scope and time frame that were defined and agreed to by all key stakeholders in Step 1
    - that is based on:
        - the data that was collected and normalized
        - the ground rules and assumptions that were documented and approved in Step 2

    For multi-year investments, adjust the point estimate for inflation.

b. Identify risks that should be assessed, mitigated and monitored. Every investment is exposed to schedule risk. Other risks to be considered include:

    - changes in price
    - changes in currency exchange rates
    - the availability of specialized skill sets

c. Provide contextual information to decision-makers about the risks and the potential variation in cost.

d. Explain which inputs generate which costs (for example, adding an FTE generates salary and employee benefit costs).

e. Provide an understanding of how sensitive individual inputs are to change (for example, if you add an additional item to a bulk purchase, how does that change the unit cost?).

f. Provide an understanding of the uncertainty associated with the estimate and the range of possible outcomes. Uncertainty analysis is focused on the variability of cost inputs and assumptions, which make the future cost of the investment unpredictable. As a result, the final cost will likely not match the cost estimate but will instead fall within a range of potential outcomes.

g. Determine the appropriate dollar amount to set aside as a contingency in order to account for risk and input variability. The objective of the contingency is to increase the probability that the initiative will be successful within its approved budget.

h. Document the cost estimate. The level of documentation needed and the level of detail that the documentation should contain should be proportionate to the level of effort invested in developing the cost estimate. At a minimum, the level of detail in the documentation should be sufficient to allow the reader to understand:

- the cost-estimating technique that was used
- the cost-estimating process, the activities conducted and any limitations
- the overall results, including the maturity of the cost estimate
- the risk assessment, its findings and recommended contingency reserve (when applicable)
- how the cost estimate was validated and any validation findings
- how the estimate meets all of the attributes of a credible cost estimate and can support the Chief Financial Officer's attestation when an attestation is required

Step 4: validate, adjust and report

a. Validate the cost estimate by:

- challenging the appropriateness of the cost-estimating technique that was used
- ensuring that a strong, overall cost-estimating process was followed and that each step was documented
- challenging the estimate's assumptions for reasonableness and completeness
- checking for errors by testing the accuracy of technical and mathematical aspects of the estimating process
- cross-checking the estimate against recognized benchmarks or authoritative sources and explaining material differences
- providing an opportunity to improve the estimate
- assessing the credibility of the cost estimate (refer to section 6 of this guide)

b. Adjust the cost estimate if necessary and determine its maturity

c. Report the findings of the cost-estimating process

6. Credible cost estimates

Cost estimates should be credible, which means that a cost estimate should be able to persuade decision-makers that the project or program can be successfully implemented. The following seven attributes define a credible cost estimate.

1. **Participative :** In order for a cost estimate to be credible a wide range of stakeholders and subject matter experts (for example, from the responsible manager to representatives of

internal services, such as information technology services) should participate in its creation. This broad participation is essential to ensure that:

- requirements are well defined
- indirect impacts have been identified
- suitable sources of data are selected
- there is agreement on the ground rules and assumptions
- risk and uncertainty are assessed

2. **Comprehensive :** A credible cost estimate should clearly define boundaries in terms of time and scope.
   Time boundary
   - For a new program, estimates would typically include costs to:
     - design and implement the new program
     - ramp up the new program
     - achieve the program's first full year in a steady state
   - For capital assets, life-cycle costs:
     - start to accumulate at conception
     - continue through acquisition and the useful life of the asset
     - include the cost of disposal
   - When there are procurement options, it is important to consider all the life-cycle costs of each option. For example, the cost to operate and maintain an asset can often be several times higher than the cost to acquire the asset, so these costs are material to the procurement decision.
   - For program changes and asset replacement, it is important to:
     - look at new costs and existing costs
     - consider whether the existing costs are increasing, staying the same or decreasing
   - For a program that has an end date (also known as a “sun-setter”), the estimate would normally include:
     - costs incurred for the duration of the program's existence
     - the cost to wind down the program

   Scope boundary
   - The scope is defined as the activities required to achieve the program or project objectives. For example, the scope could range from the cost to procure the asset to the total cost of procuring, operating, maintaining and disposing the asset.
   - Defining the scope determines which costs are relevant. For example, indirect costs, such as internal services, may be excluded from the scope of a project if it is determined that there is no incremental impact on internal services.

3. **Data driven:** A credible cost estimate is based on good quality data and not opinion. It is important to be aware that collecting and normalizing data may require a significant investment of time and effort.

    - Data should be the best available and come from an objective, primary source (such as the department's financial system)
    - If the data is taken from a secondary source, any changes that were made after the data was extracted from its primary source should be documented
    - Data should be up to date (for example, if using financial data, it should be from the most recent fiscal period)
    - Data should be normalized (for example, if the data is in a foreign currency, it should be converted to Canadian dollars)

4. **Risk-assessed :** A credible cost estimate is a prediction of a future outcome that includes a risk assessment. In order to understand the risk associated with an initiative and the recommended response, a risk assessment should be sufficiently detailed so that the assessment's basis, process, level of subjectivity and findings can be understood.
   A rigorous risk assessment would:

    - be data driven and quantitative
    - use statistical analysis

   A less rigorous risk assessment could be based on intuition and qualitative analysis. For example, a less rigorous risk assessment:

    - might only focus on determining the schedule risk
    - could assume that the probability of a risk occurring and its potential impact are not material

   Qualitative and quantitative risk analyses are often used together. Qualitative or subjective analysis can be used to help rank the priority of risks before more resource-intensive quantitative analysis is conducted. For both qualitative and quantitative analyses, it is important to document:

    - how the analysis was done
    - the results of the analysis
    - how the results were taken into consideration

5. **Accurate :** In order to produce a credible cost estimate:

    - the appropriate cost-estimating techniques should be used
    - the estimates of requirements for future years should be adjusted for inflation
    - the cost estimate should be validated

   The choice of cost-estimating technique is influenced by a number of factors, such as the maturity of the initiative and the availability of suitable data (refer to section 4 of this guide).

   A cost estimate is a prediction of a future cost and should therefore be adjusted to take inflation into account. Doing so is particularly important:

    - for long-term initiatives
    - during periods of high inflation

  Not adjusting the estimate for inflation would mean that the initiative will be under funded in future years.

  The scope of the validation exercise of a cost estimate and its findings should be documented. Depending on the materiality and complexity of an initiative, management may decide that the validation should be completed by an independent third-party because it would be perceived as more credible.

6. **Relevant :** A credible cost estimate is relevant if it is current (for example, the estimate is based on expenditure data from the last complete fiscal period). To ensure that a cost estimate is relevant, it should be updated before a decision is made about a program or project.

   For large, complex and risky initiatives, management should consider updating the cost estimate periodically in order to monitor progress (for example, to compare estimates to actuals). This approach could also provide early insight into problems and support targeted management responses.

7. **Documented :** A credible cost estimate should be documented in a cost-estimate report to ensure informed decision-making. The documentation should:

    - provide a thorough understanding of how the estimate was produced
    - allow readers to assess the credibility and maturity of the estimate
    - be able to withstand scrutiny and an audit
    - allow a third party to reproduce the results

7. Responsibilities

Developing cost estimates is a collaborative effort that involves multiple stakeholders who have a range of knowledge and expertise. Each cost-estimating process is unique and can involve people that are not listed below. The responsibilities that may be assigned to different stakeholders in a department are listed below.

The senior departmental managers are responsible for:

- ensuring that the responsibility for developing cost estimates is clearly assigned as part of program and project management responsibilities
- assessing the complexity of the initiative
- ensuring that the appropriate resources are assigned to develop a cost estimate based on the level of complexity
- encouraging the development of cost estimates in collaboration with stakeholders, including the CFO organization
- encouraging collaboration to start as early as possible in the planning phase

- where the CFO's attestation is required:
    - ensuring that the CFO organization is engaged throughout the cost estimating process
    - taking corrective measures to address CFO concerns (for example, making additional validations or disclosures)

The Chief Financial Officer is responsible for:

- setting the overall financial framework to ensure that the department has the necessary financial data for decision making purposes, including cost drivers for its programs
- supporting senior departmental managers in determining:
    - an initiative's level of complexity
    - the knowledge, expertise, data and tools that are required to develop the cost estimate
- assigning staff who have the appropriate expertise to support program and project managers in developing cost estimates
- assessing cost estimates and, when necessary, challenging them to ensure appropriate due diligence before signing the CFO attestation

The program or project manager is responsible for:

- consulting with stakeholders, including the people who will operate and maintain the initiative, to ensure that all aspects and impacts of the initiative have been identified (for example, the impact of ramping up activities and the increased demands on internal services)
- engaging a cost estimator as early as possible in the planning phase
- providing and explaining program and technical requirements to the cost estimator so that they can gain an overall understanding of the initiative
- ensuring that the cost estimator has access to the data and information that they need to produce the cost estimate

The cost estimator is responsible for:

- ensuring that:
    - all pertinent data and information are documented in the cost-estimating process
    - the appropriate level of effort is applied in developing a cost estimate, based on the estimate's materiality and the senior departmental manager's assessment of the initiative's level of complexity
    - the cost estimate report effectively supports decision-makers by clearly and concisely documenting the steps that were taken to develop the estimate, the findings and the recommendation
- advising on the presentation of cost estimates and supporting information in Treasury Board Submissions

It is a best practice to engage a third-party reviewer to validate the cost estimate or commission an independent cost estimate (independent, meaning that the cost estimator does not report to the program or project manager). However, for practical reasons the role of the reviewer is often filled by

someone who reports to the program or project manager. Management may want to revisit the reporting relationship of the cost estimator when the level of complexity or materiality of the initiative is significant.

8. References

It is recommended that the following sources be read in conjunction with this guide:

- Treasury Board Submissions
- *Guideline on Chief Financial Officer Attestation for Cabinet Submissions*
- Risk Management
- *Policy on Investment Planning: Assets and Acquired Services*
- *Policy on the Management of Projects*

9. Useful links

- Cost Estimating Community of Practice (accessible only on the Government of Canada network)
- *Cost Estimating Body of Knowledge* (publication of the International Cost Estimating and Analysis Association, which is available for purchase)
- *Government Accountability Office Cost Estimating and Assessment Guide* (guide published by the United States Government)

10. Enquiries

Members of the public may contact Treasury Board of Canada Secretariat Public Enquiries if they have questions about this guide.

Individuals from departments may contact Financial Management Enquiries at fin-www@tbs-sct.gc.ca for interpretation of this guide.

Appendix A: glossary

The glossary defines the terms that are commonly used when producing or using cost information in the Government of Canada. Additional definitions are available in an evergreen common lexicon, which can be found at Cost Estimating Community of Practice (accessible only on the Government of Canada network).

complexity

The degree to which an initiative is difficult to understand, analyze, verify and assess, or the degree to which it consists of many different and connected parts. New tasks and technologies are often

more complex than expected or forecast.

contingency reserve

An amount that is added to a point estimate in order to adjust for a lack of confidence in the comprehensiveness of a cost estimate. This amount is influenced by risk, uncertainty and sensitivity. The contingency reserve does not provide certainty that the budget will be sufficient. Instead, the objective of the contingency reserve is to provide a reasonable chance of success based on the risk assessment and the risk tolerance of decision-makers, which can vary by initiative.

cost

The monetary value of the resources (human, physical and financial) consumed to achieve a certain end. For example, the resources consumed to produce a product, deliver a service, or develop and implement a new system.

cost breakdown structure (CBS)

A hierarchical structure that is used to break down an investment into lower levels of detail or smaller pieces, so that a total cost estimate can be produced if all the levels or pieces are populated with accurate data. Because the CBS is hierarchical, each level of the CBS should be equal to the sum of the related cost elements at the next level down.

cost breakdown structure dictionary

A dictionary that has definitions of each cost element in a cost breakdown structure. This dictionary is essential for consistent communications and a common understanding among stakeholders. It is useful for current and future users of the cost estimate.

cost element

A component of the cost, which could range from the highest to the lowest level component. In practice, if there is a separate and distinct cost that can be quantified, it should be listed as a cost element unless it is considered to be immaterial.

direct and indirect costs

Costs are considered direct when they are incurred solely to support the initiative. Costs are considered indirect when they are incurred to support more than one initiative and are not attributed only to the initiative that is being costed.

ground rules and assumptions

Ground rules are constraints or boundaries that have been established by the decision-maker. Assumptions are used to fill the gaps between the ground rules and the available data.

incremental cost

The increase or decrease in costs that results from a change in the initiative (for example, a change in the cost of a service when the level of service is increased).

learning curve

An increase in efficiency based on improved knowledge and familiarity with a task or a series of tasks that can impact costs. The impact of a learning curve can be seen in a recurring activity, but also in tasks or projects that are similar. An initiative may be impacted by several different learning curves. For example, a learning curve could impact costs if the assumptions about productivity are wrong (such as if productivity increases more slowly than expected during implementation).

life-cycle cost

All the costs associated with an initiative over its life cycle, which would be the costs from initial conception until the end the program or the disposal of the asset. There are generally four phases in life-cycle costing, which are described differently depending on whether the project is an asset or a program.

An asset's life-cycle cost has the following four phases:

1. Planning: This phase is composed of defining requirements, selecting options and planning, which can include research, design and prototyping.
2. Acquisition: This phase is composed of acquiring a capital asset or improving an existing capital asset. The phase could also include coordination and support activities, such as those performed by the project management office.
3. Sustainment and operations: This phase continues throughout the asset's useful life.
4. Disposal and remediation: This phase includes clean-up costs (see the Greening Government Strategy), which would be subtracted from the residual value of the asset.

A program's life-cycle costs have the following four phases:

1. Planning: This phase is composed of activities that result in a design for a program and a plan for implementation and ongoing operations.
2. Ramp-up: This phase is composed of activities to implement a program.
3. Ongoing or steady state: This phase is composed of activities required to operate the program.
4. Wind down or sunset: This phase is composed of activities required to wind down the program.

materiality

The degree to which something is important, relevant or significant. From a decision-making perspective, an item of information or an aggregate of items is material if it is probable that its omission or misstatement could influence or change a decision. For example, a component that costs $1,000 and is part of a $1 million initiative is not likely to be considered material. However, a $1 million initiative would be material for an organization that has a budget of $20 million.

maturity of a cost estimate

The maturity and the associated quality of a cost estimate should improve as the initiative progresses because, as an initiative progresses, the level of uncertainty is expected to decrease.

Improvements in the maturity and quality reflect the fact that:

- the requirements are better defined
- the data that is used to estimate future costs is more readily available and of a higher quality initiative

When a program or project reaches a decision point, the maturity and quality of the cost estimate that is used to support the decision should be appropriate to the decision (for example, rough order of magnitude, indicative, or substantive). Refer to the Glossary of Terms for TB Submissions for further guidance.

normalization of data

The process of removing the effects of external influences from a set of data to improve consistency and comparability. Data are gathered from a variety of sources and often come in many different forms. The data should be adjusted before they can be used for comparative analysis or as a basis for projecting future costs. Data can be normalized according to fiscal year, currency, cost per unit, size or weight, key groupings, and technological maturity (that is, adjusted for productivity improvements).

opportunity cost

Among a set of possible actions, the potential gain from a course of action that was not taken. Opportunity cost can be quantified during cost estimating, but the resources that are quantified are not always financial. Depending on the circumstances, the resources could include items such as time, labour, human health and the environment. For example, there is a limit to how many people a department can have on staff, so there is an opportunity cost when staff are assigned to one initiative because that means they cannot be assigned to other initiatives.

point estimate

A single value that is used for communication or approval purposes to represent the actual cost of an initiative, which is selected from somewhere within a range of potential outcomes. The point estimate is also used to establish the limit of funds that are allocated to an initiative. The point estimate can be adjusted for risk by adding a contingency reserve. If the estimate is adjusted, the amount of the adjustment should be identified and explained.

risk tolerance

The degree to which an organization is willing to accept or reject a given level of residual risk. Risk tolerance may differ across the organization and by initiative. Risk tolerance helps inform risk-related decisions.

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