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Introduction

The requirement to develop an information technology (IT) business case framework relates to direction set forth in the Government Performance and Results Act, Clinger-Cohen Act, and Office of Management and Budget Circular A-130. Business case development is an important part of the Immigration and Naturalization Service (INS) IT Investment Management process (ITIM). This guide provides instructions for developing a business case that fully supports IT capital planning decisions.

Purpose

This document serves as a blueprint that managers can use to build business cases in support of IT investments. It outlines the analyses required to ensure that IT investments are properly planned and documented. By following this guide, managers can ensure that requirements are defined, performance metrics are identified, and program costs, benefits, and risks are well defined and understood prior to initiating an IT project.

Scope

The ITIM process and the Business Case Guide apply to all INS IT initiatives; however, operational systems or projects deemed by Review Authorities to be economically justified prior to the implementation of the ITIM process are not required to undergo the Business Case.

Who Should Use This Guide

This document provides guidance for all INS integrated product teams (IPT) and information management professionals. Any INS employees who are otherwise involved with an IT proposals or initiatives will also find this guide useful.

How This Guide Is Organized

This guide is presented in the following sections, covering the organization, components, and guidelines for developing a business case:

- Introduction
- Business Case Development Process
- Problem Definition
- Identify Alternatives
- Cost Benefit Analysis
- Risk, Uncertainty, and Sensitivity Analysis
- Alternatives Analysis
- Implementation Planning
- Document the Business Case
A business case is a structured analysis that frames the IT investment opportunity in a strategic context and demonstrates its alignment with Departmental, and/or Service mission and business objectives. It provides the information necessary to make a business decision about whether a project should proceed into the systems development process. It includes a collection of information and analytical components that will be updated and maintained throughout the life cycle of the IT program.

A complete business case includes multiple components. The documentation requirements for a business case will vary depending upon the size, scope, and importance of the project.

A typical business case will include the analytical components shown in Exhibit 1. The exhibit summarizes the various sections that make up the final business case document.
### Exhibit 1: Structure and Content of Business Case

<table>
<thead>
<tr>
<th>Section</th>
<th>Section Heading</th>
<th>Summary Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td><strong>Concept and Problem Definition</strong></td>
<td>Clear statement of mission need and analysis and definition of requirements taken from the concept paper.</td>
</tr>
<tr>
<td>2.0</td>
<td><strong>Alternatives Identification and Feasibility Study</strong></td>
<td>A description of all alternatives identified; high-level evaluation of them (Feasibility Study); identification of alternatives for further analysis; and rationale for elimination of alternatives.</td>
</tr>
<tr>
<td>3.0</td>
<td><strong>Cost Benefit Analysis</strong></td>
<td>Definition and quantification of costs (including information on non-quantifiable costs) and how costs were evaluated for each alternative. Definition and evaluation of benefits (quantifiable and non-quantifiable benefits), performance metrics, and how benefits were evaluated for each alternative. Cost benefit measures for each alternative, together with explanatory notes.</td>
</tr>
<tr>
<td>4.0</td>
<td><strong>Risk Analysis</strong></td>
<td>Assessment of the risks and uncertainties of each option, the results of the sensitivity analysis, identification of key risks and uncertainties and the overall conclusions that can be drawn from this information.</td>
</tr>
<tr>
<td>5.0</td>
<td><strong>Alternatives Analysis</strong></td>
<td>A comparative analysis of the costs, benefits, risks and uncertainties of the alternatives evaluated, and identification of the economically preferred alternative.</td>
</tr>
<tr>
<td>6.0</td>
<td><strong>Acquisition Strategy and Implementation Plan</strong></td>
<td>Discussion on acquisition and implementation issues including factors such as buy versus build, lease versus buy, sole source versus competitive bid, and schedule.</td>
</tr>
<tr>
<td>7.0</td>
<td><strong>Recommendations</strong></td>
<td>Based on the supporting evidence in the business case, makes recommendations on which option to proceed with, why, and how (summarize preceding sections to highlight the rational for the choice).</td>
</tr>
</tbody>
</table>

**Relationship to ITIM Process**

The scope and level of detail of the business case is driven by the project’s size, risk, complexity and importance to the Service. A high-profile project may require an independent cost benefit analysis and risk assessment. In contrast, for a relatively small, simple project, the business case document will cover all areas of required analysis.

The business case is a key document in the IT Investment Management process. An approved business case is required prior to beginning any new IT investment project and must be maintained with current cost, benefit, risk, and performance data throughout the project lifecycle. The level of detail and requirement for independent analysis and
documentation depends on the scope and complexity of the project. Exhibit 2 displays the documentation requirements for a typical “major” project, and for a smaller project with the minimal requirements. A major project might be large in scope and budget, mission critical, or cross components in the INS. A project with the minimal requirements may have a small life cycle cost, not involve network or interfacing, and be single office use.

**Exhibit 2: Required Documentation by Scope of Project**

<table>
<thead>
<tr>
<th>Business Case Component</th>
<th>Project Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Major</td>
</tr>
<tr>
<td>IT Concept Paper</td>
<td>X</td>
</tr>
<tr>
<td>Feasibility Study</td>
<td>X</td>
</tr>
<tr>
<td>Life Cycle Cost Estimate (LCCE) *</td>
<td>O</td>
</tr>
<tr>
<td>Cost Benefit Analysis</td>
<td>S</td>
</tr>
<tr>
<td>Risk Assessment</td>
<td>S</td>
</tr>
<tr>
<td>Alternatives Analysis</td>
<td>X</td>
</tr>
<tr>
<td>Acquisition Strategy/Implementation Plan</td>
<td>X</td>
</tr>
</tbody>
</table>

X = Incorporated within the Business Case  
S = Stand-alone analysis  
O = Option to include within the Business Case or as a supporting document  
NR = Not required  
* In some cases, where there is a mandate for a project, or where all alternatives are considered to have the same benefits, evaluation of benefits may not be necessary, but an LCCE always is.

The business case is the first detailed evaluation of a project. It is undertaken following the approval of the project concept (see the ITIM Concept Paper Guide). The business case is prepared for the second ITIM investment decision point. It essentially determines the economic feasibility of a project and provides the basis for project management planning and development of detailed project requirements. Exhibit 3 provides a phase diagram of the ITIM process with the corresponding phases of the INS System Development Life Cycle (SDLC) process. The red diamonds represent ITIM investment decision points (Approval of the Business Case is Investment Decision Point 2). As the project progresses, the development and implementation effort can be more clearly defined. Costs and benefits can be estimated with increasing accuracy and less risk and uncertainty.
Chapter 1
Introduction

Exhibit 3: ITIM Process

Select

Control

Evaluate

OR

OR

Next Step

1

2

3

4

5

6

7

Planning

Req'ments

Design

Develop

Test

Implement

O&M

Dispose

Investment Decision

SDLC Phase

5
Developing the Business Case

IT investments should be part of a business strategy that must, in turn, be consistent with the overall corporate strategy. They should be described in terms of furthering those strategies. The business case should demonstrate how the project would lead to enhanced value or improved service. An IT investment may be based on a need or opportunity to:

- Implement a program in support of a legislative mandate.
- Support organizational mission and business priorities.
- Improve organizational performance or enable new business processes.
- Enhance customer service.
- Reduce costs.

A project and studies supporting it should be coordinated with the parties that have a stake in the project, from the early stages. Once the decision has been made to proceed with a project, the IPT should undertake to contact and involve stakeholders. Working groups or committees may be useful to support the development of the business case, especially programs with stakeholders external to the INS.

The initial step in developing the business case, and the first input to the ITIM process, is defining the problem or business opportunity and the project concept. This is documented in a concept paper. The concept paper should discuss the current INS method of business or service capability, the shortfall driving the business proposal and concept, high-level business requirements and the source of these requirements, critical assumptions and constraints, strategies to meet the defined need, and consequences of not undertaking the project. Thus, the concept paper provides the benchmark of requirements that the project must meet, and a 'blueprint' to guide any engineering, development, evaluation, and acquisition activities. It may also provide performance measures by which the success of the project is determined.

Based upon the defined problem or opportunity, a set of all potential alternatives is developed to address the high-level business requirements laid out in the concept paper. A screening process is the best way to ensure that the analysis proceeds with only the most promising and practical options. Screening allows a wide range of initial alternatives to be considered, while keeping the level of effort reasonable. The screening of alternatives is documented in the business case through preparation of a feasibility study (see “Feasibility Study and Screening of Options”, p. 8).
It should be remembered that there is no single solution to a business problem. Until one examines the situation at hand and all the available alternatives, it is impossible to know the best way to deal with a given business situation. This chapter describes how to assemble and examine the alternatives that should be considered before making an IT investment decision and how to prepare the analysis that will form the business case.

How solutions or opportunities are described will shape the analysis that follows. One should not focus on specific solutions or technologies, but on how to best meet the defined requirements. All possible ways the organization can meet the objectives described in the concept paper should be considered. This way, the options analyzed will have a clear relationship to the organization's true needs. Unless this relationship is clear, one may be tempted to invest in technology for technology's sake, and possibly overlook simpler, less costly solutions.

Available options must include the base case, the option of NOT undertaking the project, as well as a wide range of other potential solutions, as described below in the following sections.

**Base Case Alternative**

The base case should show how an organization would perform if it did not make an IT investment or otherwise change its method of operation. This base case might, in fact, be the only feasible or the most cost-effective alternative, so it is important that it be realistic. It is also the measure by which the alternative investments are evaluated.

It is not adequate to state the base case simply as the continuation of the current situation. It must account for future developments, including already planned enhancements, over a period long enough to serve as a basis of comparison for a new system. For example, an organization that keeps an aging system might face increasing maintenance costs as the system gets older. There might be more frequent system failures or longer periods of down time. Alternatively, demand for a business unit's services might ultimately decrease, permitting a reduction of costs without the need for an IT investment.

The base case analysis will predict the long-term costs and benefits (if applicable) of maintaining the current method of operation, taking into account the known external pressures for change, such as predicted changes in demand for service, budgets, staffing or business direction.

**Other Alternatives**

Different strategies can manage identified problems in different ways and to different extents. There may be options that concentrate on optimizing use of existing systems, sometimes by altering current processes or procedures. These options may require little or no new investment.
Chapter 2

Developing the Business Case

It may be possible to implement an option using a number of different strategies. For example, an IT application requirement could be met by one or more of these options:

- Redefining business processes to achieve the desired result without making a new investment
- Re-using or adapting an application developed by another business unit, department, or other federal agency
- Re-engineering the existing system (if there is one) to provide the functionality required
- Acquiring a commercial off-the-shelf (COTS) hardware or software product
- Developing a new application or component (i.e., not an entire new system)

Strategic choices for building, adapting, or re-engineering an application include development in-house or using contractors, and implementation in phases or all at once.

Options for acquiring IT hardware include:

- Purchase
- Lease/rental (which may include planned upgrades)
- Service provider contract

Strategies for putting any one of these options in place might include different implementation schedules, such as a delay in investment until better technology is available/less expensive or until the proposed technology is more widely used.

### Feasibility Study and Screening of Options

Alternatives must be screened to select those that are feasible and merit further analysis. This Feasibility Study can generally be an element of the business case, but in the case of a high profile project or one with numerous possible solutions, there may be a need for a stand-alone Feasibility Study.

Depending on the project there may be a very limited number or a large number of possible solutions. A full-scale analysis of all options may be neither achievable nor necessary. A screening process is the best way to ensure that the analysis proceeds with only the most promising and practical options. Screening allows a wide range of initial options to be considered, using a high level analysis, while keeping the level of effort reasonable. The process for screening options has the added advantage of
setting out in an evaluation framework the reasons for selecting, as well as rejecting particular options.

Including all possible alternatives in this analysis makes it possible to better identify the most promising solution(s) to an organization's IT needs. For each option, the analyst should list any assumptions about the state of technology and the environmental conditions or organizational constraints within which that alternative is expected to operate. Variations in these assumptions can be considered later in a sensitivity analysis.

Typically, this sort of screening can eliminate some of the options, leaving only the most promising for detailed evaluation. Alternatives should be ruled out if it becomes clear that other choices are superior from a technical, cost benefit, or organizational perspective. Alternatives may be ruled out on the basis of risk, for example, if their success depends too heavily on unproven technology, that they may not work, are too expensive, impractical, politically unfeasible, etc. The IT Investment Ranking Criteria (see the ITIM Investment Ranking Criteria Guide) provides a framework for the screening process, since these are the criteria by which the surviving alternatives must be compared.

The IPT should document all alternatives evaluated for future reference for the following reasons:

- All alternatives considered should be identified and the reason for their elimination noted.
- Alternatives which may not be feasible at the time of the screening could become much more attractive if there are technological advances.
- Other systems may be implemented which enhance the value of the solution.
- Political, economic, or other changes may alter the context of the project.
- There may be renewed interest in an alternative due to news events or attention by INS, Department of Justice (DOJ), Congress, or oversight authorities.

**Preparation for Evaluation**

Having defined the options, it now remains to establish a basis for comparison. The next two sections outline how to identify and quantify the costs, benefits and risks associated with each option. By this time in the business case development process, the following questions should be determined:
Chapter 2
Developing the Business Case

- How does each alternative relate and respond to the Department’s and Service’s objectives and priorities?
- How will the alternative enhance service to the public or improve program delivery?
- What overall program performance results will the alternative achieve? What are the projected improvements in timeliness, productivity, cost savings, cost avoidance, quality, and service?
- Who are the stakeholders? What are their positions, interests, potential benefits, and responsibilities? How does each alternative affect them?
- What additional outcomes or benefits could occur if this alternative were selected?
- What might happen if the alternative were not selected?
- What will be the implications for the organization's staff? What requirements will there be for education, training, and reassignment?
- Does the alternative involve the innovative use of technology? If so, what risks does that involve?

**Cost Benefit Analysis**

A cost benefit analysis (CBA) is central to a business case in that it documents the economic viability of each alternative being considered and provides input to decision-makers on cost-effectiveness and annual cost and benefits flows of each alternative. Specifically, the CBA should result in recommendations about (a) whether a project is economically justified; and (b) which alternative is the most economically viable and/or cost-effective means to meet the mission need(s) or business objective(s) addressed by the project.

The level of detail in a CBA depends on the scale, importance, and life cycle stage of the project. For a major or critical project, a stand-alone CBA may be required; while for a smaller project, the CBA can be part of the business case. A CBA, conducted before a significant amount of development, may be only a rough order of magnitude (ROM) estimate, while a CBA on existing technology, which has been tested, would have far more detail. This section will outline the requirements for CBAs. Complete instructions on conducting a CBA, including techniques, methodologies, templates, and examples, can be found in the ITIM CBA Guide.

The following sections outline key requirements of the cost analysis, benefits analysis, and cost benefit comparisons.
Cost analysis is a vital component of a business case and is required for effective life cycle management of IT system assets. Developing a life cycle cost estimate (LCCE) for the base case and each alternative is critical in determining a preferred alternative. An LCCE provides the initial project baseline used to determine funding requirements to implement and support the project, to assess the status and performance of the project, and to determine the effect of schedule, funding, or scope modifications on the project's outcome.

The cost analysis supports the development of the CBA. A CBA documents relative costs, benefits, and qualitative merits of a project and alternative solutions (including the base case).

An LCCE is not a CBA; however, in some cases, where benefits are not considered (either the project is mandated, or all alternatives have the same benefits, so benefits is not a factor), the LCCE of each alternative may fulfill a requirement to perform a CBA.

An LCCE covers all costs incurred during the life cycle of an IT project or system from project initiation through termination. The level of detail varies with the project phase (early phase LCCEs generally are ROM), size of project, and type of project. The LCCE comprises all affected budgets, and is the total cost to the government for a program over its entire life. It includes the cost of planning and development, investment in mission and support equipment (hardware and software), initial inventories, training, data, facilities, and the operating, maintenance, support, and disposal or long-term storage. For more details on LCCEs, see the INS Technical Paper on Processes and Procedures for Cost Analysis (draft).

The INS’ ITIM process defines seven investment decision points, between which there are six life cycle phases (see Exhibit 4). For each investment decision made as the system is developed and progresses through the process, the project cost information must be updated and reviewed by senior management; hence, the business case must identify these costs to permit easy comparison (e.g., the LCCE for the preferred alternative stated that development costs for the pilot system would costs $x million, and the actual development costs were $(x – 0.5) million.

Note that the progress of a project is not necessarily a linear progression through the phases listed in Exhibit 4. If a system is not ready to be fielded at the time of the Phase 4 decision, it may be ‘sent back’ to an earlier phase for further refinement.
Chapter 2

Developing the Business Case

Exhibit 4: ITIM Process Phases and Activities

<table>
<thead>
<tr>
<th>Investment Decision Point</th>
<th>Key Business Case Activities</th>
<th>Corresponding SDLC * Phase(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Proceed to Business Case Development</td>
<td>Develop business case to gain acceptance of project.</td>
<td>Concept Development, Planning</td>
</tr>
<tr>
<td>2. Official New Project, Proceed to Requirements Generation</td>
<td>Update as appropriate.</td>
<td>Requirements Definition</td>
</tr>
<tr>
<td>3. Proceed to Design</td>
<td>Update as appropriate.</td>
<td>Design</td>
</tr>
<tr>
<td>4. Proceed to Development</td>
<td>Update as appropriate.</td>
<td>Development, Test</td>
</tr>
<tr>
<td>5. Field System</td>
<td>Final updates before acquisition decision; costs, budget should be complete with small level of risk, margin of error.</td>
<td>Implementation</td>
</tr>
<tr>
<td>6. Commence Operations and Maintenance (O&amp;M), Initiate Pre-Planned Improvements</td>
<td>Post implementation review.</td>
<td>Operations &amp; Maintenance</td>
</tr>
<tr>
<td>7. Dispose of System</td>
<td>(Business case for follow-on)</td>
<td>Disposition</td>
</tr>
</tbody>
</table>

* SDLC = INS Systems Development Life Cycle

Base Case and Alternative Costs and Scenarios

The base case life cycle costs (LCC) are the costs of operating and maintaining the existing system(s) or environment throughout the period that would be the operational life of the project. Thus, if a project would be implemented in 2005, base case costs prior to 2005 are not considered since these costs would be incurred regardless of what decision is made on the project. If there is no existing system, base case costs are the costs to provide the existing capabilities.

The costs for any proposed alternative to the base case are all life cycle costs — planning, system requirements generation, design, development, acquisition and implementation, O&M, and disposal — for all planned versions of the system.

Calculation and Display of Costs

Typically, the LCCs of alternatives being evaluated are broken out in several ways. For resource and schedule planning purposes, costs should be estimated by investment decision phase. Costs are associated with the activities conducted in the respective phases, and they help decision-makers understand tradeoffs (e.g., an alternative may have higher development costs, but lower O&M costs).

For budget and schedule planning purposes, and to put project costs in the context of the Agency’s overall strategy, costs for each alternative should also be shown by fiscal year, as in Exhibit 5. Budget costs should be shown using current, or budget year dollars (i.e., with escalation to
Developing the Business Case

account for inflation, see the ITIM CBA Guide for an explanation of how this is done).

Depending on the size, scope, and criticality of the project, further funding breakouts may be required. Generally, allocation by INS budget is required. More detailed breakouts may be required for the selected alternative only.

**Exhibit 5: Annual Costs ($000, Budget Year Dollars)**

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Yr 1</th>
<th>Yr 2</th>
<th>Yr 3</th>
<th>….</th>
<th>Yr N</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Case</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alt. 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alt. 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>…</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alt. N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Benefits Definition and Analysis**

If a project is economically justifiable, the value of benefits should outweigh the costs. This means that benefits must be identified, measured, and monetized or at least qualitatively described. Benefits should be consistent with mission needs, agency objectives, and project objectives (though benefits in addition to those directly intended may often result). Benefits can accrue to the government, the agency’s customers, and/or to the general public.

For all categories of benefits, whether accrued by the government or the public (individuals, businesses, other organizations), the following steps are necessary:

- Define the base case and alternatives (see below).
- Identify all benefits resulting from each alternative in comparison to the base case.
- Identify performance measures to be used to evaluate benefits, and how measures will be applied. Such measures should be objective, quantifiable, and measurable.
- Estimate benefits in quantifiable units (e.g., amount of time saved, reduction in errors).
- Translate units of improvement to monetary value.
The details of benefits analysis are found in the ITIM CBA Guide. The key requirements of the benefits analysis are highlighted in the following sections.

Exhibit 6 (next page) is a sample matrix of benefits that might be achieved by various stakeholders including government, individuals, businesses, and other organizations. All benefits identified should be evaluated and quantified to the extent possible. If a benefit cannot be reasonably quantified, describe it qualitatively so that decision-makers can take it into account. At the time of the business case, most benefit estimates are likely to be ROM only. More accurate estimates are generally possible at later phases of the system life cycle, particularly once system testing and evaluation has been accomplished (see the ITIM Investment Update Summary [IUS] Guide).

In Exhibit 6, note that ‘individual 1’ and ‘individual 2’ do not refer to any specific person, rather classes of individuals; e.g., an improvement may have different levels of benefits for people depending on their area of origin, travel patterns, or type of occupation.
Exhibit 6: Sample Benefits Table

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Benefit 1</th>
<th>Benefit 2</th>
<th>Benefit 3</th>
<th>Benefit 4</th>
<th>Benefit 5</th>
<th>Benefit 6</th>
<th>Benefit 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business Unit/Owner</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chief Information Officer</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OIRM</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individuals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Class of) Individual 1</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Class of) Individual 2</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>…</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Class of) Individual N</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Businesses</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Business 1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business 2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>…</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business N</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Organizations</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Organization 1</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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</tr>
<tr>
<td>Organization 2</td>
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<td>✓</td>
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<td>✓</td>
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<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In order to effectively analyze benefits, the baseline and base case scenario must be defined and understood. The benefits of all alternatives to the base case are calculated in terms of the value of their capabilities above and beyond what exists with the base case.

Typically, in developing the concept paper, the current capabilities are outlined, as well as deficiencies of the current system/situation, and their estimated costs, and/or the opportunities afforded by a potential new system. These data should be refined, described and estimated more...
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accurately, if possible, in the CBA, along with a description of how the proposed project would address such issues and to what extent.

The alternatives to be evaluated should be defined by the Feasibility Study, which identifies options meriting evaluation. Benefits must be identified for each option, based on the improvements that each option would bring compared to the base case. Some key guidelines and requirements for benefits analysis:

- All benefits should be evaluated using performance metrics. This provides for an objective, quantifiable measure of improvement (e.g., amount of time saved, number or percentage of errors avoided), which can usually be translated to monetary terms.

- The benefits analysis should focus on project objectives and how the project meets defined mission needs and goals. Often, other benefits are accrued, and these should be accounted for, but if an alternative does not adequately address the problem/issue/opportunity that the project is supposed to address, it may not be an appropriate solution.

- Benefits to both the government, and to agency customers or the general public, should be evaluated.

- Quantify and monetize as many benefits as possible to provide decision-makers with the best indication of a project’s or alternative’s economic value. The ITIM CBA Guide provides techniques that can be used to quantify benefits using performance measures and assign values to benefits that may not have a generally accepted value.

- “Intangible” benefits should be documented. Some benefits may not be easily measured or quantified, there may not be a reasonable level of agreement on their measurement/level/value, or there may not be adequate time or resources to fully evaluate them. In these cases, the benefit should be at least qualitatively described so decision-makers can also take them into account.

Typically, each benefit for each alternative is quantified by year for the project’s operational life cycle. It is useful to aggregate by government and client (and other, if applicable) benefits. Benefits should be calculated in both constant dollar and present value terms. It is useful to include ‘intangible’ benefits, possibly with some qualitative indicator (e.g., major, minor, possible, etc.), so that decision-makers are aware of these benefits and their potential impact, and can include these factors in their comparison of the alternatives. Exhibit 7 shows a comparison of alternatives, with summary totals for each benefit displayed.
Exhibit 7: Comparison of Benefits for Alternatives

<table>
<thead>
<tr>
<th>Benefit Category</th>
<th>Base Case</th>
<th>Alt 1</th>
<th>Alt 2</th>
<th>....</th>
<th>Alt N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GovBen1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GovBen2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PubBen1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PubBen2</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ultimately, the CBA involves comparison of the costs and benefits for each option being evaluated. Generally, if quantified benefits outweigh quantified costs, the project or option is considered economically beneficial. The option for which benefits most outweigh costs is generally the preferred option. The *CBA Guide* provides details of how to conduct cost benefit comparisons; key requirements and concepts are outlined below.

The CBA comparison of benefits to costs is conducted using present value or discounted dollars. This discounting reflects the time value of money, and is consistent with the way that businesses view investment opportunities. Present value is explained in more detail in the *CBA Guide*. The use of present value in CBAs is explained in Office of Management and Budget (OMB) Circular A-94, *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs*.

The two primary measures used to compare benefits to costs are:

- **Net Present Value (NPV)** — Life cycle present value benefits minus life cycle present value costs. By this measure, an NPV greater than zero means that benefits outweigh costs, and the alternative with the greatest NPV (or largest economic value) is preferred. This method is recommended by OMB Circular A-94.

- **Benefit to Cost (B/C) Ratio** — Present value benefits divided by present value costs. A B/C ratio greater than one indicates that benefits outweigh costs. Sometimes this method is preferable, particularly when funds are limited, and managers want to obtain the maximum ‘bang for the buck’.
Managers may want to evaluate and compare options using other financial measures. Some of these are described in the “Alternatives Analysis” section.

For smaller, less critical projects, the LCC, benefits, and their comparison(s) may be all that is needed, per the guidance of the IAB. Usually, the CBA should be supplemented by risk analysis (see next section). This will provide decision-makers with a level of confidence in the results, and an understanding of the range of possible outcomes. The bottom line is that the CBA results have to be balanced with an understanding of the risks and uncertainties involved with a project or option. Decision-makers should not consider just the “single point in time” CBA estimates, but the likelihood that these results will be achieved, and the potential that other plausible outcomes and results could occur.

Every project is imperiled by certain risks. IT implementation projects face possibly more risk than other types because information technology continues to change very rapidly. Various studies have shown that many IT projects are cancelled before they are completed, and that even completed projects often suffer severe cost and schedule overruns, and often do not provide many of the planned benefits. Information systems development is maturing as a discipline, however, and methodologies (such as those in the ITIM Process and Procedures Guide and Systems Development Life Cycle [SDLC] Manual) have been developed to help assess and manage risk associated with IT development projects.

A business case analysis is more than just tallying up the points related to costs and benefits. The business case must also provide decision-makers with the level of confidence in the estimates, and the associated risks and uncertainties that could alter the findings and results of the business case. It is important to identify factors that could have the greatest impact on results, to provide an early warning to managers.

Risk, uncertainty, and sensitivity analyses are a very critical element of the business case. The Risk Analysis Guide provides details on how to conduct risk, uncertainty, and sensitivity analysis, including how to identify, evaluate, and quantify risks and uncertainties, and how to incorporate the findings into the business case. The key elements, requirements, and factors to consider are outlined below, beginning with some key definitions:

- **Risk** – refers to threats to the project’s success, such as software not working, or an inability to integrate with other systems.
• **Uncertainty** – refers to plausible variations in assumptions or parameters behind cost and benefit calculations; uncertainties do not directly threaten the success of a project, but can account for significant variation in results.

• **Sensitivity analysis** – is an element of both risk and uncertainty analysis, but is aimed at identifying the sensitivity of the overall results to changes in individual factors; it pinpoints the factors that could cause the greatest variation in the overall results, thus providing early warning for managers.

The following sections outline ways to help identify and evaluate the risks that an IT investment may face so that they can be included in the business case. It also addresses how to plan to control or minimize the risk associated with implementing an IT investment.

The risk assessment in a business case identifies and quantifies risks to cover all threats to the successful achievement of IT investment objectives and to the benefits identified in the business case. The assessment and management of risk are ongoing processes that continue throughout the duration of IT project development, implementation, and operation, and are used to guide decisions about the implementation project. The better the risks are understood and planned for, the more a reliable decision can be made and the better the chances of success. Understanding the risks and their consequences enables managers to objectively evaluate whether the potential investment should be made.

The method underlying most risk assessment and management approaches can be summarized by the following five-step process:

• Identify the risks facing the project.

• Characterize the risks in terms of sequence of events, impact, likelihood of occurrence, and interdependence (e.g., if one risk factor happens, are other risks likely to occur).

• Prioritize the risks to determine which need the most immediate attention.

• Devise an approach to assume, avoid, or control risks.

• Implement the approach and monitor the risks, consistent with the approach in the ITIM Risk Analysis Guide.

All but the last of these can and should be undertaken as part of the business case analysis conducted prior to the decision to proceed on an IT
investment proposal. It is essential, therefore, to understand the risks facing an IT implementation project before it is approved.

There are three basic types of risk that should be evaluated:

  
  - **Systems Development and Integration Risk** — refers to risks that the hardware or software will either not work as planned, or cannot be developed as planned. A key technical risk that often needs close attention is in the area of systems integration.
  
  - **Security Risk** — whether information and computer assets can be sufficiently protected from deliberate or incidental destruction, corruption, or unavailability.
  
  - **Operational/Organizational Risk** — risks that a system will not be used effectively, or that users will not want to use the system or will find it difficult to use. This is sometimes listed separately from technical risk because even though a system will perform the required functions and is integrated with other systems once a system is installed it is not used as intended or is not well received by users.

- **Cost Risk** — the risk of cost overruns. Generally, the cost risk is much lower for a COTS item than for an item that must be developed. Cost risk tends to be most severe for major software development efforts, and a major software program designed to perform complex functions is much more risky than database development. Cost risk is often highly correlated with technical risk, in that technical problems tend to lead to cost overruns.

- **Schedule Risk** — the risk that a project cannot be completed on schedule. Like cost risk, it is often a corollary of technical risk, though budget problems and delays in related projects or events can cause schedules to slip. Schedule risk is most critical when there are schedule dependencies (i.e., one event can not occur until after another event), or when there is a requirement for a project to be implemented by a firm date.

The circumstances and environment of each project are unique. Risks should be identified at a level that managers could identify warning signals and devise an avoidance or mitigation strategy.
Identifying and characterizing risks typically involves coordination with various interested parties. Users, customers, and subject matter experts have different perspectives of the potential investment and can provide valuable input on risks.

For any project, it is likely that multiple risk factors will be identified. Once risks are identified and described, they should be assessed in terms of their probability and impact. Some may merit little management attention, some may require simple monitoring, and others may require a significant level of active management. Thus, the risks must be characterized and prioritized so that a sensible risk management strategy can be developed, which focuses on the most critical risks and makes optimal use of management resources.

For each risk identified, the degree of risk should be characterized in terms of its:

- Event sequence (what are the warning signals, trigger events, the immediate impacts, etc.)
- Impact on the project (e.g., slight delay or show-stopper)
- Probability of occurrence (e.g., from very unlikely to very likely)
- Relationship to other risks, in particular dependencies (i.e., if one risk factor occurs, another is likely to occur, or risk x is likely to occur if y happens)

Since it is difficult to assign exact values to the level of risk exposure, risks are often characterized in a semi-quantitative manner. A typical scale, with risks ranked from 0 to 5, is shown in Exhibit 8. This is a generalized ranking which can be applied to any risk or project, similar to what is used by many government organizations. It should be seen as complementary to the investment ranking criteria in the ITIM Investment Ranking Criteria Guide. The criteria in this guide are more specific in some areas, and should be used for INS projects.
Chapter 2

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Exhibit 8: Risk Levels

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No (known) risk exposure, no risk to project.</td>
</tr>
<tr>
<td>1</td>
<td>Risks are inconveniences, minor problems, or of nuisance value but not a threat to the project.</td>
</tr>
<tr>
<td>2</td>
<td>Risks of minor impact; possible minor cost increases, short term delays, or minor impact to project effectiveness.</td>
</tr>
<tr>
<td>3</td>
<td>Significant risk that could cause greater than 10% cost or schedule overrun, possibly degrade product or processes.</td>
</tr>
<tr>
<td>4</td>
<td>Serious risk to major element of product, or to overall performance of product; potentially serious cost and/or schedule overruns.</td>
</tr>
<tr>
<td>5</td>
<td>Risk of catastrophic failure of project; that project could not be implemented or not perform required functions.</td>
</tr>
</tbody>
</table>

Risk Prioritization

Once the risks have been identified and characterized, they can then be ranked in priority order to determine which merit management attention. Priority should be based on a combination of an event's impact, likelihood and interdependence. Warning signals of each risk should be identified so steps to mitigate/manage the risks can be taken at the earliest possible time.

The purpose of risk prioritization is to enable managers to focus on the greatest threats to the project. A threat to the project or the exposure level is a combination of the risk level and the probability of occurrence. Sometimes the risk level or estimated dollar value of the risk is multiplied by the probability of occurrence to calculate an expected risk, which is used to prioritize projects. Managers may want to have plans for a risk that is potentially disastrous but very low probability, however, they may prefer to focus on higher possibility events.

Courses of Action

There are three main types of responses to risk in IT development projects and they are listed in ascending order of their potential to reduce risk:

- **Accept** — No direct action is taken. This does not necessarily mean that no planning or action takes place. There may be contingency plans (e.g., if one vendor fails, another, possibly less preferred source may be available), so that if a risk event does occur, there is a planned alternative course of action.
Developing the Business Case

- **Control** — This is essentially a reactive approach to risk. No steps are taken specifically to avoid the risk, but there are plans to respond to it if it occurs. This approach may be taken in the event that avoidance strategies are not deemed feasible or cost effective.

- **Avoid/Mitigate** — This is proactive risk management. The IPT takes action prior to the occurrence of an event to reduce its probability of occurrence or mitigate its impact. Many risks can be mitigated or avoided through effective project planning.

Selection of a type of response depends on the priority assigned to a risk, its nature (whether it is amenable to control or avoidance), and the resources available to the project. In general, the higher the priority of a risk, the more vigorous the type of response applied.

Note that activities for reducing risks will require time, effort, resources, and usually, funding. These actions need to be incorporated into the project budget, schedule, and other planning components as appropriate.

### Uncertainty Analysis

Whereas risks are factors that could directly threaten the feasibility, viability, or benefits of a project, uncertainties are external factors that do not directly threaten the project but could have a significant impact on the overall results. **Uncertainties** refer to the changeability of parameters, assumptions, and variables used to calculate the most likely costs and benefits (e.g., future traffic levels, number of inspections). Generally, there is little that the project staff can do to directly impact uncertainties.

The reason for uncertainty analysis is that many factors used in the calculation of costs and benefits are based on assumptions, estimates, statistical averages, or trends. These may be ‘best guesses,’ but in reality, there will always be variations from the ‘best guesses’ used in the analysis. The point of the uncertainty analysis is to evaluate plausible variations and determine the level of confidence in the estimates, to identify which factors could have serious impacts on results, and if possible, to identify strategies to mitigate such impacts if necessary. Uncertainty factors can mean the difference in a project being economically beneficial or not.

The types of cost and benefit uncertainties, and how to identify, evaluate, and quantify them are described in the ITIM Risk Analysis Guide.

### Sensitivity Analysis

Sensitivity analysis is a basic element of the business case; but whereas risk and uncertainty deal with the probability and impact of such factors, sensitivity analysis is concerned with identifying which factors would have the greatest impact on results. Sensitivity analysis is conducted by
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varying one cost or benefit variable at a time, so the impact of changes to each variable can be assessed.

The sensitivity analysis should identify ‘watch factors’ related to the success of the project. In particular, it is important to determine whether the study results are sensitive enough to any factors that a plausible variation in that/those factor(s) could change the overall results.

A second use of sensitivity analysis is to identify how extreme the conditions would have to become before a project was deemed cost-non-beneficial. For example, this function operates in much the same way that a business might calculate, what level of customers it needs for a store to be profitable. This method is used particularly when the level of benefits is uncertain or the value of a benefit is subject to debate, in which case the analyst may want to test different values to determine the impact on results. This analysis assists decision-makers in understanding the conditions that would render a system successful or unsuccessful.

<table>
<thead>
<tr>
<th>Summarizing and Presenting Risk Analysis</th>
</tr>
</thead>
</table>
| For each alternative evaluated, the analysts should develop a summary of the risk, uncertainty, and sensitivity analysis which highlights for decision-makers (a) the most critical factors, (b) factors the results are most sensitive to, and (c) which factors management should concentrate time and resources on. The most critical factors are those which merit the most attention which can be due either to the severity of the potential impact or their probability of occurrence. Factors that the results are most sensitive to are key warning signals to management. These factors may not have a high probability of occurrence but they should be carefully monitored, as they have potentially the greatest impact. Factors which management should concentrate time and resources on are those that management could effectively take action on (certain factors could have a severe impact, but management may not be able to counter them).

A summary chart, such as that depicted in Exhibit 9, should present risks and uncertainties in order of their threat to the success of the project. The recommended action should indicate whether avoidance or mitigation actions by management are possible or feasible. For example, the project staff could not do anything about uncertainty over the number of border crossings, but could take avoidance or mitigation steps against an information security risk. |
Exhibit 9: Summary of Risk, Uncertainty and Sensitivity Analysis

<table>
<thead>
<tr>
<th>Factor</th>
<th>Type of Risk or Uncertainty</th>
<th>Severity of Impact</th>
<th>Probability of Occurrence</th>
<th>Sensitivity</th>
<th>Recommended Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor 1</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>::</td>
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<tr>
<td>Factor N</td>
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</table>

There are a variety of means to compare alternatives. The best way may depend on the specifics of a project. Analysts could develop a point system to indicate an overall level of risk for each alternative, or for each alternative indicate the number of severe risks, or risks/(negative) uncertainties with a high probability of occurrence. Another useful comparison would be the number of risks or uncertainties that could be effectively neutralized by management action.

Alternatives Analysis

Once the costs, benefits, and risks of all feasible alternatives have been examined, what remains is the comparison and choice of one to recommend. This section summarizes the alternatives analysis process and identifies the criteria that will help select the best alternative. Exhibit 10 summarizes the business case alternatives analysis process from the identification of alternatives through selection of the preferred alternative.
The Feasibility Study identifies the alternatives requiring further analysis, which are then subjected to life cycle costing, benefits analysis and risk analysis (as previously noted, in some cases, an LCCE may be all that is needed).

A CBA compares the benefits and costs of all alternatives. The primary result of the CBA is a recommendation of the best alternative in economic terms. The ITIM CBA Guide provides a summary of what information should be provided in a CBA. Depending on the expected size of the project, a separate CBA may be required, with the business case document just summarizing its results; or the CBA may be done within the business case.

Where there is just one alternative, the comparison is the present value benefits versus present value costs and whether this value is greater than the base case costs. Otherwise, each alternative is compared to the base case in the same way and the results are compared. Although intangible (unquantified) benefits do not figure directly in the benefit-cost comparisons, they should be described fully so that decision-makers can take them into account. This is especially important when multiple alternatives are being considered and they do NOT have the same unquantified benefits.
Per OMB Circular A-94, in economic terms, the preferred alternative is the one that provides the greatest net present value (NPV) or the present value benefits minus the present value costs. If only an LCCE is required, the economically preferred alternative is the one with the lowest present value LCC. The determination of the greatest NPV or lowest LCC must include an evaluation of risks and uncertainties. An alternative with a lower NPV (or higher LCC) and a small amount of risk or uncertainty may be preferable to an alternative with a higher NPV (or lower LCC) with a significant risk associated with it, because there is greater confidence in its result.

A risk/uncertainty and sensitivity analysis is conducted along with the CBA. A separate project risk analysis is also often conducted as part of the business case to evaluate a broader range of risks/uncertainties, and to discuss in greater detail risks, which cannot be directly quantified (e.g., budget shortfalls, schedule slips). Depending on the size, scope, and criticality of the project, a separate risk analysis document may be required.

The economic perspective does not cover all considerations. Although economic criteria usually weigh heavily in the decision, there are times when other criteria may have priority, for example when Congress or a regulation mandates something. Regardless, each investment must also be viewed in terms of the Department and Service's overall goals, objectives, and strategies. Typically, different alternatives may have different risk profiles, schedules, political implications, and levels of compliance with Department/Service priorities.

The INS uses the ITIM investment ranking criteria for alternative analysis. A similar system was developed by the U.S. General Accounting Office (GAO) for government-wide use, but has been modified specifically for the INS. These are the same criteria used by the IAB in evaluating IT projects. These criteria are summarized in the Self-Ranking Using the IT Investment Criteria section (p.29).

Even these criteria cannot take into account all decision variables. There are other subjective factors, which may be compelling, that also drive the choice of the preferred alternative, which must be accounted for. Whether such factors exist and what they are depends on the specifics of the project being evaluated. Additionally, in some cases, a factor may take on far more weight than is accorded to it in a ranking system; the ranking system criteria are essentially average weights, or weights for a ‘typical’ project, so special cases can arise.
This section describes some of the key financial measures that are used in investment decision-making, and may be used in the business case analysis:

- **Net Present Value (NPV)** — Present value benefits minus present value costs. This is the generally preferred measure to use, particularly when only one alternative is being evaluated.

- **Benefit-Cost (B/C) Ratio** — Present value benefits divided by present value costs; sometimes referred to as the 'bang-for-your-buck.' Comparing B/C ratios is not always the best way to select an option, since one option can have a significantly higher NPV than another with a slightly lower B/C ratio.

- **Payback Period** — The amount of time it takes to recover the initial investment. This measure is more commonly used in business than in government, but where a project involves private sector investment, it is a useful measure to use. Since the government generally does not receive revenue for its services (even when fees are collected, they are not set with the objective of making a profit, as in business), using the payback period for a government investment should be done with caution. The 'payback period' for a government investment is the time it takes for (public and government) life cycle benefits to exceed the net costs.

- **Break-Even Analysis** — Similar to and associated with the payback period. The break-even analysis determines the point in time that present value life cycle benefits surpass present value life cycle costs.

- **Return on Investment (ROI)** — Similar to the B/C ratio. ROI refers to the payback for an investment, and is typically used by businesses to evaluate and measure the economic impact of investments. Although the term is sometimes used in Federal and Departmental guidelines, it doesn't really apply well for government investments. Since government investments are not intended to yield revenue or profits for the government (though users may pay fees for services), and most benefits are usually accrued by the general public and/or businesses; the term cannot be applied in the same way that businesses use it. It is a useful measure in that it measures the impact of money invested; and since government investments should be cost-effective, beneficial, and efficiently managed, it can be a useful measure to compare alternatives or evaluate a portfolio.

Although NPV is generally the preferred method to use in a CBA, sometimes organizations may prefer to use the B/C ratio, particularly
when funds are scarce and there is a desire to get the maximum return on every dollar spent. The other measures may be useful for specific purposes. In particular, when an analysis involves private sector expenditures, the analyst should consider measures more commonly used to evaluate private sector investments, such as payback period and ROI, since these results are more likely what will be of interest to the private sector, and would more likely determine their behavior.

### Comparing Risks, Uncertainties, and Sensitivities

A second key element of comparing investment analysis alternatives is the risk, uncertainty, and sensitivity analyses. While the CBA provides point estimates of costs, benefits, and other economic/financial measures (such as NPV, B/C ratio, etc.), the risk, uncertainty and sensitivity analyses provide a measure of confidence in the results of the CBA, and ultimately, a range of plausible results for each alternative. Simply put, an alternative that provides the highest NPV and B/C ratio but has much more risk and uncertainty associated with it, may not be preferable to an alternative with less impressive CBA numbers, but with much less risk and uncertainty. There is no defined cut-off point on level of risk or probabilities that require a specific type of decision. The appropriate decision-makers have to use their judgment, based on these and other factors, about which alternative would most likely be the best. As noted, "Raines' Rules," the ITIM Risk Analysis Guide, and other guidance documents provide instructions on reducing and minimizing project risk.

The CBA and risk, uncertainty, and sensitivity analyses can be an iterative process. Often, in conducting a CBA, areas of high risk or uncertainty are identified, which can lead to efforts to reduce or avoid such risks. Sometimes, modifications or risk mitigation efforts have an impact on costs or benefits. For example, in cases where there is higher risk software development, identification of the impact of the risk could lead to changes in the project plans, such as a phased implementation or adopting a less risky means to implement the functionality. In many cases, the identification and characterization of risk results leads to risk mitigation or contingency plans that significantly reduce the possibility and the potential impact of the risk. In some cases, risk mitigation may result in additional costs, but could significantly reduce the range of variation.

It is particularly important to conduct risk, uncertainty, and sensitivity analyses carefully when there are multiple alternatives in serious contention. If alternatives are variations of each other, there may be only minor differences between alternatives in risk/uncertainty analysis results. However, when alternatives represent different strategies, or there is a development alternative versus a COTS or an upgrade alternative, there may be very different risk and uncertainty factors and overall profiles. It
is important to assess and compare the different potential impacts, probabilities of occurrence, and dependencies.

The ultimate result of the risk, uncertainty, and sensitivity analyses is a range of plausible results, with estimated levels of probability. Ideally, this is shown in terms of providing the most likely results and low and high bounds with a certain level of confidence. For example, that there is only a 10 percent chance that the NPV (or costs or benefits) would be below $x and only 10 percent chance of being above $y. If possible, there should be an indication of the probability that the most likely results will be achieved. There should also be an indication of the likelihood of a positive result, particularly in higher risk alternatives.

Risk/uncertainty analysis is thus an extension of the basic cost benefit investment criteria. The greater the uncertainty associated with a project, or the more complex it is, the more cost effective the use of a quantified approach becomes to deal with uncertainties. The key point is that decision-makers need to have a solid understanding of risks and uncertainties in the CBA results. The final investment decision must account for the CBA results, the risk analysis, risk management strategies, and uncertainty factors.

The Investment Ranking Criteria Guide explains the ITIM process for investment decision-making and provides the ranking criteria for alternatives, with explanations of the ranking criteria and how to use them.

**Self-Ranking Using the IT Investment Criteria**

After the economic aspects (CBA, risk analysis) of the alternatives are evaluated, decision-makers have to consider these results along with other key decision factors. The ITIM Investment Ranking Criteria Guide is the model specially designed for and used by the INS. The model considers economic factors, as well as strategic and organizational factors that drive investment decisions. It considers five key factors:

- Mission Effectiveness
- Strategic Alignment
- Cost Benefit Impact
- Risk
- Organizational Impact

Each of these factors is broken out into sub-factors, which are weighted. For example, ‘Risk’ is subdivided into the components: schedule risk, cost sensitivity, technical risk, organizational risk, and risk of not completing the project. The Investment Ranking Criteria Guide discusses this ranking system in detail and demonstrates how to apply it.
The Ranking Criteria in the Investment Ranking Criteria Guide does not constitute a complete list of all possible ranking factors, and in some projects, certain elements may not apply, or may have a weight much greater than indicated. These are ‘average’ weights for a typical IT project, and are essentially ‘default values’. In most cases, where the ranking mechanism differs from that described in the Investment Ranking Criteria Guide (e.g., INS is mandated by Congress or DOJ management to implement a specific solution), it will be clear to the project staff.

The investment analysis process deals with the life cycle costs, benefits, and risks of prospective projects and alternatives under consideration. In addition to demonstrating the economic aspects of a project, the IPT must show that the project or preferred solution can be brought to operational status. The acquisition strategy describes how all equipment, materials, resources, and support are acquired during the life of the project. It is intended to ensure that necessary resources can be obtained when required. The implementation plan describes how the system will be installed and transitioned to full operational status. It also details how the necessary resources for implementation will be acquired and used. Both are included in the business case to ensure that an orderly transition to the new system is feasible and well planned, and that the organization’s operations will continue throughout the transition without disruption.

Acquisition Strategy

The acquisition strategy’s primary function is to demonstrate that a system can be procured and all requisite support can be obtained as required. It is intended to provide management with adequate information for decisions concerning procurement of all equipment, materials, resources, and services, and ensuring the availability of funding. The SDLC Manual provides further details about the contents of the acquisition strategy.

The formal acquisition strategy is developed after the selection of an alternative, but consideration of how acquisition will work for viable alternatives should begin at an earlier stage. In the feasibility study, the analyst should, at a high level, evaluate acquisition requirements for each alternative. After an alternative is selected, the formal acquisition strategy should be developed. It can be part of the, or, if required, a separate document. It should provide details about:

- Whether the acquisition is at a single point in time, spread over multiple years, or phased
- Whether there are upgrades and what acquisition requirements are associated with them
- The amount of equipment, other purchases, and labor that is required
The Acquisition Strategy comprises the period from pre-solicitation to post-award of the acquisition contract. It covers all phases and aspects of system acquisition, including:

- Developing the statement of work (SOW)
- Developing and issuing the request for proposal to acquire the system
- Evaluating proposals
- Ensuring that all required equipment and materials can be procured as required
- Planning, organizing, and coordinating to ensure that the funding, personnel, resources, and logistic support required are available when and where required

The acquisition process should be considered in the investment analysis, since the investment analysis includes the costs to acquire the system, the projected schedule, and budget.

In developing the Acquisition Strategy, the analyst needs to carefully evaluate the process of acquiring the system and all requirements for a smooth acquisition. This is a much more detailed evaluation of this phase of the life cycle than in the Investment Analysis, and effectively provides a 'sanity check' for the Investment Analysis. The more detailed analysis of the process should also help to identify efficiencies and cost-saving measures in the acquisition process. Two key elements of the Acquisition strategy, to a large extent interrelated, are the budget and schedule.

One of the IPT’s primary responsibilities in planning the acquisition is to develop the budget, including the budget profile (i.e., how much money in which years) and the amounts required from the different budgets. The investment analysis should include the budgetary requirements for the preferred alternative. The IPT needs to ensure that:

- The budget covers all requirements for the acquisition, including all peripheral equipment, telecommunications, supplies, logistic support, and government and contractor personnel.
- The budget is adequate to cover all acquisition-related activities, including any risk mitigation actions, contractor support, legal support, etc.
- The budget request is based on a realistic assessment of funding requirements.
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- The budget profile is consistent with the acquisition schedule; that is, funding is available when it is needed to meet the planned schedule. Among the considerations should be whether the acquisition is single or multi-year, whether it is phased (i.e., it should cover planned enhancements or future phases), whether there are planned upgrades or refurbishments, and the implementation schedule if the system will be installed at multiple sites.

- The funding profile is provided in budget year dollars (i.e., inflation included).

- Review authorities will require accurate budget numbers.

Schedule Planning

Careful schedule planning is necessary to ensure materials, resources, and support can be delivered when needed, and then to ensure that the budget reflects the financial requirements to meet the schedule. The schedule should include milestones for all acquisition period events; i.e., developing the SOW, issuing the request for proposal, evaluating the proposal, selecting the vendor, contract award, any production required, and delivery of products and services. As necessary, the schedule should also include time for legal reviews/opinions, or other events particular to the project. The ITIM Process & Procedures Guide lists project milestones for required activities, with guidance on actions required and scheduling. As with the budget, the schedule analysis should be more detailed than in the CBA, and should provide a sanity check for it. Some key elements that the schedule analysis should account for include:

- Schedule dependencies (e.g., x has to be completed before y can occur)

- The lead-time required for various activities

- Coordination of schedule with the budget

- Time-period between contract award and delivery; this can be minimal for COTS items, but where production or software development is required, the time and annual funding for such activities needs to be carefully planned and coordinated

- Coordination with the implementation schedule (which may drive the acquisition schedule), particularly if (a) the implementation is phased, and/or (b) a large number of systems is being installed over multiple years

Implementation Plan

The implementation plan covers the period from the acquisition of the system and related resources until the system is fully operational. Although there should be a degree of implementation planning during the
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investment analysis (for each alternative, what is required to implement the system, any infrastructure needs, etc.), the actual plan is developed after the preferred alternative is selected. Like the acquisition strategy, the implementation plan is often presented as part of the business case package; however, for major or critical systems, or systems being installed in numerous locations, there may be a requirement for a separate document. The SDLC Manual provides details about the implementation plan.

As with the acquisition strategy, development of the implementation plan is equivalent to a sanity check on the investment analysis. The analysis involved ensures that the system can be effectively implemented, and provides information to the Project Manager and decision-makers for effective planning and coordination. Also, like the acquisition strategy, it requires special attention to budget and schedule issues.

Budget
Since there are numerous activities during the implementation phase, all must be evaluated in terms of budgetary requirements. Again, it is important to plan and coordinate with the schedule to ensure that adequate finances are available when needed. This is especially important when there is a phased implementation, and/or when the implementation is at multiple sites. Planning is necessary to cover any known upgrades/enhancements.

The transition period is important. In many cases, there is a brief period where both a legacy and a new system are running simultaneously until there is adequate confidence that the new system is working properly. There may also be a temporary requirement for extra staff or contract support. Other measures may have to be taken to ensure that daily office functions are performed and services to the public continue while the transition is taking place. If an existing system(s) is/are being replaced, budget planners should also account for removal and disposal of such system(s).

Training is one item that is often miscalculated. Training plans need to consider numerous factors: number of people to be trained, length of training courses, course materials (type, media, etc.), whether course materials are available or need to be developed, type of training (briefings, classroom, laboratory), and logistics (e.g., how many people need to travel, and to where?).

Schedule
Careful schedule planning is necessary to ensure that materials, resources, and support can be delivered when and where needed, and to ensure that the budget reflects the financial requirements to meet the schedule. The
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A key function of the acquisition and implementation plans is to provide the analysis and planning to demonstrate the feasibility of acquiring the system and bringing it to operational status. They also refine the CBA cost and schedule estimates, in particular, the acquisition budget and implementation schedule.

For each option being considered in the investment analysis, there should be at least a high-level analysis to determine and estimate the costs of acquisition and implementation requirements. A schedule must also be estimated since this determines the operational life cycle period. In most cases, the investment analysis should identify acquisition and implementation issues such as site preparation and infrastructure requirements, integration issues, training requirements, and security issues. In general, the investment analysis should provide decision-
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makers with life cycle cost and benefit estimates, and an approximate schedule and budget that is accurate enough for planning purposes.

For project reviews, particularly presentations to the IAB, decision-makers and managers will want to see that there is thorough planning for system acquisition and implementation, covering security, resource and budget issues, risk management, and schedule in order to decide whether to fund it or not.

**Documenting the Business Case**

Once the analysis has been completed and an alternative has been recommended for approval, assemble the findings into a concise report that can be used to support informed decisions. The report should be consistent with other program documentation. It should also address the various topics identified in this volume, including options, assumptions, parameters, performance measures, costs, benefits, risks and uncertainties, sensitivity analysis, and a recommendation. This section shows how to prepare the business case documentation to demonstrate the relevance and financial viability of an IT investment option.

**Identify the Audience**

Early in the process, identify the audience for the cost benefit analysis and for the report. In particular, it is important to determine who are the decision-makers and the stakeholders. In practice, there may be several audiences at various levels or for different parts of the process. In nearly all business cases, the audience will include:

- **The IAB** – the INS review authorities, who view the business case in terms of the standard IT investment ranking criteria. Ultimately, the IAB decisions play a major role in determining which projects are funded.

- **Congress** – which provides funding for projects, is primarily interested in solid justification for projects in terms of economic soundness, meeting organizational goals and objectives, and adhering to the guidelines of federal directives such as the GPRA, the Clinger-Cohen Act, and "Raines' Rules".

- **Other Stakeholders/Sponsors** – This may include system users, other INS groups or managers, INS senior management, other government organizations, private sector businesses, organizations, and other groups impacted by the project. Stakeholders have an interest in the project because they will use it or its products and are primarily focused on their interests being addressed. The IPT should coordinate with stakeholders throughout the business case process, including the presentation of results.
## Developing the Business Case

The report must be tailored to the audience's needs, concerns, expectations, and level of understanding. In most cases, there should only be one version of the business case. The presentation of the business case (briefings) is tailored to the specific audience. There may be certain projects where different audiences are focusing on very different sets of measures. This could result in several differently tailored briefings with corresponding graphics and charts.

### Prepare the Contents of the Report

The complete business case may include a variety of analyses, including a summary of the concept paper (if developed), feasibility study, CBA, risk/uncertainty and sensitivity analyses, alternatives analysis, recommendations, and depending on the review committee requirements, may also include the acquisition strategy and implementation plan.

The following subsections list several key elements that should appear in business cases.

### The Executive Summary

The report should start with a concise executive summary that outlines the major findings of the business case analysis. It should include:

- A clear linking of the project to the Service's business objectives and, where the investment is significant, to the Department's business plan
- Key contextual information, notably, the rationale behind proposing the project (from the concept paper), its goals, objectives, and requirements
- A brief description of the main alternatives analyzed, together with their NPVs (or other statement of value to the organization)
- Most significant costs and benefits, and who the benefits accrue to
- Any other highly significant information pertinent to the recommendation, such as risks and constraints, and any significant acquisition or implementation issue
- An explanation of which option was chosen and why
- Key recommendations (what should be done next), along with any relevant qualifications

### System Context

The system context should provide the reader with a clear explanation of the rationale for undertaking a project, including the problem being addressed, and why and how it is being addressed. The context of the issue includes the following factors underlying the analysis:

- A clear statement of any relevant background
- The mission need and concept of operation
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- Goals and objectives
- Stakeholders, including their role, and how they are impacted by the project
- Ground rules and assumptions

These are the why, how, and for whom behind the project. Presumably, the options, the course of the business case, and the results, are all consistent with the context. If the options or recommendations deviate from-or change-the blueprint, or change the vision, explain why.

Body of the Report

The body of the report provides the background detail to the executive summary. It should include:

- Clear statement of mission need, and analysis and definition of requirements
- Information on assumptions, parameters used, and constraints identified
- Description of each option considered, which options were eliminated in the feasibility study and why, and the strategy behind options being further evaluated
- Definition of benefits, performance metrics, and how benefits were evaluated for each alternative
- Qualitative and quantitative description of costs and benefits
- Cost benefit tables for each option considered, with explanatory notes
- Information on non-quantifiable benefits
- Assessments of the risks of each option, the results of the sensitivity analyses, and the overall conclusions that can be drawn from this information
- Acquisition and implementation plans (schedule, resources, etc.) and issues

Also include supporting data or any background work that went into the analysis, or copies of business case documents or plans used. Graphics and charts can make a document easier to understand. Tables that summarize costs and benefits or compare options will make the report more readable for decision-makers.

Budgetary Requirements/Funding

The costs presented in the CBA may not reflect the full funding requirements of an option because the common costs and benefits are excluded while other costs are valued on the basis of opportunity costs.
Furthermore, costs in the CBA are presented in constant and present value terms. These costs do not reflect real funding requirements that must be provided in budget year dollars (i.e., accounting for inflation). See the *CBA Guide* for a description of constant, present value and budget year dollars and how they are calculated.

The acquisition budget for the project, showing year-by-year funding requirements, should be provided using budget-year dollars. These numbers are derived by calculating the funding requirements by fiscal year, in constant-year dollars, and then multiplying by the appropriate inflation factor for future years. The source for the inflation factor is the OMB inflation rate guidelines, which are updated once or twice a year. If parts of the funding will be provided by different INS budgets, the funding profile should be aggregated by budget. If there is any cost sharing with other government organizations or with the private sector, details of the arrangements should be provided so decision-makers can clearly see the level of funding from each funding source.

**Benefit Realization Plan**

Whenever there is the slightest doubt that the benefits of an investment will automatically accrue, include a benefit realization plan showing how the benefits will be realized. This plan should address the who, what, where, when, why and how of each benefit.

**Presentation of Results**

In addition to documenting the business case, the project team will be usually called upon to formally present the results in briefings, before both review organizations and stakeholders. All INS project business cases will have to be briefed to the IAB, and depending on the project's criticality and characteristics, possibly to other INS or DOJ management. Briefings to stakeholders do not have any specific, formal rules, since each project will have different stakeholders, of different types of organizations, who may have different agendas and interests. Thus, the guidelines in this section refer primarily to briefings to the INS or DOJ.

**Appoint a Presenter**

The project manager should assign the role of project briefer at an early stage of the business case. The presenter should be a person in a management position who has reasonably strong technical and management familiarity with the project, so they can present the business case and respond to basic technical, economic, and management questions. The presenter should be familiar with:

- The goals and objectives of the project
- The business case, and how it was conducted
- The major assumptions
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- The methodology
- The economic factors
- The risks
- The conclusions
- The project acquisition and implementation strategies

Preparation for Management Briefings

The material to be included in the Executive Summary of the report is the basic story that should be presented for management reviews. In addition, the briefing should include a budget profile so the committees can evaluate the financial requirements of the project. The briefer should also be prepared to discuss the acquisition strategy and implementation plan, which demonstrate that the project can be feasibly realized.
### Acronyms and Abbreviations

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<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
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<tbody>
<tr>
<td>B/C</td>
<td>Benefit to Cost Ratio</td>
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<tr>
<td>CBA</td>
<td>Cost Benefit Analysis</td>
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<tr>
<td>COTS</td>
<td>Commercial Off-the-Shelf</td>
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<td>DOD</td>
<td>Department of Defense</td>
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<td>DOJ</td>
<td>Department of Justice</td>
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<td>GAO</td>
<td>General Accounting Office</td>
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<td>GPRA</td>
<td>Government Performance &amp; Results Act</td>
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<td>IAB</td>
<td>Investment Approval Board</td>
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<td>IT</td>
<td>Information Technology</td>
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<td>INS</td>
<td>Immigration and Naturalization Service</td>
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<td>IPT</td>
<td>Integrated Product Team</td>
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<td>ITIM</td>
<td>Information Technology Investment Management process</td>
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<td>IUS</td>
<td>Investment Update Summary</td>
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<td>LCC</td>
<td>Life Cycle Cost</td>
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<td>LCCE</td>
<td>Life Cycle Cost Estimate</td>
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<tr>
<td>NPV</td>
<td>Net Present Value</td>
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<tr>
<td>O&amp;M</td>
<td>Operations &amp; Maintenance</td>
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<tr>
<td>OMB</td>
<td>Office of Management and Budget</td>
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<tr>
<td>OIRM</td>
<td>(INS) Office of Information Resources Management</td>
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<td>ROI</td>
<td>Return on Investment</td>
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<td>ROM</td>
<td>Rough Order of Magnitude</td>
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<td>SDLC</td>
<td>Systems Development Life Cycle</td>
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<tr>
<td>SITD</td>
<td>(INS) Office of Strategic Information and Technology Development</td>
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<td>SOW</td>
<td>Statement of Work</td>
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